THE REALIZING OF A DATA CUBE USING MICROSOFT SQL SERVER 2005 FOR IMMOBILIZED ASSETS

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Abstract:
The intelligence businesses begin from the solving of data centralization in a context of a huge data volume but and an inefficiency of the classical methods. So, the cube represents the solution through the data are organised and structured in an hierarchic and multidimensional arrangement and OLAP instruments and Data Mining are technologies what put in values the data getting in the multidimensional structures.

Key words: *OLAP cube, data deposit, data source, data warehouse.*

JEL classification: M15, M21

The conceptual modeling of the data deposits begins with dimensional models which group the data in the relational tables in schemes of star or snowflakes type, which comprise quantitative data from the aggregate transactions tables, mainly referring to the time unity (day) then after other criteria (customer, product, service, kind of transaction, etc.)[1]".

The creation of an OLAP cube bases on the multidimensional data structure. We also have to have in mind the multidimensional scheme that has to be the support for OLAP analysis. Here we define the data source, the facts table and the dimensions. The measure is the result of some combinations among many columns, as the type of expressions. The memorizing options are:

- MOLAP memorizes both data and aggregations in multidimensional structures;
- ROLAP the data are memorized in the relational data basis beside the aggregations memorization;
- HOLAP the data are memorized in the relational data basis, but the aggregations in the multidimensional structures;

For the managers to have support for their future approaches, it is important to be created an OLAP cube for the corporal immobilizations belonging to a company. The realization of an informatics application shows the data analysis with the help of an OLAP cube and of the results that appear as different and complex reports.

1. The creation of the transactional data basis

The cube is compound of data stocked in a transactional data basis; this will administrate the evidence of the immobilized assets. The name of the data basis is IMOB, the projects bear the name IMMOBILIZATIONS. Here are parts of their creation:

[1] Dorin Zaharie şi colectivul, *Sisteme informatice pentru asistarea deciziei*, Editura Dual Tech, Bucureşti, 2001

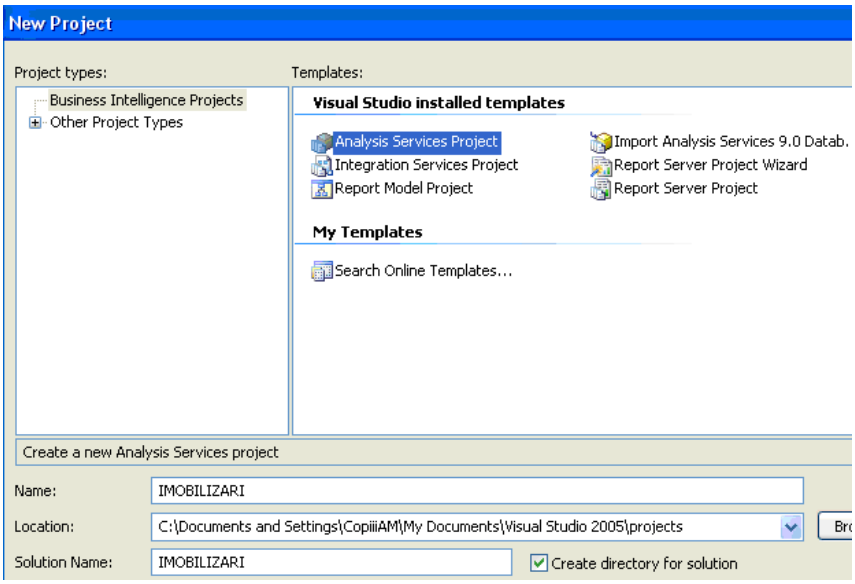

Figure no.1. The creation of the project and of the data source

With the administration environment Management Studio, the integration with Visual Studio 2005 and Microsoft .NET Common Language Runtime help us create and operate the applications more rapidly and efficiently. For creating and developing the Data Warehouse, Microsoft SQL Server 2005 offers several components, such as:

- Business Intelligence Development Studio[2]
- SQL Server Management Studio[3]

The necessity for some decisions more rapid and informed, the necessity of the increase of the productivity and flexibility of the personnel responsible for development and the pressure of reducing the IT budgets found solutions using Microsoft SQL Server 2005. It offers increased security, scalability and availability for the company's data and the analytical applications.

SQL Server 2005 offers an integrated solution of management and data analysis, which helps the companies:

- Develop, implement and administrate more sure, scalable applications
- Maximize the IT productivity by reducing the complexity of the applications' creation, implementation and administration for the data bases
- Select data on many platforms, applications and approaches in order to facilitate the connection between the intern and extern systems.
- Control the costs without sacrificing the performance, the availability, the scalability or the security

For the application we proposed to implement, there was necessary the commuting between
Business Intelligence Development Studio and SQL Server Management Studio, for every stage. Thus, the IMOM transactional data basis contains the following tables:

- facts_movement_MF, which refer to:
  - The movement of the immobilized assets
  - Stock value
  - liquidations
- PV_entrance

[2] http://www.microsoft.com/romania/servere/sql/default.mspx
[3] Idem

- PV_exit
- Administrations
- Time (with the following hierarchy: year, month, term and season).

The structure of the table facts_movement_MF can be seen in the figure no.2:

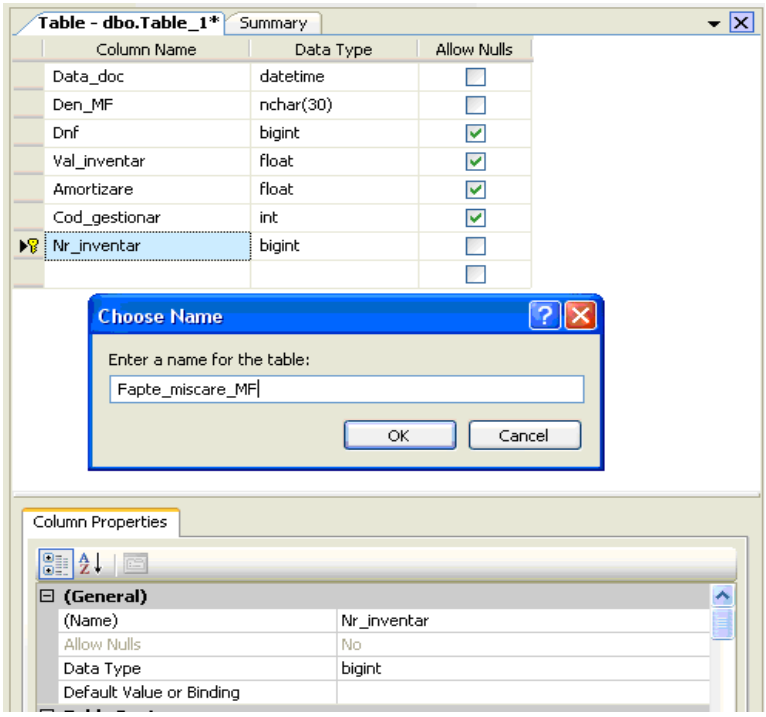

Figure no.2 The creation of the table facts_movement_MF

Figure no.3 represents the composition of the IMOB data basis in Microsoft SQL Server 2005

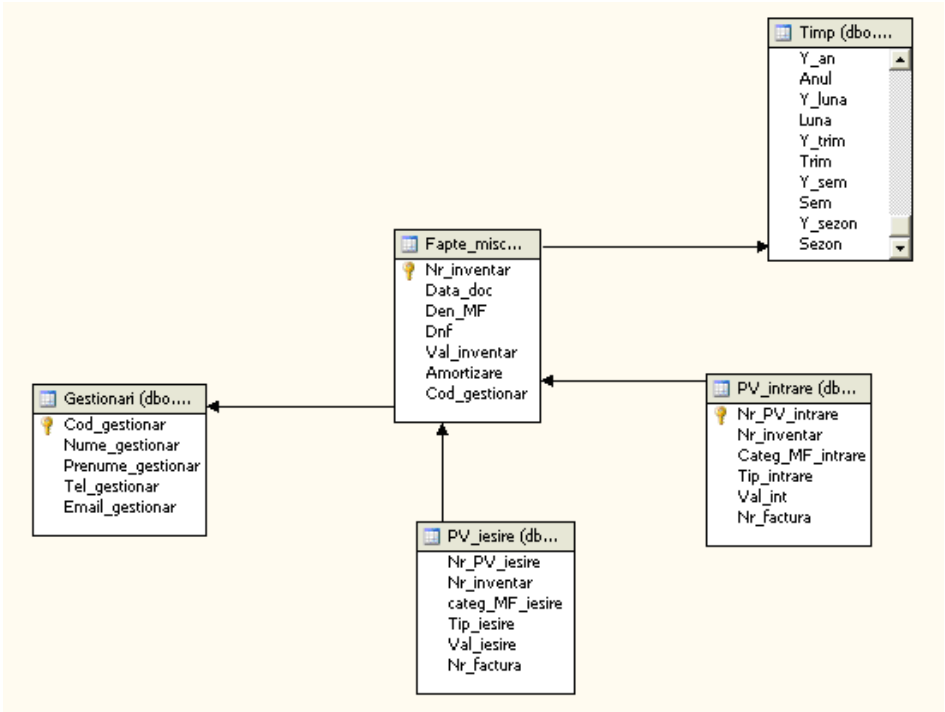

Figure no.3 The structure of IMOB data basis

2. Defining the *Data Source*

In order to define a data source, the views, the dimensions and the cubes beside Business Intelligence Development Studio (BIDS), we also use Microsoft SQL Server 2005, Data Base Engine and Microsoft SQL Server 2005 Analysis Services compounds.

The creation of the IMMOBILIZATIONS project is of the type SQL Server Analysis Services; it is realized with the help of BIDS following a standard template project Analysis Services (AS). Our project represents a collection of interdependent objects. The projects exist within a solution, named by us IMMOBILIZATIONS. The component part *Solution Explorer* contains arborescent views over the objects in a solution. A solution can have several objects and every project contains one or more articles. Every project has in its structure folders for every kind of object.

The defining of the data source supposes the defining of the information as a succession of characters at the data source, the way in which the connection to the data source is made, the name of the server and of the AS project.

3. Defining of the Data Source View

In order to see a project, it is necessary to have a view of the data source. This means a single unified view of the meta data in the specified tables with data basis. The content of a source appears in *Data Source View Designer* from BIDS. It contains:

1. a diagram (with the graphic representation of the tables and the relations among them)
2. the tables (arborescent structure)
3. sub diagrams (for data subsets)

An example can be seen in the figure no.4:

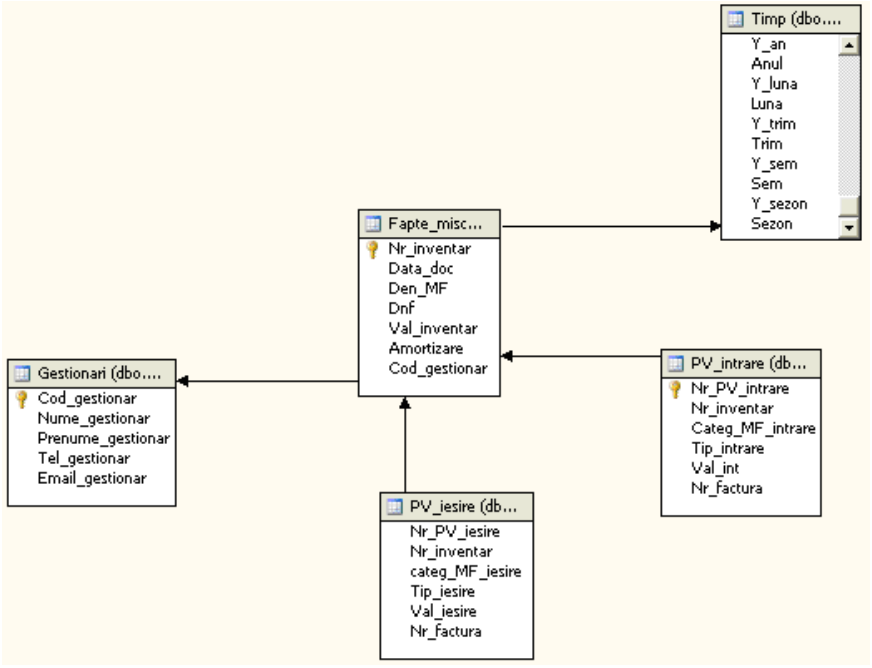

Figure no.4 The content of IMOB data source, viewed with *Data Source View Designer*

4. Defining and displaying of the cube

From Business Intelligence Development Studio we use *Cube Wizard* for defining and displaying of the initial cube:

1. the defining of the initial cube

2. the seeing of the cube properties and dimensions
3. the carrying on an AS project
4. the navigation through the displayed cube

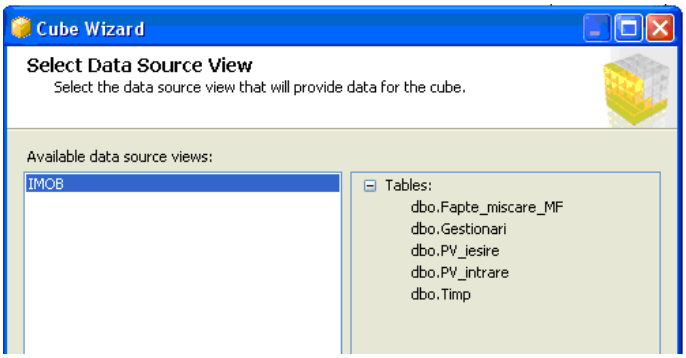

Figure no.5 Page *Select Data Source in Cube Wizard*

The next step in generating the cube is the automatic detection of the facts tables and dimensions tables. Then we have to identify and revise some elements of the working variant, choosing 3 facts tables and 4 dimensions tables, this is a different option against *Wizard*. This is the point where the assistant signals out the apparition of improper selections; there is the possibility of a remediation.

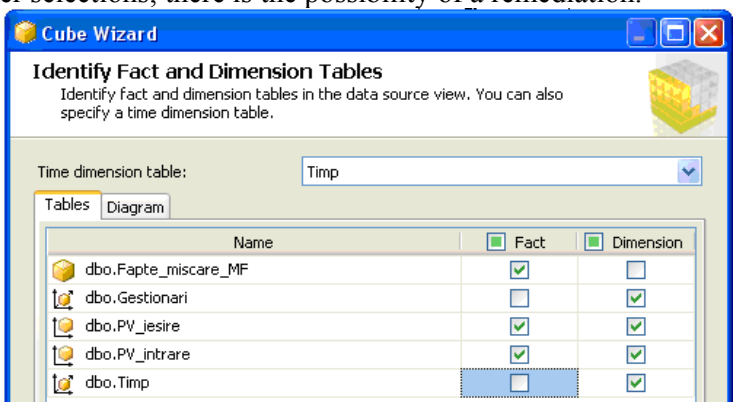

Figure no.6 Page *Identify Fact and Dimension Tables*

The selection of the time period can be seen in the below figure:

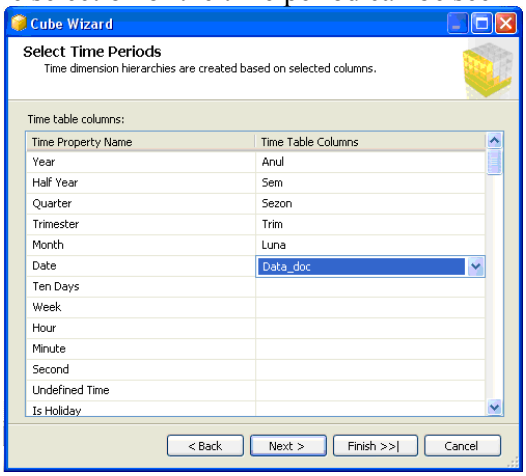

Figure no.6 The selection of the time period in *Cube Wizard*

The stage of the selection of the measures included into the cube:

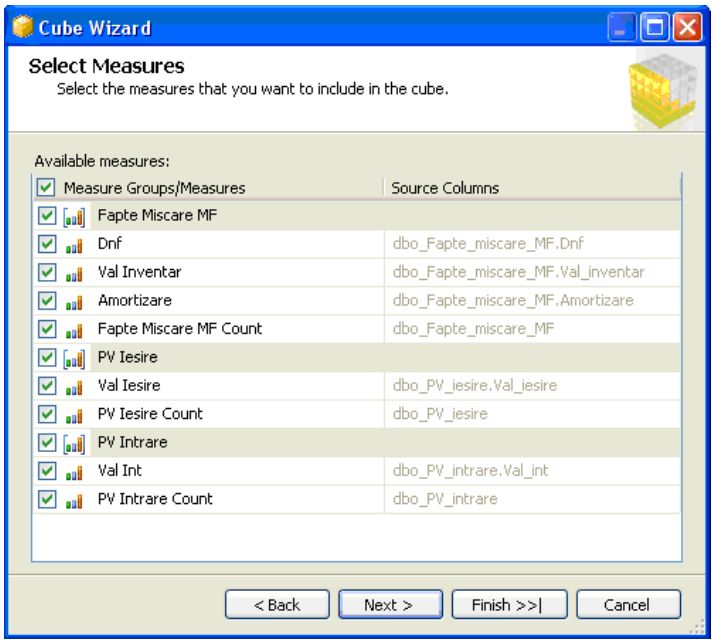

Figure no.7 The selection of the measures included in the IMOB cube

The detection of the hierarchies and seeing of the new dimensions can be seen in the following figure:

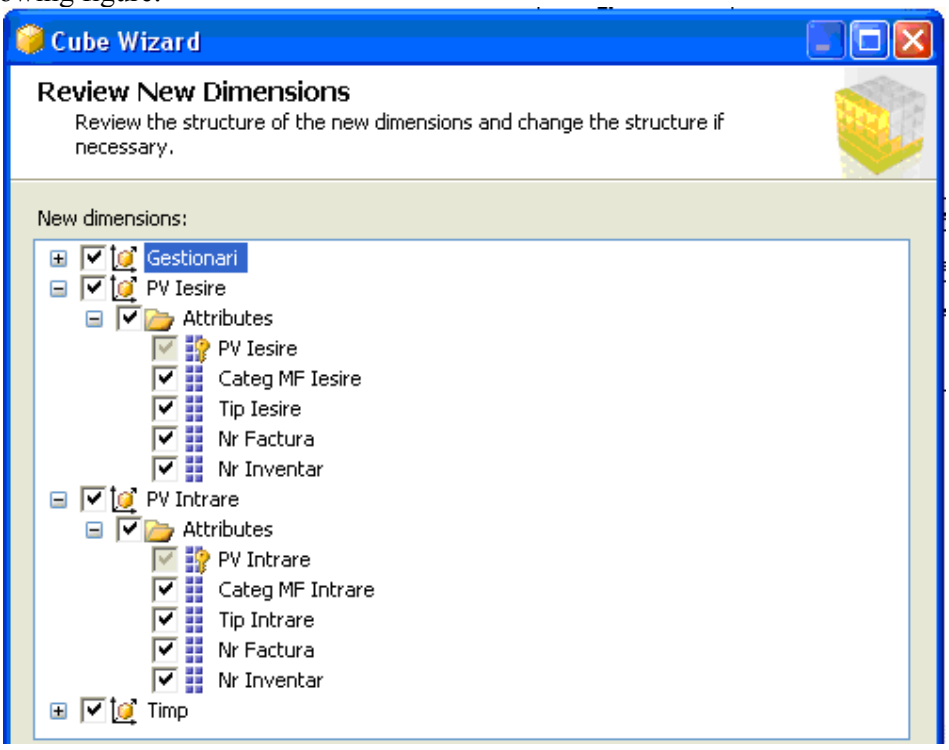

Figure no.8 Image from seeing the new dimensions of the cube

The ending of the application is done with the naming of the cube step.

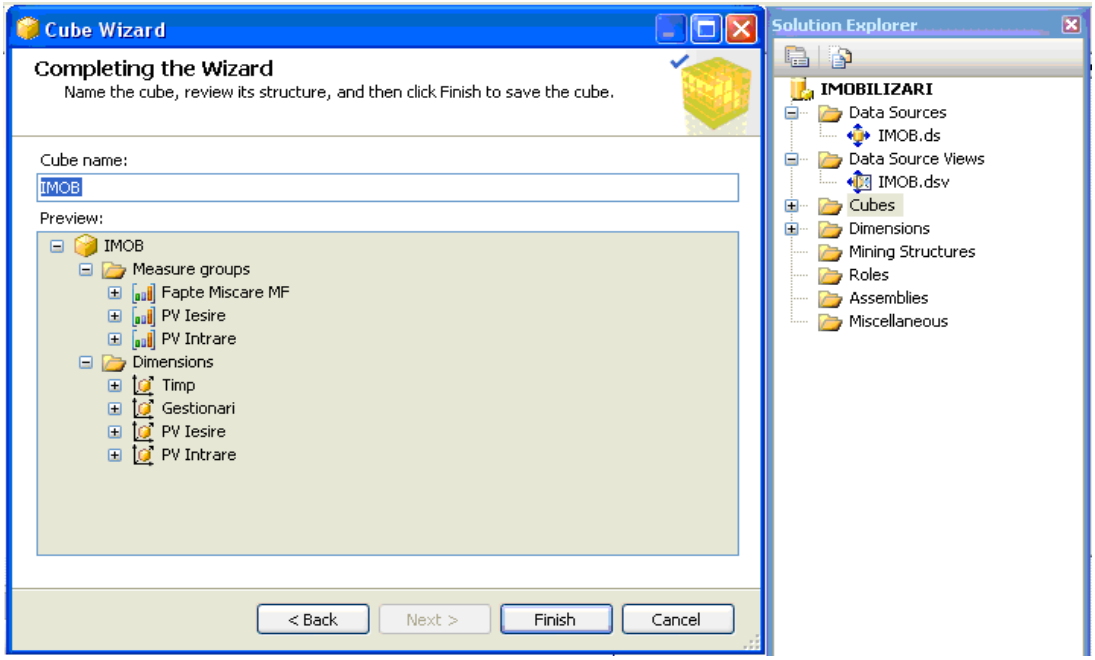

Figure no.9 The application of the cube name : IMOB
The final result : the IMOB cube

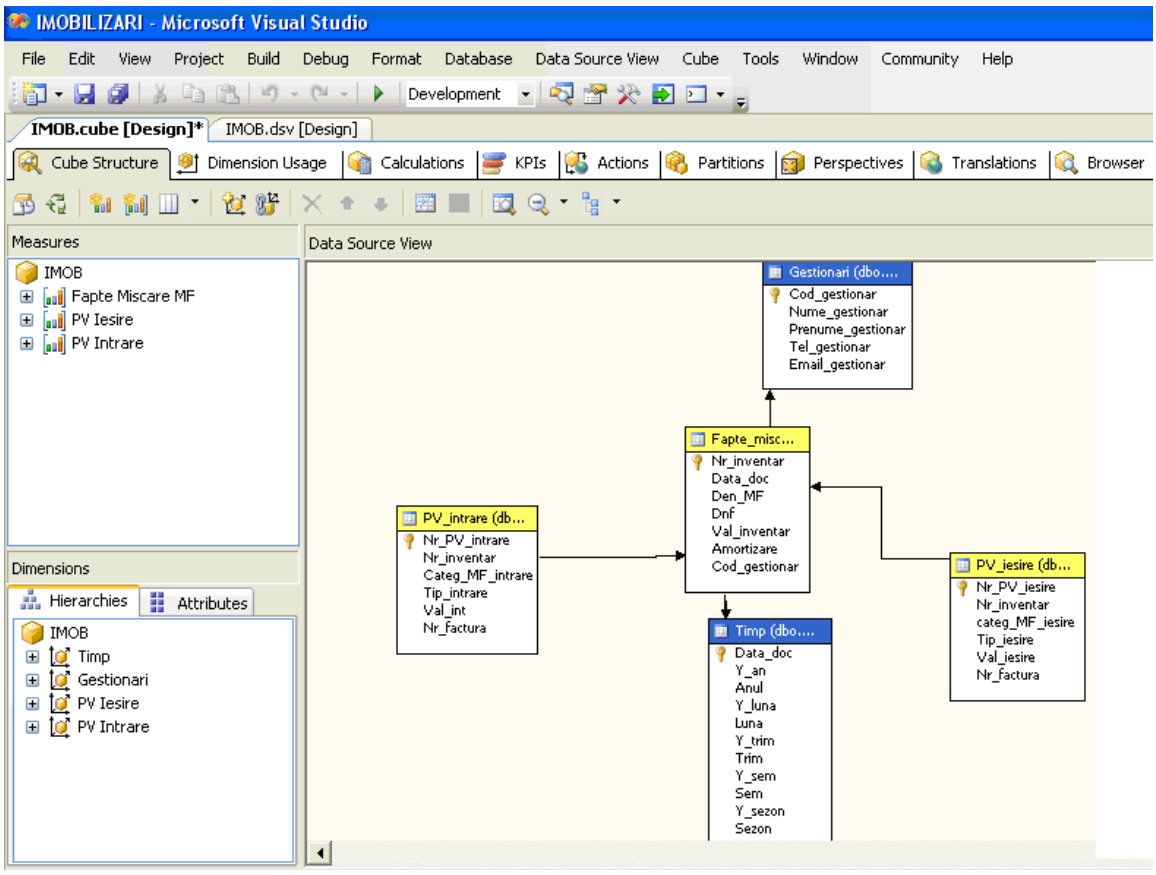

Figure no.10 The IMOB cube

Conclusions:

Within the cube, we have calculated members, which are the result of the execution of some calculated expressions at their defining. The defining of the calculated members is memorized into the cube, but their values are calculated when interrogation takes place.

When displaying strategic data necessary for the decisional process we invoke a class of OLAP instruments specialized in systems of business analysis.

The data warehouses contain pieces of information which when treated with systems of OLAP instruments, after E.F.Codd rules, can help for:

- static analysis based on historical data;
- dynamic analysis of drill-down type, based on historical data
- contemplative analysis
- template analysis

From the perspective of the business management, the assistance of taking decision in business supposes that from a huge volume of existent data, be selected, analyzed and viewed only the relevant and significant data.

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