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Improving information – a necessity in substantiating the accounting decision

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Abstract

As regards the decision-making process, there are two general principles accepted in decision-making: 1) the decision is made in terms of gain-loss; 2) a decision depends on the context; even if the decision-making rules are known, the context of the decision may be different, which means that the meaning of the concepts involved in the decision-making rules changes.

The article attempts to introduce the idea that the specification of rules and constraints of concept use should be part of the level of knowledge modeling on the principle of data level separation of the logical level of the application. Specifying constraints at the place and time of manifestation of their knowledge characterizes the context and adapts the decision model. The article addresses the issue of interest and presents examples of accounting.

***Keywords**: accounting decision, pieces of knowledge, information, knowledge, rules*

***JEL Classification**: M42, M41, L86, D83*

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Introduction

Initially, the term information was defined (Shannon, 1948) as a measure that expresses the uncertainty that was removed by realizing an event from a set of possible events. This definition is currently used in the statistical theory of communication to express the uncertainty of the occurrence of a set of symbols defining a multi-possible state of an element in a communication network. In brief, information reduces uncertainty.

The issue of information to reduce uncertainty means for accountants:

- Data synthesis to obtain the indicators needed to evaluate exploitation, financing, investments (after the occurrence of economic events);
- use of indicators in anticipated analysis of the effects of possible decisional alternatives on profitability.

Obtaining information is not just about data processing. Information must have a meaningful sense for everyone who uses it.

Members of an organization differ by the amount of knowledge, principles, cultures, values, etc., and the management's concern is to empower members to share a common vision with the organization's strategies. In other words, the interest of management consists in printing an informational culture common to all members of the organization.

1. The research methodology

In addressing the subject proposed in this article, we considered it necessary:

a) presentation of the concept of information from the point of view of a broadcasting reception between the accountants and the decision-making environment;

b) computer-based solutions;

c) defining the pieces of knowledge.

a) Information, accounting and semantic integration

The presence of information is not only characterized by the possibility of measuring it, but also by the presence of a common sense for the transmitter and receiver (Freeman, 2000). Strictly speaking, the common sense of information can only be obtained if the transmitter and receiver have the same knowledge (obtained either through learning or experience). Often, it is possible for the transmitter and the receiver to place the message in different contexts, and thus the information will produce less uncertainty for different problems. The ability to understand does not depend on any receiver's intelligence, but on the knowledge and, more importantly, on the common judgments of the transmitter.

The information culture on organization strategies translates for accountants into plans, approved budgets, and analysis indicators.

Concerning accounting, we can give the following example of understanding an indicator.

Managerial accounting uses an indicator called the margin for the contribution in assessing the current operations of an organization (Needles, 2001). The calculated contribution margin for each product helps in assessing performance, impact on profitability, planning and budgeting. Once accountants and managers understand how to use the indicator, it can be said that the accounting information system is an analytical "binder" between the operational system and the management system. The contribution margin is the amount that each product brings to fixed costs and profit. It is determined when using the direct cost (variable) method in the calculation of the cost of production. The direct cost method considers fixed production costs as the expense of the period and is a method that is not accepted by accounting law in disclosing information on the cost of goods sold and determining the profit tax. It is an extremely useful method in carrying out the decision-making processes related to the exploitation activity.

Errors produced in sharing the same visions, of the same information culture, lead to perceived difficulties and errors in producing relevant information. Aggregations that are desired to be performed on data on the same meaning are no longer possible. Management needs quantifiable aggregations to get information. For example, the "sales amount" information may be irrelevant if there is no unification of the concept of "sales", and so the information from different systems is wrongly quantified because it does not correspond to the common sense (Wu, 2005).

In addition to the perceived errors of the members of the organization involved in the implementation of business processes, there are also the perception errors of those who design and implement information systems. Always

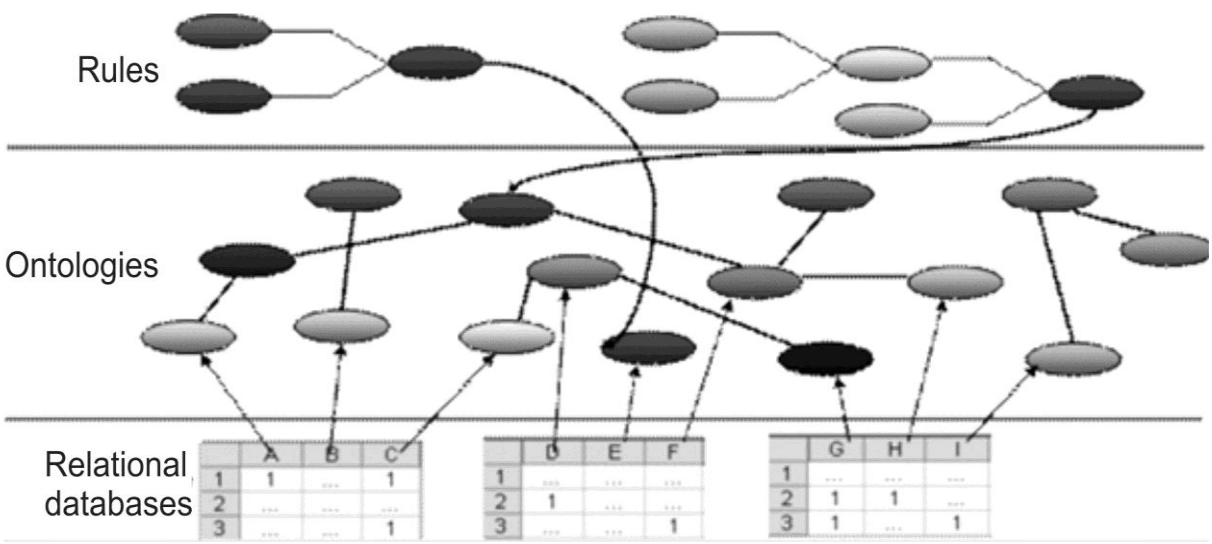
have tried to align the visions of management members with those of information system developers (Reich and Benbasat, 2003).Thus, it has come to the idea that members of the organization must have the tools to enable them to axiomate their own universe and to create an ontology related to the business process. The IT tool used by members of the organization must be not only intuitive, but must also allow the acquisition of knowledge of the business process, coupled with overlapping on the entities represented in the relational data model. Each responsible person must have access to the common ontology by using a custom application that has an ontology derived from the common ontology. For example, the accountant performs aggregation operations to provide useful information to decision-making processes. It gets the magnitude of the synthetic indicators in the managerial internal reports. The "bridge" from the processing of data to the application of knowledge is represented by the significance of synthetic indicators in decision-making.

b) Computer solutions

Until this semantic unification is achieved, specialists use other methods: either choose to manually overlap (computer tool that allows the user to link the concepts from ontology to fields in the database); or choose to perform an automated overlay (an IT tool that generates an ontology formed of concepts identical to the field names in the database). Both approaches are limited and not used because they have not reached an acceptable standard so far. The main disadvantage comes from the fact that members of the organization are not too involved in organizing the information system. As far as the organization of the information system is concerned, it becomes the task of the IT practitioners, who, in the most optimistic case, are provided with the organizational procedures manuals. The approach is wrong not only from the point of view of systems implementation but also because it does not respect a basic principle: the members of the organization have knowledge of the processes and thus only they can organize their own universe. In Figure 1 we presented a possible organization of knowledge by using ontologies and implementing the rules of knowledge.

Knowledge is expressed by inference rules, and rule execution will infer the result of logical implication in the knowledge base. In literature, the implementation of rules is considered to be feasible with inference engines, considered programs that have control, procedural or operative knowledge, exploiting the knowledge base, and are designed to combine and chain knowledge to infer new knowledge through judgments, plans, demonstrations, decisions and predictions.

Figure 1. Using ontologies and rules in improving information



Inferential engines have special interaction interfaces with programming languages and run rules to solve a problem (Turban and Aronson, 1988). Rules, as rules of action and knowledge execution, are not part of the functional side, implicit in solving a problem but are reasoning that should be used to provide relevant information and thus to personalize the services implemented by the information system. In other words, the rules must be stored separately and defined on the concepts of a common ontology for the members of the organization involved in the same process. They will use to provide answers close to the speech universe of members of the organization who ask questions (queries) on the concepts defined in the common ontology (Chen, 2000).

The accumulation of knowledge and the realization of common meanings are dynamic processes in an organization, stating that the main problem is not the accumulation of knowledge but the realization of identical meanings.

In our opinion, decision models should be implemented to provide an adequate knowledge of knowledge defined in the decision model able to provide the information needed to solve the problems.

The principle of knowledge representation is respected by introducing structural differences, which at the level of knowledge means roles and role-limitations for different types of knowledge. The principle of problem solving was translated into the science of management informatics by specifying problem-solving algorithms. "All Informatics Applications Mean Data Structures and Algorithms" is a syntax that has transformed computer applications into small-scale applications. For a long time, it was considered satisfactory, the requirements of the problem depended on the task of fulfilling the application and the purpose was considered to be achieved. Moreover, in accepting the rational approach, nothing seems to be impossible to formalize. Any economically-mathematical modeling decision becomes possible to formalize using algorithms.

If we take an example from inventory management, we can see the rational context inconsistencies in the context.

We took this example, precisely because in literature it is considered that the formation and use of stocks is a structured issue that can be reasonably approached.

Inventory management depends on consumption demand, inventory costs, supply quantity, lot, time parameters. The accepted model of theory (Țigănescu and Mitruț, 2006) is the Willson model and its derivations. Literature admits that there are uncontrollable variables such as costs, demand, re-delivery time, delivered quantity, and attempts to control factors through estimates and assumptions. Because it is a management problem rather than a decision, the rational approach can be accepted because the information provided by the models (optimal production) is useful for the exploitation activity.

The information provided will be used in making management decisions regarding the identification of relevant costs and the opportunity cost. Relevant costs and opportunity cost depend on context, can not be anticipated (both value and nature) and are information to be extracted from the decision-maker at the time of decision.

Economic analysis, statistics, IT, management accounting consider necessary historical data analysis for forecasts. All economic indicators that follow a computation formula, a law of evolution can be predicted. However, the cost of opportunity in decision-making can not be estimated, anticipated or anticipated. Determining the cost of behavior may be a problem to solve by neural network technology or data exploitation. Problem solving by using data mining tools has not yet been found to be satisfactory: Data sets are large and, as such, industry researchers are looking to discover grading, segmentation, general class extraction algorithms by using mathematical formulas. However, they all argue that the data must be linear or that the distances between the data must be constant, when it is actually known that this is impossible in the real world. The only algorithms needed to be used are searches by using artificial search intelligence in the status space. The only solution to anticipate cost behavior seems to be using the method of estimating and analyzing the cost over the life cycle of the product in which it participates. The Cost Evolution Law can be represented graphically and could be a real tool for analysis, control, planning and decision making.

A second example we are referring to is the classification of expenditure in the "capital" or "management" category.

Management has an important role when deciding whether a payment should be considered active or

expense. The influence of accounting decisions is not limited to net income, profit tax or share price but can have serious consequences when such decisions are wrong. It is about classifying payments into capital or management costs and involves respecting the principle of ensuring connectivity of revenue expenditure. Since the production of benefits is after the moment of registering the expenses, the classification in one of the two categories is a matter of professional reasoning.

Informatics could provide a single solution to this: extracting the answer from the decision maker. The decision maker chooses the expense category and the registration is made. Realizing income does not depend on the accountant, and any mistaken reasoning may be difficult to prove. Compliance with the principle of cost-income connectivity is part of the decision-making model for the application of knowledge developed by the decision-maker, from which it follows that the IT decision model must have implemented the classification rule considered by the decision-maker.

The organization prepares accounting policies for recognizing a payment as an asset or expense. The implementation of such rules is proposed by the rules-based management systems (Morgan, 2003). We propose that such rules be implemented on concepts from an ontology rather than directly on the data, because exhaustive policies can not be developed to classify a payment as expense or asset. In this way, it would also be possible to trigger several rules regarding the concept of payment or active and the warning about a violation of a rule or a non-observance of a principle.

It seems useful to emphasize that the only solution is segmentation of knowledge, classification of concepts at the level of representation of knowledge and not by the execution of algorithms. But as the data is represented by the organizational needs specific to the applications that support them, it is not advisable to modify the representation scheme. And then, the only possible solution is the use of ontologies, which at the moment is still cumbersome and incipient.

The use of ontologies aims to share common meanings and not a knowledge management, a manipulation of general knowledge. The sense perceived by an individual or a group is not automated by the computer, and applications and information systems share common ontologies in order to increase human-computer interaction. Every individual must be respected individual freedom, for it will always be a problem to ensure the balance between gain and loss in sharing personal knowledge. Sharing common meanings is a sufficient objective to ensure business competitiveness and personalization: there is no need to propose as an objective of sharing common knowledge. Sharing common knowledge we believe could only be achieved in an extremely perfect society in which the gain-loss ratio would not be of any importance to the individual or organization: it is hard to believe that in such a society people or organizations will not find other goals to follow.

Ontologies are the form of organization of general knowledge, but they also do not contain possibilities to organize knowledge in the human sense: deduction and induction. Artificial Intelligence has developed induction algorithms for automated learning able to propose the value at time n + 1 based on the law discovered for values in the 1-n range. The values thus obtained must be characterized in the object-attribute-value form for being introduced into an ontology. Similarly, the symbolic or numerical values involved in deduction processes must be specified a priori to be included in ontology. We will see in the next paragraph that the manifestation of intelligence can create knowledge through the processes of reasoning, but it involves the existence of a knowledge structure, namely ontology.

A smart system must be a system capable of adapting to new information and learning from changes. The "adaptive" and "smart" concepts should be redundant (Wunsch, 2000).

In inventory optimization, genetic algorithms are used (Chorafas, 2001). The estimation of the evolution of the indicators is possible, with the specification that the neural networks developed for this purpose have to be defined as inputs that determine the value of the indicator and not the time series containing the values of the indicator. A potential information user will understand from the following statement, "We estimate that production will increase by 10% this year" that the organization estimates growth because it has knowledge of possible ongoing investments, R & D expenditures, additional staff and does not assume that the estimate was performed in a statistical sense over time series or with a neural network designed in the same manner. Statistically, the dependence of the factors determining the value of an indicator is achieved by regression analysis. The technique is difficult to apply and with not very convincing results, but it demonstrates the dependence of the factors and the type of link between

the factors and the indicator under analysis. If the statistical solution is accepted, the equation obtained can be used in future estimates, but the basic assumption to be accepted is that the magnitude of the influence of the factors is constant.

The problem of estimation in the information needed for the decision-making process is little approached in practice by means of statistical or induction methods. Informative, it can have value only if the same conditions of action, risk and uncertainty are assumed.

Genetic algorithms, neural networks and fuzzy rules work with numerical values, and so the data from the implemented models must be labeled so that they can be used by decision-makers in future inferences. Often, their various hybridizations allow extraction of the knowledge embedded in models in the form of rules, but they are quite difficult to use when the business context requires relevant, current, current, and useful information.

c) Pieces of knowledge

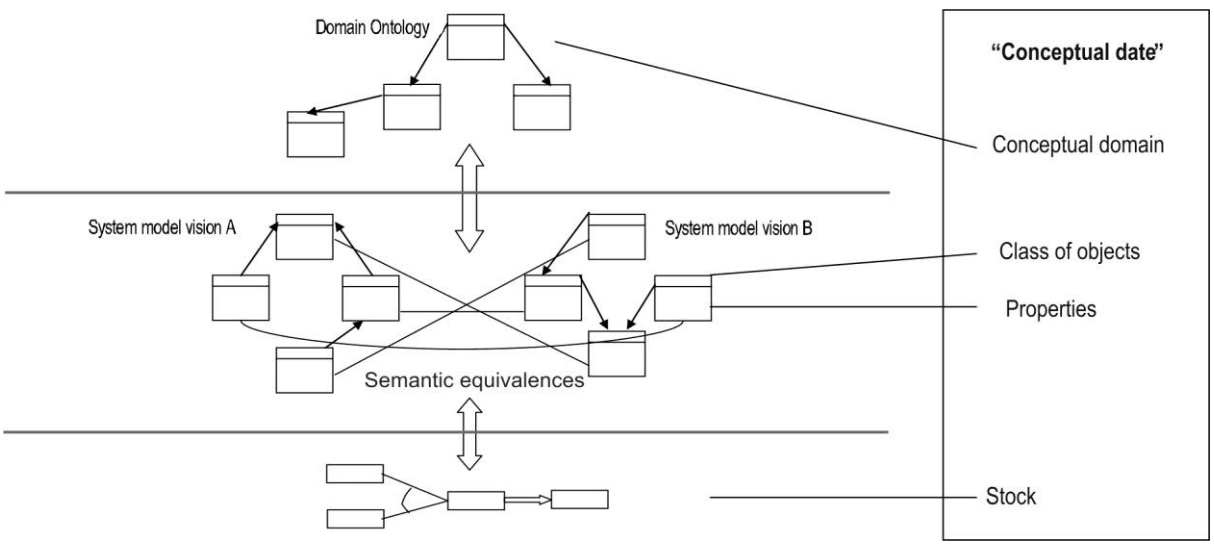
Based on the definition of A. Newell's level of knowledge (Newell, 2006) of the human problem solving mode as defined by H. Simon and A. Newell and the study of literature in the field of knowledge-based systems (Newell and Simon, 1995), we try to define a piece of knowledge further. In our conception, a piece of knowledge must:

- be a symbol of part of an ontology describing its existence;
- participate in logical inferences;
- develop the structure to which it belongs.

Organizations develop physical-logical models of the information system based on a function, process, or domain-oriented approach. Regardless of the methodology chosen in the development and implementation of information systems, the difficulties encountered come from the defective organization (the real informational system) and the limits of integration. Each participant in the development process has a different view of the system model depending on the field of expertise to which it belongs. The user wants a system that is geared to his needs, the developer wants a system based on the methodology he / she is used to for the analysis phase, the implementer wants a system appropriate to the physical architecture available.

Although the place of implementation of the rule specification is, as mentioned earlier, above the level of data organization, at the level of abstraction the situation is reversed. The values specified in the rules are the values that form an element of so-called knowledge of action, and the most abstract (general) element that defines a conceptual date is the vocabulary of the class to which it belongs. In **Figure no. 2** we presented what would form in our vision the characteristics of a so-called "conceptual data" or piece of knowledge.

Figure no. 2. Characteristics of a piece of knowledge



A piece of knowledge is primarily characterized by the instances of the classes of objects in the field and by the logical steps that access it. Courts do not necessarily belong to the classes in the visions of system models; they are often instances of classrooms in the conceptual field. As we can see, the relationships that appear are complex and depend on the effective organization of system visions and semantic equivalences between visions. The specification of knowledge pieces can not be achieved at the level of data organization nor at the ontology level where the general existence of the object classes is specified. The participation of knowledge pieces remains essential in specifying the rationale for solving problems, targeting the developed systems and ensuring the conceptual integration of systems.

Accounting has its own methods of synthesizing data: the account and periodic summary calculations carried out in check balances, balance sheet and other financial reports. The data processed in the indicators included in the synthesis calculations constitute decisional information usable in all management activities. In current information systems, such information is described in a data repository sometimes called a data repository, sometimes a knowledge repository (where it also contains qualitative information). Stored information is used in decision models but is not structured according to the principles of existence. The logic of their use in reasoning is not available to the user, and the organizational structure does not allow creation (learning) of knowledge.

Conclusions

The use of information and communications technologies to improve the processes of organizations has led to benefits, even if they have sometimes been difficult to quantify or suspect. The terms of data processing technologies, data mining technologies, Internet technologies, collaborative technologies, intelligent technologies attempt to cover the wide range of users' needs for information applications and information systems in different forms of integration.

Organizational theories and attempts to formalize business processes have always suggested that decision-makers need useful, relevant, real-time and quality information. Always the volume and quality of information has been inherently linked to the quality of business decision-making. Any manufacturer of computer applications or application packages uses as a syntax for marketing the developed product the quality of the information provided, improving the decision-making process and increasing the value of the business, but the use of software in practice has often led to different benefits than those promised by the manufacturer.

It is known that models of operational research are not perfect, just as statistical estimation models can be good if they work on very large sets of data so that the normal distribution of probability can act on all possible states. Risk assessment models in the rational approach are only suited to the theory and leave room for evaluation based on possibilities or fuzzy sets. Maxi-max or maxi-max decision models can not prove their usefulness beyond the lab and leave room for the incorporation of decision rules into expert systems. Each method, technique or algorithm has limitations and is not general, because use depends on the practical context of solving the problem.

In modeling decisions, it is important to note that the decision-maker is the man, he makes decisions using inferential chains that activate their concepts and qualities such as much, little, probably, and so on.

It is true that economic-mathematical models in decision-making are difficult to combat because they are often also used by statistical evaluations of developed models to demonstrate the utility of models. However, the problem remains their usefulness and practical use. In the context of stock exchanges where values are many and constantly changing, mathematical analyzes and neural networks are of real use because it is a tool for assessing the "pulse" of the market. In performing audit or fraud detection activities, the use of neural networks proves to be successful because the set of factors is constant, the set values change continuously and the factor dependency function is not perfectly defined.

In the microeconomic context, at organizational level, things are not as large as in previous cases, although data on the production process is sometimes the only benchmark for assessing the continuity of an organization's work.

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