Conference Proceedings | 7-8 April, 2017
GLOBALIZATION – ECONOMIC, SOCIAL AND MORAL IMPLICATIONS
DOI: 10.5281/zenodo.581790

The Management of Businesses through Information Systems

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Abstract: The paper presents ways to manage businesses through information systems that can store data into databases and makes possible the creation of complex queries which will help managers to make an appropriate decision based on facts that express the business environment.Unlike conventional systems based on files for automatic data processing, information stored in databases so that data is not duplicated. However, sometimes, to achieve high performance in terms of response time is accepting some redundancy data. Sharing data refers not only to the aspect of ensuring multiple users access the same data, but also the opportunity to develop applications without modifying the database structure. Sharing problems arise at a higher level for DBMS enabling networking sites. An information system for business that is based on databases can resolve the issues of manipulation of large quantities of data that are provided from different departments such as supply, production, accounting, marketing and other areas. Based on these data can be built complex reports that allow the managers to create different scenarios with various inputs and multiple outputs on which decisions may be taken. Analysis and complex queries are provided by tools that extract certain amount of data in specific periods of time and so it is possible to create forecasts and scenarios that make the process of decision more efficient.

Keywords: Management information systems, business model, data warehouse star model, SQL queries and reports, economical analysis.
JEL Classification: C23, C26, C38, C55, C81, C87

1. Introduction

Management information system provides, obtaines and provides information requested by the user using IT means, to base decisions on a specific area within the company. Current management systems are integrated. They are characterized by the principle of introducing multiple unique data and processing them according to the needs of specific customer information. Sistem information integrated for accounting is characterized by placing unique data taken from primary documents that maintains a unique database of accounting which will subsequently be exploited in ensuring the specific work of financial accounting and those specific management accounting responding thus processing requirements of all users. A system is a set of elements (components) interdependent between establishing a dynamic interaction based on pre-established rules in order to achieve a certain objective. Dynamic interaction between elements materializes flows established between these flows involving existing resources.

Systemic work in the field led to the definition of a model that promotes systemic vision of the undertaking which it considers consists of three subsystems:

- decision subsystem leverages information provided by the information subsystem in decision making.
- subsystem information plays a double role: on the one hand provide all information necessary to make decisions on all levels of responsibility, management and control on the other hand provides communication channels between other subsystems, since decisions made by subsystem manager are transmitted makers execution by information subsystem (down stream).
- subsystem operation (within which carries economic processes specific to the activity of the economic entity) occurs collect data which are then transmitted information subsystem (upstream) for storage and processing of data required to obtain the information used in decision making at subsystem level decision (driving).

Subsystem requires specific information necessary to support decision-making on the part of strategic decisions and on the other tactical and operational decisions.

ERP (Enterprise Resource Planning) is a set of interrelated information subsystems for human resource management, material and financial resources of

a company or public institution. ERP systems are open systems that works closely with corporate partners (customers, suppliers, public institutions, financial-banking etc.) [1], [5].

2. The atributes of information systems and the design of components

Management systems are based on the information and its support or are defining by the starting at the function management information system to be achieved. In the first case, management information systems means all information used within the company, means and procedures for identification, collection, storage and processing of information. In the second approach to define management information systems starting from its purpose, namely providing information requested by the user to the desired form and at the right time to base decisions. Management information systems involve defining: management areas, data, models, rules management.

Management areas corresponding to each of the activities carried out within the firm homogeneous, commercial, manufacturing, personnel, financial accounting - taking into account the interactions between them. Moreover, addressing these areas is done in a hierarchical vision leading to identification of the following levels:

– Transaction in which operations are performed Elementary;

– Operational home of the current operations, decisions are taken at this level current of routine;

– Tactical corresponding control activities and decisions in the short term;

– Strategic decisions characteristic long-term and / or employing global company.

The data represents the raw material of any management system. All data are considered handled and processed regardless of their nature, their formal or informal or supports on which it is located. Management models regroup their own a domain procedures. Such a model contains data for:

– Accountant, specific financial accounting;

– Technology domain specific manufacturing production;

– Sales specific commercial field.

Management rules permit processing and use information in accordance with the objectives of the system. Within a company that manufactures and / or commercial can be identified following management rules:

– Supply is achieved when the stock actually stock falls below normal;

– A raw material is stored in one or more management;

– Second quality products price is reduced by 8% etc.

– Evaluation of materials is done according to the first in / first out method;

The notion of the domain derrive from the concept of subsystem management information determined by functional criteria, which are picked other two concepts: the management and rules management. Management information system provides rules for obtaining and providing information requested by the user using IT means, to base decisions on a specific area within the company. Current management systems are integrated. They are characterized by the principle of introducing multiple unique data and processing them according to the needs of specific customer information [2], [4].

For example a system information integrated accounting system is characterized by placing unique data taken from primary documents that maintains a unique database of accounting which will subsequently be exploited in ensuring the specific work of financial accounting and those specific management accounting responding thus processing requirements of all users.

The realization of computer system information can opt for one of the following solutions:

– a centralized computer system;

– a decentralized system;

The centralized IT is characterized by the fact that the whole process of storage and data processing and system development is performed at a single location where there is only one computer system, usually a mainframe that stores a database unique and all application programs. Users interact with the system through terminals.

The advantages of centralization:

– Effective control over the use and development of software;

– Control over data security and integrity;

– Resource sharing hardware, software and data between users;

– Eliminating the risk of incompatible hardware and software in the system;

– Promote easily standards (technical, design, procedural etc.) throughout the system;

– Rendering the services requested by the users computing power of the central system such as mainframe.

Centralization disadvantages:

– Fall of the computer system blocks all users;

– Corruption of data and programs, deliberate or accidental, affecting all users;

– The system may be slow and inflexible to the needs of users, often insufficiently adapted to local needs or group of users;

– Can achieve a high response time when multiple simultaneous requests users.

Decentralized computer system is characterized by the fact that data, software and computing power are dispersed in different locations, even geographically dispersed of the organization. Processing is done on personal computers or in a network of independent local.

The advantages of decentralisation:

– Data is stored and processed locally;

– Software is better adapted to local needs;

– Damage hardware, software or database at a location take not affects other locations;

– System configuration can be designed according to the needs of various departments within the organization or even local users;

– Greater autonomy and motivation to the local user.

The disadvantages of decentralisation:

– Risks related to hardware and software incompatibilities between different locations;

– Inherent appearance of duplication of data and software in different locations;

– Difficulty of complex projects at local level;

– The risk of fragmentation of IT policy;

– Higher costs compared to the centralized system.

Decentralization must be such as full responsibility and authority for decentralized functions are belonging to the local management; one to ensure alignment with the standards used to level and overall organization;

At central level should be achieved:

– a wide development strategy and organization;

– a communications management within the local network of the organization;

– a data management;

– a disaster recovery.

Until a few years ago it was geared towards decentralization trend, but currently there is a clear trend towards centralization oriented, especially due to the emergence of networks with a large number of users such as internet [3], [5].

Architecture promoted for realization of decentralized systems is client-server architecture characterized by the fact that applications and data available to users are dispersed on different hardware depending on the number of users who should have access and computing power needed.

The hardware components are:

– Workstations, PCs, used by individual users;

– Departmental servers shared by users characterized by the same processing needs;

– Central server shared by all users.

Software exploited in the organization is as follows:

Applications to the customers:

– Running on the workstation available to the client;

– Exploiting the data stored on the client;

– They are represented in the main processors tables, word processors, databases exploiting applications.

Departmental applications necesitates:

– Departmental server running on;

– Exploiting the department, the data stored on its server;

– Are shared by users of the same department;

Applications to the organization level necesitates:

– Running on a central server;

– Exploiting the data of general interest stored on the central server;

– Are shared by several departments' users;

– Require higher processing power.

An activity for design and implementation of management systems requires performing rigorous tests and the following of the principles:

– Global approach to solve the problem;

– Using a uniform methodology in the design and implementation of information system;

– Application of the most modern solutions and methods for the design and implementation of information system;

– Structuring information system taking into account the organizational structure of the company.

– The direct participation of beneficiary future activities of analysis, design and implementation of information system. Such participation ensures the clear design and specifications necessary to validate the solutions proposed by designer staggered However ensuring the final product which fully correspond to user requirements;

– Compliance with the legislative framework. Being management information systems become mandatory achievement records, calculating indicators and drawing works of synthesis in accordance with the regulations in force [3], [4].

– Development of appropriate information systems resources available to the user

Since by nature software is subject to change, this change must be anticipated and controlled; Compromises are inherent in software development and they should be explained and documented.Success factors in achieving system information:

– User involvement final
– Executive management support
– Clarity requirements
– Planning.

Information system architecture is generic solution processes relating to data processing that must be done and how data integration and processing. In other words, architecture is a constructive solution of the system and reflects management's strategic vision on how the organization works. The company's global information system decomposes into subsystems, each covering a distinct area of activity. In turn, each application subsystem is broken down into each covering a distinct activity in the field. For example, for the commercial information subsystem will decompose into separate applications for each of the following activities: purchasing, sales, marketing [1], [6].

The decomposition process continues and the next step will be defined for each application procedures realizing distinct functions within the application, for directing processing procedures, procedures for updating the database, procedures for consultation of the database. In turn, the procedures are divided into modules. These include code sequences making each distinct function in the procedure. For example, a procedure for updating the database will include: a module for adding records, records an edit mode, a mode of deleting records. Descending strategy called top-down rationale decomposition of complex systems into components having a less complex, defined by fields of activity for example, and successively going through multiple levels of detail within each defined component. Through this approach, the computer system acquires a hierarchical modular structure in which each component performs a specific function and its operation will be coordinated components placed at the next higher hierarchical level.

– Apply complex information systems, covering a wide area of coverage;
– Ensures a global solutions unit at a conceptual level for the entire system, its components will be designed and developed independently (on a schedule), priorities are fixed at the option of the customer or

the importance of those components and wires required in the global system.

As the design components of the overall architecture of the computer system will test them in the final product and then integrate the functionality of this and will also be checked.

It requires an effort both in the analysis, requiring a very thorough and comprehensive analysis given the complexity of information processes undergone computerization, and the design and implementation which requires special financial efforts. In the process of integrating components will not show particular problems due to uniform design and implementation strategy defined at the start of the project [2], [3].

Strategy upward called bottom-up initiative promotes in each management area such as accounting, commercial, manufacturing etc, without a solution defined framework and architecture for global information system across the organization. Management systems are designed performed and operates independently of management by addressing the needs of the areas for which they were made, after which they precede to their integration into the global information system of the organization.

The lack of unified strategy such as plan hardware and software is a unified solution design and implementation of a low risk integration of subsystems of management made in the system of the organization.

3. Information system based on a relational database for sales and marketing designed as a data warehouse

An interesting idea for marketing and sale department is to make simulations and scenarious based on different sets of data. An information system based on a relational database for sales and marketing [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 SALES_REPRESENTATIVES (ID_SALES_REPRESENTATIVES,
ID_HR, ID_MARKETING, ID_SALE, SALES_QTY_PER_PERSON, SALE_
DATE) VALUES (1, '5', '4', '3', 56, '03/23/2017');
```

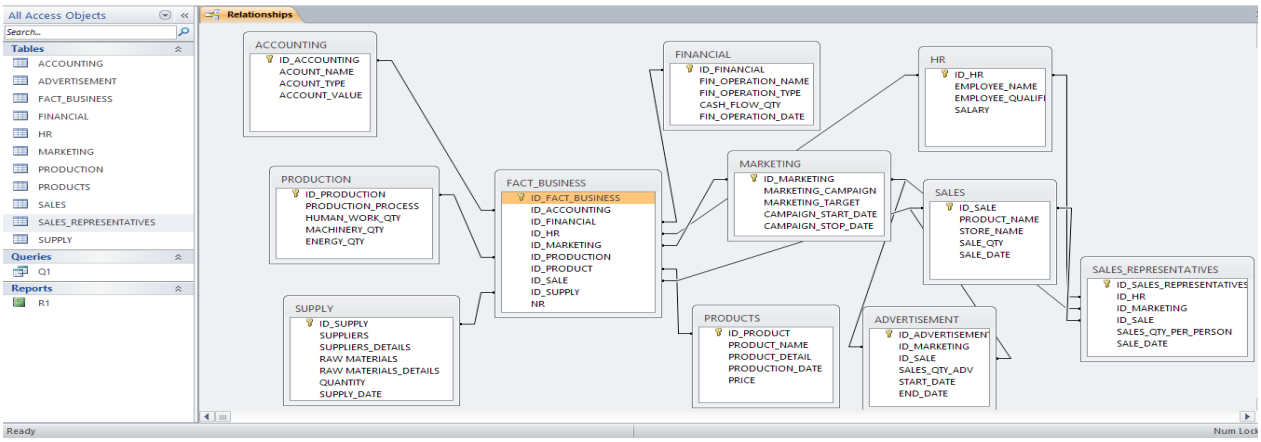

Figure 1 – A star warehouse model for business

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_BI1 (ID_FACT_BI1, ID_ACCOUNTING, ID_
FINANCIAL, ID_HR, ID_MARKETING, ID_PRODUCTION, ID_PRODUCT, ID_
SALE, ID_SUPPLY, NR) VALUES (1, 3, 6, 4, 2, 5, 6, 2, 1, 3);
```

Creating a query into a star model warehouse:

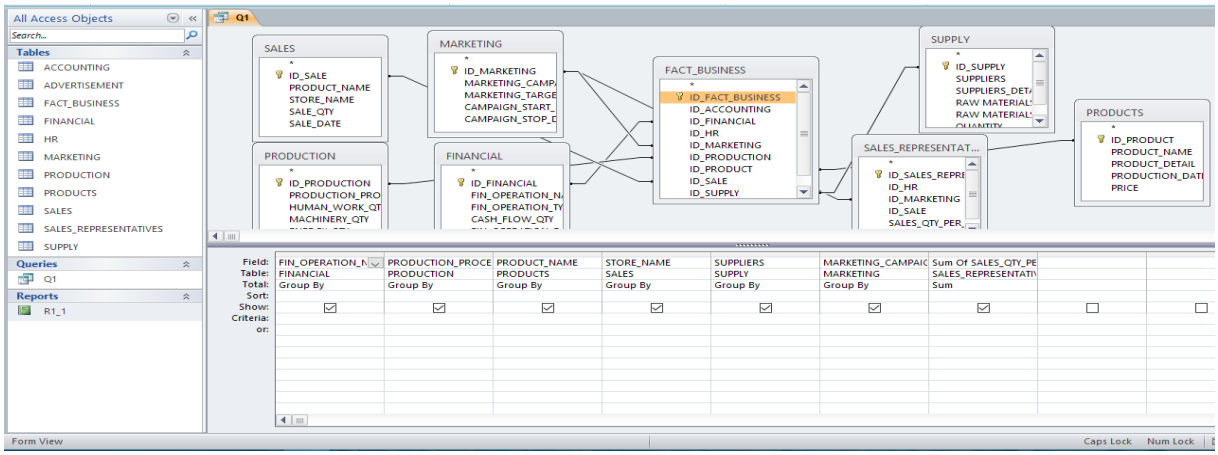

Figure 2 – Building a query in a star warehouse model for business

The query code:

```
SELECT DISTINCTROW FINANCIAL.FIN_OPERATION_NAME, PRODUCTION.
PRODUCTION_PROCESS, PRODUCTS.PRODUCT_NAME, SALES.STORE_NAME,
SUPPLY.SUPPLIERS, MARKETING.MARKETING_CAMPAIGN, Sum(SALES_
REPRESENTATIVES.SALES_QTY_PER_PERSON) AS [Sum Of SALES_QTY_
PER_PERSON]

FROM SALES INNER JOIN ((MARKETING INNER JOIN SALES_
REPRESENTATIVES ON MARKETING.[ID_MARKETING] = SALES_
REPRESENTATIVES.[ID_MARKETING]) INNER JOIN (SUPPLY INNER
JOIN (PRODUCTS INNER JOIN (PRODUCTION INNER JOIN (FINANCIAL
INNER JOIN FACT_BUSINESS ON FINANCIAL.[ID_FINANCIAL] = FACT_
BUSINESS.[ID_FINANCIAL]) ON PRODUCTION.[ID_PRODUCTION] =
FACT_BUSINESS.[ID_PRODUCTION]) ON PRODUCTS.[ID_PRODUCT] =
FACT_BUSINESS.[ID_PRODUCT]) ON SUPPLY.[ID_SUPPLY] = FACT_
BUSINESS.[ID_SUPPLY]) ON MARKETING.[ID_MARKETING] = FACT_
BUSINESS.[ID_MARKETING]) ON SALES.[ID_SALE] = FACT_BUSINESS.
[ID_SALE]

GROUP BY FINANCIAL.FIN_OPERATION_NAME, PRODUCTION.PRODUCTION_
PROCESS, PRODUCTS.PRODUCT_NAME, SALES.STORE_NAME, SUPPLY.
SUPPLIERS, MARKETING.MARKETING_CAMPAIGN;
```

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:

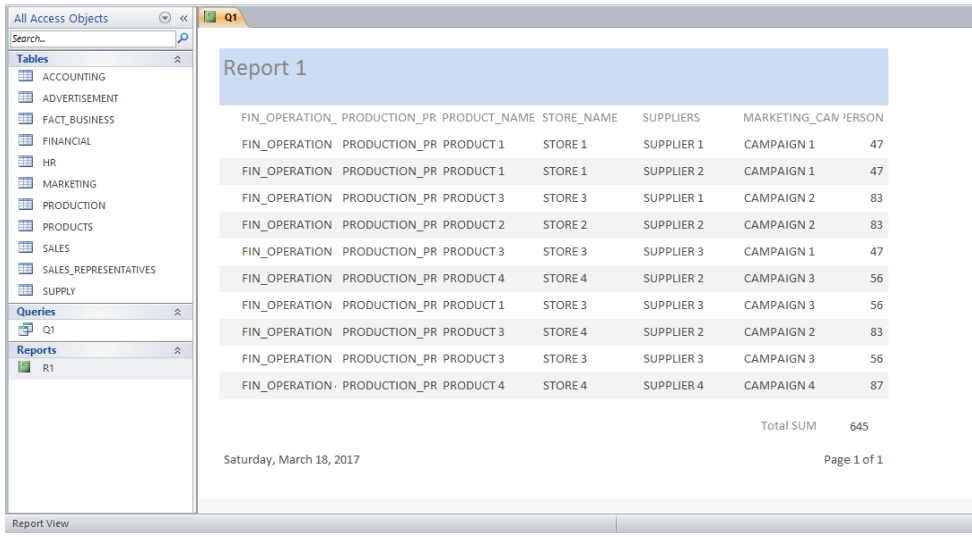

Figure 3 – A report based on a query in a star warehouse model for business

Data - acts as a bridge between the machine components (hardware and software) and the Human component. The database contains both the operational data (set of records that is working) and metadata.

Data stored in a database are persistent data, ie data stored on magnetic media remain independent of the implementation of application programs. Persistent data of a database is inserted, deleted or updated using the data input (from the keyboard, the reading of data files or receive messages). The input data are, in general, non-persistent data; they are generated by users and are stored (becoming persistent data) only after being validated (accepted) by the DBMS. The outputs of a data base system are also non-persistent data; they come from operations query the database and made available to the user as impressions, printed reports, etc. [4], [6].

4. Conclusions

The main aim of system information systems is to use data to multiple users for different purposes (applications). Most often, a database is not made in isolation. Especially for the realization of applications with databases that are part of an integrated, but not limited to an application data must be used in other applications. This reduces the storage space required and effort loading /

validation. Another facility is to access as simple data users without them having to know the entire database structure; this remains the responsibility of the database administrator. The end user or intensive (nontechnical users) who are the beneficials of application database has little knowledge of computer. Than that he does not care database structure but only use as smooth. For this DBMS software should provide specialized tools for developing application programs as user-friendly, to guide and to help beneficiary database usage [1], [3]. An information system can change the perspective of the management through the analisys of data and the posisbilities of storing large amount of business data in databases that offers powerful tools to query and update information according to the reality of the business environment. Based on complex reports the managers may take a decision that reflects a certain scenario that emprove an economic flow or maximize a specific indicator.

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