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# ADVANCED METHODS OF INCLUDING CLASSES AND OBJECTS IN APPLICATION MODULES SPECIFIC TO BUSINESS ECONOMIC SYSTEMS

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**Abstract:** *The paper presents the advanced methods of including classes and objects in application modules specific to business economic systems. Current systems supported by economic applications are based on modules that define economic flows and are built using interconnected classes and objects to facilitate data exchange. The interfaces specific to classes and objects represent the templates that expose the variables and methods used inside economic applications, thus providing flexibility and efficiency within the modules specific to economic flows. The development of any economic, financial or banking activity cannot be imagined without the use of a strong informational support that ensures the competitive advantage in relation to the other competitors on the market. Information technology offers not only the informational support necessary to run the business in conditions of efficiency, but also solutions for rethinking the way to organize your business in order to maintain competitiveness. Optimizing applications through rewriting means fundamental rethinking and radical redesign of business processes to achieve substantial improvements in terms of costs, quality, decision making speed. This rethinking of the way of doing business is influenced and also finds answers in new IT solutions. The impact of economic applications on the company is felt not only from the external environment but also from within the company. Any organization (company, bank, etc.) assumes the existence of five interdependent elements (components) such as organizational structure, business management and processes, information technology, organization strategy and employees and the culture of the organization. Rethinking the business and adapting the economic applications requires a considerable effort, which supposes the decomposition of modules into classes and objects, the redesign of interfaces and the restoration of functional dependencies for specific business data.*

**Keywords:** *classes and objects for business, advanced interfaces for classes, data from external environment, rewriting business applications, business conditions of efficiency, information technology in applications, organization strategy*

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

## 1. Introduction

The redesign of economic applications means the fundamental rethinking and radical redesign of business processes to obtain substantial improvements in terms of costs, quality, and decision-making speed. This rethinking of the way of doing business is influenced and also finds answers in new IT solutions. The way of doing business within any company is changing (fig 1.1) due to the combined action of the following factors: globalization, high level competition, information has become a key resource, the virtual work space and even the performance of the activity under the conditions of the virtual company, electronic commerce and the existence within the company of personnel specialized in data processing and analysis such as knowledge workers.

Components specific to each organization must be in a state of equilibrium and this state will be maintained as long as there are no significant changes in the external environment or in any of the components. The computer applications component knows a special dynamic. This causes qualitative changes in the other components. The dynamics of the IT component is also felt at the level of the organization's strategy, providing specific means and tools for the analysis and substantiation of the strategy. An economic system represents a set of elements, interdependent components, between which a dynamic interaction is established, based on predetermined rules, with the aim of achieving a certain objective. The dynamic interaction between the elements materializes in the flows established between them, flows involving the existing resources (Tirmizi 2022; Foote 2022).

The system of economic IT applications represents the technical-organizational set of data collection, transmission, storage and processing in order to obtain the necessary information for the decision-making process. The informational subsystem is interposed between the decisional subsystem and the operational subsystem with the aim of providing the necessary information to the managerial staff, representing at the same time a means of communication between the other two subsystems. The information subsystem should not only be seen as an interface between the operating system and the management system, but also as the connecting element between the company's internal environment and its external environment that is economic, financial, banking environment. The main purpose of the information system is to provide each

user, depending on his responsibilities and duties, with all the necessary information (Knight 2022; Ghosh 2022).

The computer system of economic applications represents a part of the information system that allows the collection, transmission, storage, data processing and dissemination of information thus obtained through the use of information technology means and personnel specialized in automatic data processing (Sieja 2020; Karimi 2020).

## 2. Optimizing economic application systems through redesign and decomposition into interconnected modules

The economic application system includes: the set of internal and external, formal or informal information used within the company, as well as the data that was the basis for obtaining them; the software necessary for data processing and information dissemination within the organization; procedures and techniques for obtaining (based on primary data) and disseminating information; the hardware platform required for data processing and information dissipation; staff specialized in data collection, transmission, storage and processing.
The economic application system system is structured in such a way as to meet the requirements of different groups of users:

- Management of factors at the level of strategic, tactical and operative management; • the personnel involved in the data collection and processing process;
- The staff involved in the process of scientific research and the design of new products and manufacturing technologies.

Along with the definition of the business strategy, it is necessary to define the IT system strategy and this 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;
- Economic application systems are open and flexible, constantly adapting to the requirements imposed by the dynamic environment in which the company operates;
- Promoting IT solutions supports the organization in business consolidation and development (eg: electronic commerce, e-banking, etc.);
- The computer system provides the necessary information to control the fulfillment and adaptation of the operational and strategic plans of the organization;
- The organization must know and control the risks related to the implementation of new technologies and the adaptation of the IT system to the new requirements;

- Establishing some standards at the level of the IT system that are meant to specify the characteristics and hard and soft performances of the components to be purchased and which methodologies are to be used in the development of the system.

Within the computer system of a company we find: the computer subsystem of accounting, the computer subsystem regarding stock management, the computer subsystem regarding the records of deliveries, etc. Within the computer system of a bank we find: the computer subsystem of accounting, the computer subsystem regarding current account operations, the computer subsystems regarding the management of banking products and services offered to customers such as deposits, loans, certificates of deposit, etc.), the computer subsystem regarding payment operations through cards and so on.

Interorganizational subsystems designed to ensure information flows between:

- Organization and its partners such as suppliers, customers, bank and so on. Ex: e-banking, electronic commerce, etc. a "Mother Company" and its organizational subdivisions.

- Systems intended for management (MSS - Management Support Systems) have the role of providing information with the aim of supporting and assisting managers in making decisions and include (Korab 2019; Khan 2022).

- Systems intended for current management (MIS - Management Information Systems): are computer systems with the role of providing managers with the information necessary to monitor and control business processes as well as to anticipate future performances.

- Decision Support Systems (DSS – Decision Support Systems): represent interactive IT systems with the role of assisting managers (strategic plan) in solving semi-structured problems using specialized models and databases on well-defined problems for this purpose.

- Executive information systems (EIS – Executive Information Systems): represent information systems designed to provide: fast and selective access to internal and external company data, information on the critical success factors determining the achievement of strategic objectives, calculation facilities and special graphic representations .

Systems intended for the operational level that include:

- Systems intended for office activity (OAS - Office Automation Systems): they are used mainly by the people involved in the data processing process (officials, secretaries, accountants, etc.) but also by managers, their role being to collect, process, store and transmit information using IT means. 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 systems), office activity management (electronic diaries, accessories, etc.).

- Transaction Processing Systems (TPS – Transaction Processing Systems): they are specialized in retrieving, storing and processing data corresponding to daily transactions, routinely ensuring the current updating of the database: they are characterized by the repetitive nature of the processing and their reduced complexity, the large volume of processed data; are intended for the current activities carried out in the functional departments of the organization; they are used by operative staff from the functional departments.

Process Control Systems:

- Systems intended for knowledge management (KWS – Knowledge Work Systems): allow 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, for the design of new products), or other specialists - analysts and economic, financial, legal advisors, they being creators of knowledge-generating information.

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

Groupware or collaboration software represents the specialized software for carrying out the activity within a virtual work group. Groupware uses the communication facilities offered by the organization's intranet, thus creating the possibility of parallel work and interactivity between group members (Korab 2019; Foote 2022).

Analyzing the structure of the global IT system of an organization, it can be make the following classifications related to its components:

By coverage area:

- Economic application subsystems covering distinct areas, defined according to functional criteria within the organization:

- Accounting subsystem o Production subsystem o Research subsystem o Commercial subsystem

- Human resources subsystem

Ex: Within the computer system of a company we find: the computer subsystem of accounting, the computer subsystem regarding stock management, the computer subsystem regarding the records of deliveries, etc.

Within the computer system of a bank we find: the computer subsystem of accounting, the computer subsystem regarding current account operations, the computer subsystems regarding the management of banking products and services offered to customers (deposits, loans, certificates of deposit, etc.), the

computer subsystem regarding payment operations through cards and so on (Knight 2022; Tirmizi 2022).

Interorganizational subsystems designed to ensure information flows between:

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

Depending on the nature of the supported activities:

- Systems intended for management (MSS - Management Support Systems) have the role of providing information with the aim of supporting and assisting managers in making decisions and include.

- Systems intended for current management (MIS - Management Information Systems): are computer systems with the role of providing managers with the information necessary to monitor and control business processes as well as to anticipate future performances.

- Decision Support Systems (DSS – Decision Support Systems): represent interactive IT systems with the role of assisting managers (strategic plan) in solving semi-structured problems using for this purpose models and specialized databases on well-defined problems.

- Executive information systems (EIS – Executive Information Systems): represent information systems designed to provide: fast and selective access to internal and external company data, information on the critical success factors determining the achievement of strategic objectives, calculation facilities and special graphic representations.

## 3. Usage of data sets in application modules

For example in the cartesian product of n sets. The sets below are given and their cartesian product is required.

$A_1 = \{1, 2, 3, \ldots, k_1\}$
$A_2 = \{1, 2, 3, \ldots, k_2\}$
……
$A_n = \{1, 2, 3, \ldots, k_n\}$
Example: $A_1 = \{1, 2\}$
$A_2 = \{1, 2, 3\}$
$A_3 = \{1, 2, 3\}$

$A_1 \times A_2 \times A_3$ = {(1, 1, 1), (1, 1, 2), (1, 1, 3), (1, 2, 1), (1, 2, 2), (1, 2, 3), (1, 3, 1), (1, 3, 2), (1, 3, 3), (2, 1, 1), (2, 1, 2), (2, 1, 3), (2, 2, 1), (2, 2, 2), (2, 2, 3), (2, 3, 1), (2, 3, 2), (2, 3, 3)}.

For the solution, the ST stack and a vector A containing the numbers k1, k2, ...kn are used. We use the backtracking method, slightly modified for the following reasons:

a) Any element at level k of the stack is valid, which is why the valid procedure does nothing but assign the value TRUE to the variable ev.

b) The upper limit on level k of the stack is given by A(k).

The design of the algorithm results from the following:

The algorithm presented here is like backtrackinglogic. The question makes sense because the return mechanism is absent. This algorithm is also backtracking, but "degenerate".

```
Private Sub Algorithm1()
  Dim a As vector
  cit_n "n=", n
  cit_data "a", n, a
  pattern " the multitudes are : ", n, a
  back_prod_cart
End Sub

Sub cit_n(mes As String, nnn As Integer)
  Do
   nnn = InputBox(mess, y)
  Loop Until n > 0 And n < 100
End Sub


Sub cit_data(mes As String, n As Integer, a As vector)
  For i = 1 Ton n
   a.v(i) = InputBox(mes + "(" + Str$(i) + ")=", y)
  Next
End Sub

Sub pattern(mes As String, n As Integer, a As vector)
  string = ""
  For i = 1 Ton n
   sir = sir + Str$(a.v(i)) + ","
  Next
  MsgBox mes + " " + string
End Sub

Sub back_prod_cart()
  Dim k As Integer
  k = 1
  init k, st
  While k > 0
   Do
    succesor_prod am_suc, st, k
    If am_suc = True Then
     valid_prod ev, st, k
```

```
    End If
   Loop Until (Not am_suc) Or (am_suc And ev)
   If am_suc Then
    If solution(k) Then
     pattern_r
    Else
     k = k + 1
     init k, st
    End If
   Else
    k = k - 1
   End If
  Wend
End Sub

Sub valid_prod(ev As Boolean, st As stack, k As Integer)
  ev = True
End Sub
Solution function(k As Integer) As Boolean
  If k = n Then
   solution = True
  Else
   solution = False
  End If
End Function

Sub succesor_prod(am_suc As Boolean, st As stack, k As Integer)
  If st.ss(k) < a.v(k) Then
   am_juice = True
   st.ss(k) = st.ss(k) + 1
  Else
   am_juice = False
  End If
End Sub
Sub init(k As Integer, st As Stack)
  st.ss(k) = 0
End Sub
```

Data that are present in sets of data may by used with special algorithms that follow the logic backtracking. Using data from datasets in application modules requires complex processing to retrieve, sort, or apply various arithmetic operations. Their integration into application objects specific to object-oriented programming requires additional efforts to create specific data structures and use them optimally and easily (Khan 2022; Foote 2022).

## 4. Conclusions

In many economic organizations there are systems for processing transactions that are specialized in retrieving, storing and processing data corresponding

to daily, routine transactions ensuring the current updating of the database: it is characterized by the repetitive nature of the processing and their reduced complexity, the large volume of processed data ; are intended for the current activities carried out in the functional departments of the organization; they are used by operative staff from the functional departments. On the other hand, there are systems designed for knowledge management that allow 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 design applications - for the design of new products), or other specialists - analysts and economic, financial, legal advisers, they being creators of knowledge-generating information (Khan 2022; Tirmizi 2022). The existing data in an economic organization make the connection between the two systems, and the encapsulation helps to transmit knowledge, but also the use of predefined templates as inputs for various modules. The level of knowledge must be adapted to the requirements of users who use real data from the economy of the external environment which is in constant change and adaptation.

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