MAKING DATA FLEXIBLE FOR APPLICATIONS THAT USE DATABASES FOR BUSINESSES

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Abstract
The paper presents methods of making data flexible for applications that use databases for businesses in the competitive environment where the exchange of data and the forecasts are making the decision processes much easier. A star warehouse model for business is flexible at the physical level in the sense that offer the posibility to add new dimensions or new measures and at the presentation level permits to build numerous reports that can reflect different scenarious by simply changing some key values an give other perspectives to the decision maker. An information system for business has a physical architecture that mirrors all the main components, from supply chain to sales and also has an interaction layer that may possible to evaluate an before situation and also to build scenarious that make possible future production that indicate the growth. An information system that uses databases are very flexible and offers many advantages such as controlling flows beetwen the main components of a company such as Supply, Production, Products, Accounting, Financial, Sales, Marketing, HR and Fact business. In a company there are exchanges of informations between the main departments and a database can record all these informations and may be used later in different types of queries. To a business company the choice of a database application designed and implemented as data warehouse star model, helps in analyzing and the surveillance of the main information flows such as finacial and operational.

Keywords*: Database for business, business intelligence tools, business model, data warehouse star model, SQL queries and reports, rollup and drill down objects.*

JEL Classification: C63, C68, C88, C81, C87,C83,C80

1. Introduction

In an economic system an information system connects both driving directions between an system manager and executive or decision-making system. Any economic system requires certain operational components can be any system of production of goods or services.

Led system provides system-specific activities to achieve the overall objective for which it was created. Led system consists of all those involved in operational undertaking and uses information contained in the information system or use of information system rules of behavior. The leader provides forecast command, organization, coordination and control their activities to achieve the objectives sistemului. It consists of all actors that secure and adapt objectives and business strategy using information contained in the information system. The driver information system intervenes in order to adapt to the objectives and business strategy, changing nature of information and rules of behavior [2], [4].

Given the dynamic nature of the economic system, objectively an information system must be in continuous adaptation and improvement. Elements of the economic system may represent interference system information but it is a database system there is the possibility of adapting and consistent operation of the two systems. Information system regarded as a reverse connection cybernetic system are decisions to maintaining economic system as a whole or decisions taken by the management information subsystem for the proper functioning and improve it.

Feedback is achieved through the necessary economic information management system for both economic decision making and for monitoring their effects. Information system has autoregulation capacity so that it is always consistent with it and reflects the economic system. Forecasting functions, organization, coordination and control of the system attributes ruler in modern society become increasingly more complicated. Therefore there is a need in the management methods which allow information flows to and from the dominion led system, which enables management and notification of problems that may occur in the future. The enterprise is put in a position to process all these information flows and to choose their own path of much more options that you have available. These complex possibilities of action translates into a higher level of information flows entering and leaving the undertaking, streams to be analyzed and controlled by company management. Decisions must underpin developed outlining several options simultaneously evolving to include criteria of time, money and performance [1], [5].

2. The specification of database information systems and the design of elements

From the definition of information system shows that the overall objective pursued is the treatment and recovery of information at all levels in the system that creates and develops.

Methods, means and techniques used in achieving the objective of characterizing the processing of data. We have a processing manual, automatic or interactive.

Although at first calculatorele electronics were used exclusively for calculations technical-scientific, since the seventh decade of our century, they are used on a larger scale for automated processing of data on economic processes and phenomena; solve automated means of problems arising in decision making. Automatic Data Processing has emerged with the use of computers for information in making electronic processes. Computer system is introduced for defining a set of three definitions universally accepted, but focusing on one or the other traits, complementing each other. When using computers in the information system electronics prevails, says that he is a computer system [3], [6].

• A system can be defined as a set of technical and organizational automation of the collection and processing of information for deployment management process in order to ensure the greatest possible efficiency respective economic and social activity.

• The component information system that ensures, based on use computers and the first electronic computers, rational treatment of data and information, with increased efficiency, is a computer system.

The computer system is associated with an information system and is required subordinate decision-making. By treating data computing errors are eliminated information that negatively affects the quality of their activities. The computer system as part of the information system should be structured as a system with two control loops. The main loop adjustment reflects the main influences of the environment: linkages with banks, beneficiaries, etc. Secondary loop is self-regulating loops which deal mainly internal disturbances in the system. System structure with two control loops of the computer system is necessary and sufficient for the system to be used as a tool of management.

Under a market-orientated activity, business strategy may change substantially depending on the economic circumstances have arisen. If due to some disturbance of this kind, the leader reassess its decision primary (original plan), may envisage a modified form of the initial target. In this case, when during the implementation of the decision, both initial and final shape have changed, we can speak about the computer system as a bivariate system.

The computer system consists essentially of the following categories elements:

- Computers and other equipment;
- Methods and techniques for treating data and information;
- Organized collections of data;
- Procedures and data processing programs;
- Specialized staff;

Within systems, electronic computer becomes a factor support analysis and decision of the utmost importance by solving optimization problems, both in the development of work programs, and during their execution. A computer system is designed through collaboration between specialists in related fields and the achievement of an information system is a complex, lengthy and activities that require specific analysis, design, programming and implementation. The information system should become, by introducing the system, instrument control and self-regulation of the economic system. The overall objective is to increase economic system reliability study [1], [4].

From the practical work of making systems emerge the following principles for achieving systems.

1. The system user, which implies:
   - Permanent user participation in all stages of the system;
   - Providing user-oriented documentation in a language accessible to him;
   - Approval of all proposals made by the user in the project;
   - Responsible for the implementation of the future user, the accuracy of data used for staff training necessary system operation;
2. The key issue is the people not the equipment, and in particular systems analysts, designers, professionals who have a decisive influence on how to achieve systems.
3. Computer systems must be justified in terms of quantity and quality, as it represents significant investment.
4. Making information system is an iterative process, which means that only the general must first set, then gradually detailing being done in several iterations.
5. When we can not plan something that we can do the right thing, principle applies not only in computer science. By virtue of this principle must be constantly monitored and updated planning system to achieve initial measure. Also, special attention should be paid to how staging works and size steps that we want to achieve.
6. Procedures manuals are as important as the programs, depending on the duration of their correct design implementation and operation of system.

7. The transition from the old system to the new system is itself a system and should therefore be treated with caution. The system designer has actually faced three systems: the old, the new and the one who makes the transition from the old to the new way of working.
8. The system must have good documentation at all stages of implementation.

Systems database informations are characterized by a life cycle that begins with the decision to undertake a fresh SI to better meet new user requirements and ends with the decision to replace the existing SI with a new, more efficient. The life cycle takes place in stages within each phase being defined and specific activities.

From the beginning we mention that regardless of historical or methodological step, the systems are approached through their life cycle.

They appear develops and decreasing perish, or a new cycle improves, giving rise to another version or a new system. Changes in technology and methods of information systems approach were reflected in the systems development life cycle, either by changing its stages, either by changing their optical scroll. For example, object-oriented approaches with systems were launched new models of the life cycle. By going through the literature, it appears that the number of phases / stages ranging from three (analysis, design, implementation) to over twenty. There are several models of the life cycle, many of them knowing evolving over time. For example, the waterfall model provides several stages of the life cycle sequentially down menus but was allowed to return to the stage previously browsed need to remove the shortcomings identified in the higher stages of the life cycle [2], [4]. Life cycle stages of a cascade system in the model are:

1. Analysis and definition of requirements - defined goals, services and restrictions that must meet the computer system, presented in a way that can be understood by both staff and users of the system design.

2. The system and software - establishing the requirements for hardware, software and overall system architecture development. The functions of the information system will be represented so that it can be transformed into one or more executable programs.

3. Implementation and unit testing program - designing software from the previous step is translated into a lot of programs or program modules and ensuring that each program or module meets its specification.

4. Integration and system testing - integration and testing programs and software modules as a complete system to ensure that the information requirements are met. After testing the system it is delivered to the user.

5. Operation and maintenance of the system - is the phase where the computer systems is actually used by the beneficiary and are discovered and

resolved any errors and omissions in the design and programming of initial data requirements.

Operations are performed on data from the moment of their appearance, to generate meaningful information relevant and are referenced together by the notion of cycle processing, which comprises five stages: data collection, data preparation, data processing, maintenance files and getting information out.

Data collection phase comprises two fundamental activities:

- Observing the environment that generates the data or by a human observer, or by the various equipment;
- Recording data, either by writing them in the source documents, either by capturing their different forms with special equipment.

Data preparation stage consists of a number of operations performed on the data to facilitate further processing, namely:

- Data classification, involving assigning identification codes (account symbol, code section, etc.) so that data to be included in relevant subsets;
- The grouping of data that is accumulating similar inputs to be processed group;
- Verification of data encompasses a variety of procedures to control the accuracy of data before they are processed;
- Sorting the data by which data groups are arranged in groups of records, ordering numerical criteria, alphabetical or alphanumeric time;
- Coupling two or more batches of records into one;
- Transmission of data from one point to another;
- Transcribing data from one form to another, so as to make the transition from handwriting in the documents typed or written in specific environments.

Phase data processing may include activities such as:

- Calculations include some forms of mathematical treatment of data;
- Subject to examination simultaneous comparison of two or more types of data including a logical link (ex. The final balance and the final);
- Synthesis is an important activity which merge the information;
- Filtering is another operation that extracted data to be amenable to the next;
- Restoration, which are made in-memory data in a form accessible to man, for further processing human or a computer readable form all.

In the maintenance phase of files there are several activities, among which:

- Memorizing (storing) data for use in future;
- Updating the data stored so as to surprise the latest events;
- Indexing data to facilitate an easy retrieval them;

- Protection of stored data, comprising a wide variety of procedures and techniques for preventing destruction or unauthorized access.

The last phase of the cycle of data processing of output information is obtained. Output information can be found in one of three forms: documents, reports, answers to questions. Most times, no data are passed through all activities and some of them can not pass through all five phases.

Database systems are integrated systems that create and maintain a single database of primary documents, which will then be engineered for specific customer situations.

Database information system involves the following four components: the areas of management, data models, rules management.

Management areas correspond to activities within the firm: personal activity, production activity, trade, financial and accounting, research and development. The data represents the raw material to be processed in the computer system to obtain the necessary information to take decisions at all levels of management: operational, tactical and strategic. Management models grouped domain-specific procedures and management rules define the processes that are performed on the data and use information in accordance with the objectives of the system. Management information system brings together information subsystems specialized fields between which manifests specific interactions. Each sub-group is defined processes homogenous information specific to a certain area.

In each subsystem will be defined distinct applications corresponding to these activities. In turn applications consist of procedures decompose into modules representing the code sequences by which it is independent of the procedure. A procedure for the update operation will decompose in the following modules:

- Coordinator of the update function module;
- Module to perform the function of adding recordings;
- Delete function module records;
- Module for editing by records from the database.

Methodologies are sequences of individual steps which help to achieve the final product, in our case the computer system. The methodologies involve the use of several techniques such as direct observation and interviews with old information system users.

The techniques are procedures applied in order to ensure completeness and intelligibility of a work for other team members.

Making information systems is a complex endeavor that combines a large number of activities: analysis, design, implementation, operation. In addition, it claims human, material and financial large, a considerable period of time. The effective use of these resources in order to obtain a computer system imposed ordering this complex process in a succession of

phases and sub-phases well established and the use of appropriate methods and techniques. These observations led to the outlining methodologies for achieving systems [1], [3].

Between the various stages of implementation of information systems there is an unbreakable bond, bond reflected that logically and practically quality carrying out certain activities in previous stages and phases decisively influences the quality of the activities of the following step.

3. Developing an informatics system based on a relational database for production designed as a data warehouse

A business model for a data warehouse implies the description of the main components such as: Supply, Production, Products, Accounting, Financial, Sales, Marketing, HR and Fact business. In building a data warehouse is based on the analysis of data. Extract information in order to obtain information for decision making. Basically there are two steps: designing and populating data. Design is the stage where the data warehouse model is chosen, depending on the complexity of the system real user requirements and data structure existing in the company such as databases, Excel spreadsheets and so on [3], [5].

Building a data warehouse there are three models: type star, snowflake patterns type and constellation type models. Conceptual models are multidimensional and designed to organize data necessary decision-making process on issues. The models may change depending on the context, presenting the data in a structure bed, easily designed and accessible to end users.

In such a model is highlighted:

- quantitative data centralized called measures of activity
- quantitative criteria for centralized aggregation, referred sizes
- relational table that stores the measures identified by the facts dimensions is called table
- Tables where aggregation criteria has explicit codes, called type tables list. Facts associated table.

The star is the type of aggregation criteria when codes are explained in type tables list. Using data from lists, star type structure enables higher levels of aggregation on the initial size [4], [6].

Data warehouse star

The constellation type contains several schemes that use the same type star catalogs. The advantage is that the same warehouse can store different facts that have certain common coordinates and therefore share the same lists.

Deposit constellation

The type is snowflake if any alternative classifications for the same code by integrating undersize and alternative dimensions. To analyze the evolution of the value of Supplies Company based on several criteria required of users, you can define a data warehouse type star.

In figure 1 is described a star warehouse model for a business:

In such a model the dimensions have a corresponding key in the fact tables (ex. Id_financial – primary key from Financial has a corresponding key in Fact business – foreign key). This model permits to create complex query by simply choose the attributes from dimensions and a measure from the fact table. It also is possible to create graphics based on queries that contain attributes from dimension tables and measures from the fact table.
Inserting data into dimensions can be made through an insert SQL command:

```
INSERT INTO MARKETING (ID_MARKETING,
MARKETING_CAMPAIGN, MARKETING_TARGET,
CAMPAIGN_START_DATE, CAMPAIGN_STOP_DATE) VALUES (1,
'CAMPAIGN 1', 'CAMPAIGN TARGET 1', '11/1/2016', '11/24/2016');
```

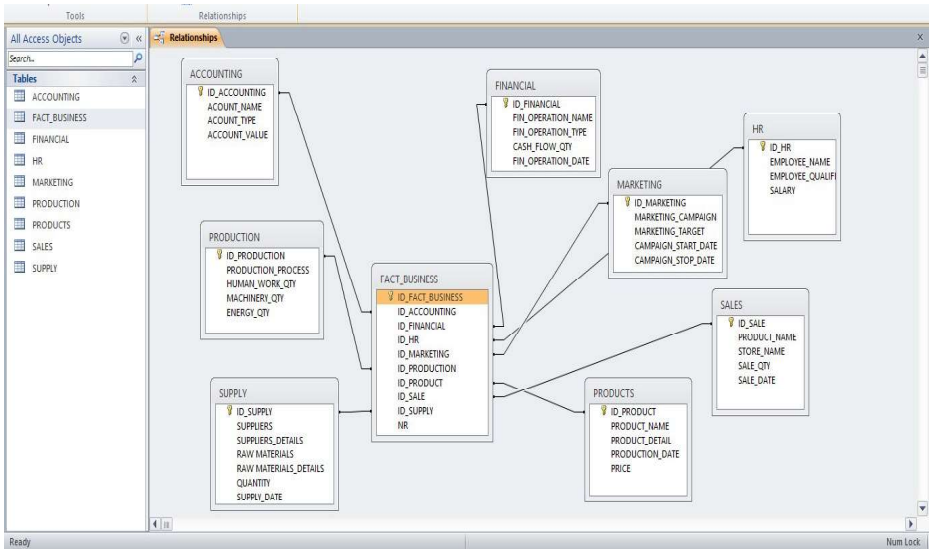

Figure 1 – A star warehouse model for business

Inserting data into the fact table is made also through an insert SQL command based on a trigger fired when inserted data into dimensions is:

```
INSERT INTO FACT_BUSINESS (ID_FACT_BUSINESS, ID_ACCOUNTING,
ID_FINANCIAL, ID_HR, ID_MARKETING, ID_PRODUCTION, ID_PRODUCT,
ID_SALE, ID_SUPPLY, NR) VALUES (1, 1, 4, 5, 3, 1, 2, 5, 4, 1);
```

Creating a query into a star model warehouse:

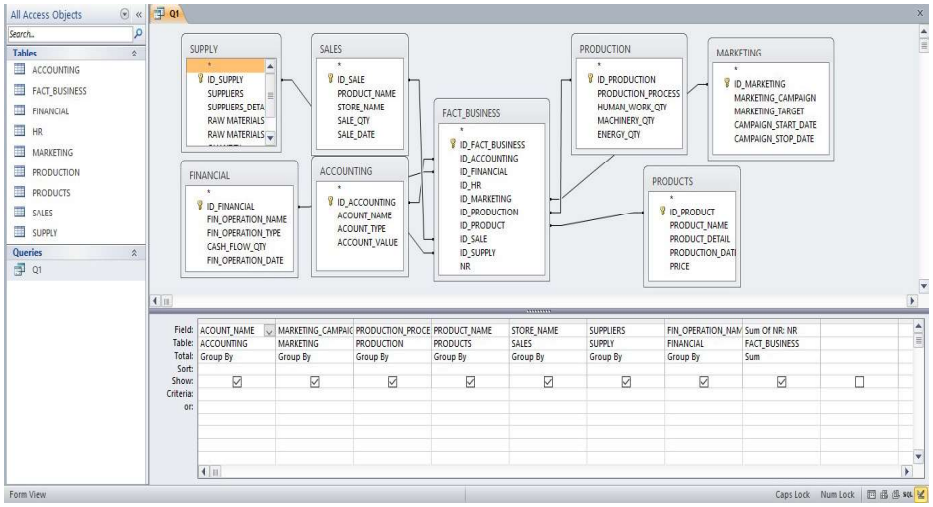

Figure 2 – Building a query in a star warehouse model for business

The query code:

```
SELECT DISTINCTROW ACCOUNTING.ACOUNT_NAME,
MARKETING.MARKETING_CAMPAIGN, PRODUCTION.PRODUCTION_PROCESS,
PRODUCTS.PRODUCT_NAME, SALES.STORE_NAME, SUPPLY.SUPPLIERS,
FINANCIAL.FIN_OPERATION_NAME, Sum(FACT_BUSINESS.NR) AS [Sum
Of NR]
FROM SUPPLY INNER JOIN (SALES INNER JOIN (PRODUCTS INNER JOIN
(PRODUCTION INNER JOIN (MARKETING INNER JOIN (FINANCIAL INNER
JOIN (ACCOUNTING INNER JOIN FACT_BUSINESS ON
ACCOUNTING.[ID_ACCOUNTING] = FACT_BUSINESS.[ID_ACCOUNTING])
ON FINANCIAL.[ID_FINANCIAL] = FACT_BUSINESS.[ID_FINANCIAL])
ON MARKETING.[ID_MARKETING] = FACT_BUSINESS.[ID_MARKETING])
ON PRODUCTION.[ID_PRODUCTION] = FACT_BUSINESS.[ID_PRODUCTION])
ON PRODUCTS.[ID_PRODUCT] = FACT_BUSINESS.[ID_PRODUCT]) ON
SALES.[ID_SALE] = FACT_BUSINESS.[ID_SALE]) ON
SUPPLY.[ID_SUPPLY] = FACT_BUSINESS.[ID_SUPPLY]
GROUP BY ACCOUNTING.ACOUNT_NAME, MARKETING.MARKETING_CAMPAIGN,
PRODUCTION.PRODUCTION_PROCESS, PRODUCTS.PRODUCT_NAME,
SALES.STORE_NAME, SUPPLY.SUPPLIERS,
FINANCIAL.FIN_OPERATION_NAME;
```

Based on the queries it can be built reports that helps the decision makers to choose what direction should have their actions. An example of a report based on the query above is represented in the image bellow:

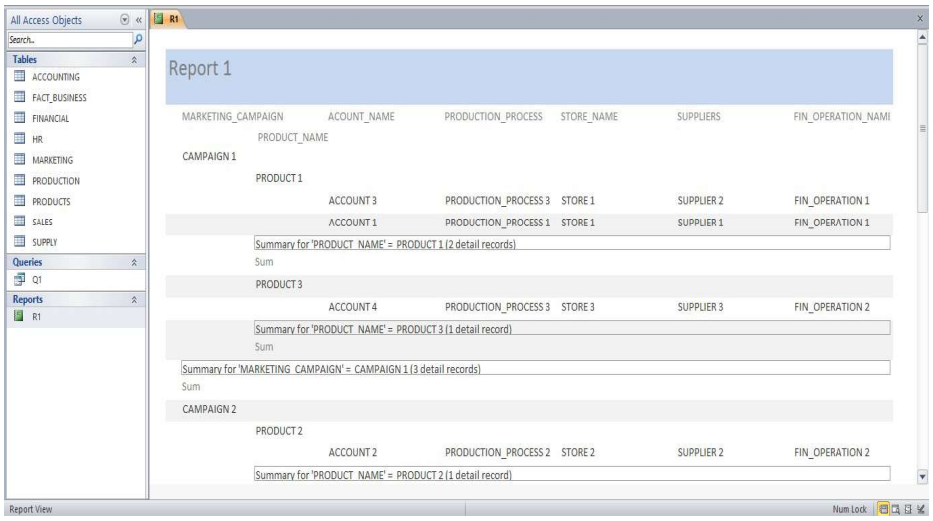

Figure 3 – A report based on a query in a star warehouse model for business

This kind of warehouse for business can improves the information flows beetwen the main components of a company such as Supply, Production, Products, Accounting, Financial, Sales, Marketing, HR and Fact business. The outputs from one module may be the inputs for another and so the cash flows and the operational flows are under control and the business manager can have a general idea about the connections made inside his company. This flexibility is offered by the business intelligence tools in obtaining various results and create many types of reports for choosing the proper solution [4], [6].

Conclusions

An information system that uses databases are very flexible and offers many advantages such as controlling the flows beetwen the main components of a company such as Supply, Production, Products, Accounting, Financial, Sales, Marketing, HR and Fact business. In a company there are exchanges of informations between the main departments and a database can record all these informations and may be used later in different types of queries [1], [3]. A good management relies on store data in large databases shaped as data warehouses that contain dimension tables and fact tables that have measures available for complex queries and reports. A star warehouse model for business is flexible at the

physical level in the sense that offer the posibility to add new dimensions or new measures and at the presentation level permits to build numerous reports that can reflect different scenarious by simply changing some key values an give other perspectives to the decision maker. An information system for business has a physical architecture that mirrors all the main components, from supply chain to sales and also has an interaction layer that may possible to evaluate an before situation and also to build scenarious that make possible future production that indicate the growth. [2], [5]. In the competitive environment of business the companies that have data stored in information systems based on databases have advantages in knowing the inside the exchange of data beetwen the main departments and so it can improve the disfunctions that may apear.

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