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CONCRETE ASPECTS CONCERNING THE SYSTEM ANALYSIS IN DECISION ASSISTANCE FOR THE MANAGEMENT OF A PORTFOLIO OF DERIVATE FINANCIAL PRODUCTS

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Abstract:

A successful projection of a decision assisting system supposes a good formulation and understanding of the problem, emphasizing the organization's informational needs. This understanding can lead to a clear differentiation between the system analysis ("what has to be done?") and system projection ("how it must be done?").

The paper makes a complex study over the activities and informational fluxes usually run by the management activity in order to establish the general requests which shall be provided by means of an information system for decision assistance for the management portfolio.

Key words: *decisional model, model of objects, classes of objects, association of relations*

The scope of the analysis system is to know what has to be developed [7]. Before starting a complex analysis process, it is welcome the definition or the system requests which has to be designed, in order to assist the management decision for a portfolio of derivate financial products.

The definition of the system request has as starting point the formulation of the decisional model [5], which begins from the following situation: *In the conditions of an unstable market, which offered not very satisfactory capabilities, can we obtain a portfolio to protect the investment of capital, and not only, but to offer also an additional income?*

We consider that if we disposed of a model for decision assistance, well founded theoretically, to analyze the market best derivate financial products, which we can then group in portfolios, we would succeed to demonstrate that their profitableness is high enough. In other words, the model supposes another question: *If I invest in financial derivates and I want to built a portfolio good enough in order to exceed as profitability a certain asset, what kind of futures/options contracts should I have to select, how many of each, in what moment?* Moreover, the initiation of speculative operations and headging over the portfolio of derivate financial products obtained will be able to provide not only protection, but also an additional income.

From the formulation of the decisional model there come off 2 important stages of the decision simulating process in order to support the management of portfolio:

- the decision simulation for obtaining a strategic portfolio out of derivate products and a secondary portfolio made of corresponding supporting assets, needed for various comparative studies;
- the decision simulation for initiating the operations with derivate financial products using **specific stock market instruments.**

The reason for breaking in two stages takes into account the „divide et impera" general principle [4] which proved its use no matter of the decisional context. Decomposing the decisional situation which represent a significant degree of complexity into smaller parts and more accessible, made out of elements which can be modeled separately, constitute a decisive factor for a better understanding and in order to obtain a correct evolution in way as operative as possible.

The system requests base on the following requirements from the management of portfolio:

- Modernization of the decisional act by means of precise and operative data provided by the informational system;
- Provision of a general optimum and on domains of activity, by means of tactical, strategic, and operational management decisions;
- Capitalization of transaction activity from the market of financial derivates;

- Usefulness of data provided by the new system into a modern information form: reports, synthetic indicators, composite charts, with a relevant content, displayed on the computers monitors;
- Provision of routine decisional processes by means of the new system processing, inclusive the provision of a coordination of the informational and operational system;
- Provision of a scientific decisional process, based on static and dynamic mathematic models dedicated to specific processes from the stock market domain, and also the use of some mathematic functions adaptable to this domain;

In comparison with the definition of requests, which in our attention concentrated on the outside perceived behavior, now it wants to obtain an inside image of what the system must do. In other words, the analysis defines a model of the decisional domain, independently of any technical detail. What does this model contains? It contains the domain objects and classes, with their specific relations and behavior. It must not be forgotten that the analysis is developed inside the limits marked in the previous activity and that, together with it operates into the space of iteration. Therefore, what is obtained is only a part and not the entire system, and the enclosing domain is well delimited.

The steps to be followed for obtaining the model are the next ones [3]:

1. Identification of objects and classes
2. Identification of associations and aggregations
3. Define the class attributes
4. Refining the model by identifying the relations of inheritance and grouping the classes into modules

1. Identification of objects and classes – represents a valuable source of information and suggestions for the domain of problem to be informed

The action to identify the main types of candidate classes has as source of information, the requirements specification and the formulation of decisional model for the management of portfolio. Normally, this thing is done by examining all the substantives from the text of used to formulate the objectives, the imposed requests and the proposed functions, obtaining a class for each substantive. *This might be:*

Futures contracts	Financial derivate quotations	Trader
Options on futures contracts	Futures contracts quotations	Clients
Support assets	Option quotations	Portfolio
Operation	Support assets quotations	BMFMS[1]
Transactions	Brokerage agency	Assignment
Broker	Manager	Order

From the classes identified we start cancelling the incorrect classes, meaning those which are included in the following category:

- *Redundant classes'* ↔ 2 classes expressing the same information. *For example*: the classes *futures contracts quotations* and *option quotations* are redundant classes as they express the same notions as *financial derivate quotations* reason for which they shall be excluded.
- *Irrelevant classes* ↔ classes which do not bring any necessary information for modeling the problem. *For example*: class *bmfms* describes rather the entire system and does not bring any information in the modeling system.
- *Vague classes* ↔ classes which are not clearly defined. *For example*: classes *data*, *manager*.
- *Attributes* ↔ are identified as classes which initially describe individual objects, but which can be reformulated as attributes of other classes and they will not be kept *(not the case)*
- *Operations* ↔ there had been identified classes which actually describe operations applicable to objects and shall not be kept in building the model. *For example* class *assignment* is an operation applicable to *order, transactions, trader x* class.

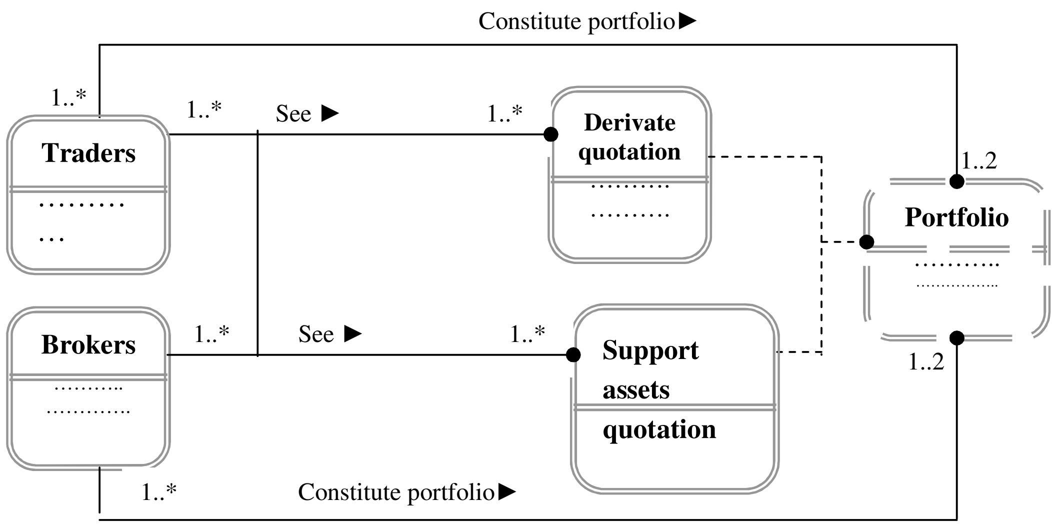
2. Identification of associations. Associations express the existence of semantic correlation between classes of objects. An association instance is called *link* and is a group of realizations of corresponding objects. In our case, there can be made the following connections:

[1] Monetary Exchange – Financial and Stock in Sibiu

Futures contracts are daily **quoted** at *BMFMS*
Options on futures contracts are daily **quoted** at *BMFMS*
Support assets are daily **quoted** at *BVB*
Financial derivate *quotations* are **seen** by *brokers* and/ or *Traders*
Support assets *quotations* are **seen** by *Brokers* and/ or *Traders*
*Orders **generate** Transactions*
*Traders **run** Transactions*
*Brokers **run** Transactions*
Orders are ***issued*** by *Clients*
Orders are **traded** by the *Trader/Broker*
*Clients **issue** sale/ purchase Orders*

The association is represented by a continuous line between the classes of corresponding objects and can have a name and a sense, with the scope to specify the properties of the respective class at association, respectively: multiplicity, navigability, visibility and changeability.

In *Figure 1* is represented, as example, the association which expresses the connection between traders/ brokers and the strategic portfolio they want to obtain. One or more ***(1…*)*** traders/ brokers can ***see*** one or more ***(1…*)*** quotations for the financial derivates and/ or support assets. Seeing the conditions, one or more ***(1…*)*** traders/ brokers based on a defined algorithm can ***constitute*** portfolios. The portfolio is not a actual class, but an association – class which has the features of a class: attributes, operations or other proper associations. Multiplicity in this association is ***(1…2)***. Value **1** from the multiplicity expresses hereby the collocation "constitutes **a** portfolio" of derivate financial products or/ and **a** portfolio of support assets, so maximum **2**. The second portfolio is made only to illustrate a comparative situation in the operations management with derivate financial products.



For the graphic representation is used the usual class symbol, connected through a interrupted line to the respective association, the name being the same one both for association and for class it is realized by.

3. Attributes identification

The current status of an object is described by one or more attributes or instance variables. The general notation of attributes is the following:

Visibility **name** [*multiplicity*] **:** type_data = initial_value {*list of properties*}

Where: *visibility* can have one of the values: **+** *(public attribute)*, **–** *(private attribute*, *respecting the package principle)*, **#** (*protected attribute*);

[*multiplicity*] indicates the fact that the respective attribute can have several values. Making reference to the number of quotations for a futures contract and/ or options in a month of transactions (except for the saturdays and sundays): *#quotation [0…22]: currency* mentions that the protected attribute *quotation* can have different values from 0 to 22 of currency type, *multiplicity* 0 indicating that is also allowed the absence of value for this attribute, respectively the null value;

: type_data indicates the data nature in specific terms of a certain language;

= initial_value is an expression of which value is attributed automatically in the moment when an object, from the respective class, is created;

{*list of properties*} is a list of properties additional to the attribute;

In the designing process we can also meet notations like:
Futures contracts. Maturity ↔ indicating the fact that the *maturity* is an attribute of the *futures contracts* object

Afterwards, the attributes can be further modified depending of a series of new elements which can be discovered in the analysis stage, which is why **it is better to**:

- Give a higher importance to main attributes, because afterwards they will be refined;
- To ignore the derivate attributes;
- To mention the reference attributes, similar to the foreign keys from the relational model.

Taking into account the previous recommendations there will be made the attributes dictionary where are mentioned all the descriptive details of each attribute, no matter of its appurtenance to a certain type of class or association. So, for each attribute shall be established the identifier uniquely associated at the level of the entire data base, type, length, and validating condition, all these elements being established depending on the requests and restrictions imposed by the data administration system [8].

4. Refining the model – supposes the introduction of inheritance relations between the classes representing common aspects, building a *super-class* or delimiting a general class in specialized <u>sub-classes</u>. Analyzing the description of each class, it is natural a refining of the object model, therefore creating:

- <u>Super-class:</u> **quotations**, out of which to drive the classes ***financial derivate quotations*** and ***support assets quotations;***
- <u>Super-class:</u> **operators on market**, out of which to drive the classes ***trader, broker*** and ***client,*** as trader, broker, client are the main operators implicated in the transaction process;
- Super-class **financial derivates** out of which to come off the class ***futures contracts*** and class ***options***
- <u>Sub-classes</u> for: **sale orders** and **purchase orders**, as from the analysis of the transaction process was deducted the fact that are elaborated distinct orders depending on the operation initiated on the market.

Grouping the classes into modules is recommended when the number of classes identified is relatively important, on the contrary we can consider that there is a single module offsetting with the system. We preferred to divide the system in two modules grouping the classes identified depending on the activities run in the same sphere. Therefore we have:

- **Portfolio module** which will group the activities leading to the definition of the structure of a strategic portfolio;
- **Transaction module** which will group the activities beginning at the run of transactions in the stock market area.

These stages allow the definition of the object model and its description. The representation known as object chart [6] is of a real use when we have to define, from the logic and physic point of view, the structure of the data base.

Conclusions:

The structure of the data base represents the constant aspect, invariable or, correctly said, less variable. A good object model reduces the risk of major changes in the structure of tables and restrictions, conferring stability for the data base and reducing the efforts for maintenance after the application installation.

Only analyzing in detail the object system we can detach the directions on which hardware and software resources must be directed to for the support system for decision assistance for the operation management with derivate financial products.

References:

[1] Avornicului, C.; Tomai, N.; Avornicului, M., (2004), *Proiectarea obiectuală şi UML,* RISOPRINT Publishing House, Cluj-Napoca.

[2] Avornicului, C. *et al.*, (2003), *Aplicaţii informatice*, RISOPRINT Publishing House, Cluj-Napoca.

[3] Blaha, M; Rumbaugh, J., (2005), *Object-Oriented Modeling and Design with UML*, 2nd Edition, Prentice Hall.

[4] Hîncu, D., (2002), *Models for Founding Decision*, ASE Publishing House, Bucharest.

[5] Păun, M., (1997), *Analiza sistemelor economice*, All Educational Publishing House, Bucharest.

[6] Ramakrishnan, R.; Gehrke, J., (2000), *Database Management Systems*, Graw-Hill International Editions, Boston, New York, London, Madrid.

[7] Spîrcu, C.; Lopătan, I., (1995), *Analiza, proiectarea şi programarea orientate spre obiecte*, Teora Publishing House, Bucharest.

[8] Ştefănescu, A., Ştefănescu, L*., Studiu comparativ între modelul de date orientat spre obiecte şi modelul de date relaţional*, Revista de Informatică Economică, nr.1/2003, Economic Publishing House, Bucharest.