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Speaking of Theories and Models in the Accounting Sciences

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ABSTRACT: Just as happens with the concept of theory, the meaning of model is also very diffuse. This paper intends to contribute to a better understanding of the distinct concepts of theory and model as used in accounting science by clarifying the sense of the two dimensions, following an epistemological path of logical ordering. Theories, understood as gathered knowledge with diverse levels of systematization and credibility whose purpose is to explain, elucidate, interpret and unify given domains of social phenomena, are compared with the concept of models – knowledge obtained about the structure and/or behavior of a system, aiming to explain and predict the properties of systems according to well-formulated scientific theories. A model seeks to specify the nature and importance of relations among variables, constructs, factors, etc. that can offer, based on scientific theories, explanations of a given system. It can be affirmed that a model is the theory of the system. The main functions of theories and models are presented and discussed, and some 'models' of theories and accounting science models are exemplified.

Key-words: prices, commodity, behavior patterns, copper

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1. Meanings of Theories

The term theory has been employed in different manners to indicate distinct questions. In reviewing the literature to construct a scientific work, we find contradictory expressions and ambiguous concepts such as 'theory', 'theoretical orientation', 'theoretical framework', 'theoretical scheme', 'theoretical reference' used as synonyms. In other situations, the term theory serves to indicate a series of ideas that someone has regarding something ('I have my own theory for relating to rebel subjects'). Another conception is to consider theories as sets of incomprehensible and unprovable ideas, generally espoused by professors and scientists ('it's my theory!'). Theories are often seen as something totally apart from everyday life. They are understood as ideas that cannot be verified, much less measured, evidencing a mystical conception of theories: Marxian Theory, Freudian Theory, etc. Particularly in the applied social sciences, like accounting science, these erroneous interpretations have been causing controversies and also leading scientific investigations to go down diverse and worrying paths.

In a very general way, behavioral scientists have identified a theory as any class of conceptualization. Concepts such as 'culture', 'nationalism', communications media', public opinion', etc., on being defined and used for interpretations, are equated to social theories. They are referred to thus: 'theory of public opinion', 'theory of information', 'theory of socialization', etc.

There are those who conceive of theory as a conceptual scheme, and in this sense a theory is understood as a set of related concepts that represent the nature of a reality (psychological, social, physical, economic, accounting, political, etc.). For example, in social psychology, the relationship of concepts and variables – such as instinct, impulse – represent motivational theories about aggression.

According to Abbagnano (1970), the modalities and degrees of proof, or confirmation, that a theory must have to be declared or believed to be a scientific theory are not definable by a single criterion. Manifestly the truth of an economic theory, psychological theory, any theory of the applied social sciences, calls for levels of proof totally different than for a physical theory, because the verification techniques are very different. The levels of confirmation required are also different and often, outside the field of physics, theories are called mere suppositions that do not depend on any semblance of proof. A theory's validity depends on its capacity to fulfill the functions that it is called on to perform: a theory must constitute a systematic unification scheme for different contents. A theory's degree of comprehension is one of the fundamental elements to judge its validity; a theory must offer a set of means for conceptual representation and symbolic representation of the data from observation; and also a theory must constitute a set of rules for inference permitting predictions of data and of facts – the theory's principal function. A theory can also be understood as a set of ordered principles and notions relative to a determined scientific object: for example, Galileo 'elaborated the theory of falling bodies.' Consequently, the word "theory" designates a synthetic description of the knowledge acquired on a subject. In common language, theory often means either a set of rules and suggestions for action (revolutionary theory), or a more or less susceptible group of hypotheses on a subject that may or may not be controllable.

The search for comprehension and more complete explanations of reality, conducted through the process of scientific investigation, can lead to the formulation of laws and theories. Theories make it possible to structure the uniformities and regularities explained and corroborated by the laws of an increasingly more ample and coherent system, with the advantage that they can be corrected and perfected (Köche, 1997). A theory's goal is the conceptual reconstruction of the objective structures of phenomena, aiming to explain them. Within the context of research, theories orient the search for facts, establish criteria for observation, select what should be seen as pertinent to test hypotheses and seek responses to the questions raised. Theories serve not only as instruments that guide empirical observation, they also contribute to the "modeling of a heuristic picture for the study" (Bruyne et al, 1977), enabling the researcher to perceive the problems and their possible explanations. Theories emerge as a frame of reference, methodically systematized, sustaining and orienting research.

Kerlinger (1980) gives a scientific definition of theory:

> A theory is a set of interrelated constructs (concepts), definitions, and propositions that present a systematic view of phenomena by specifying relations among variables, with the purpose of explaining and predicting the phenomena.

Further regarding the concepts of theory, the interpretation given by Hegenberg (1976, p.79) stands out, by which **a theory is the collection of statements of certain types, interconnected by a certain number of relationships.** Theories can be compared to 'nets' cast out with the objective of 'hauling in' what is denominated the world: to dominate it, rationalize it, in sum, to understand it. Systematization and the search for secure explanations for occurrences are the objectives of theories. Some theories help us to guide future investigations, others permit us to trace out 'maps' of reality. Not in vain does science require theoretical references. The advance of science presupposes increasing systematization and explanation of phenomena, hence the need for inclusive theories that make sense of factual propositions, permitting us to consider and analyze the support for such propositions that a broader field of application can confer.

A large number of isolated data can become an obstacle to a better understanding of reality. Blindly gathering information hampers understanding the phenomenon under investigation – forming theories can attenuate these involuntary errors. The formulation of theories is without doubt a distinguishing mark of modern science.

Seeking to characterize theory, Hegenberg (1976, p.81) said:

> In a first approximation, we can affirm that theories appear in the context of explanations. Giving a causal explanation of an occurrence means deducing a statement that describes this occurrence, starting from certain premises – in which one or more universal laws and some singular statements emerge, establishing the 'initial conditions.'

As can be noted, Hegenberg describes theories as constructs to explain phenomena of the natural sciences. Nevertheless, the fertility of his definition helps enormously to understand the idea of theory in the social sciences. The flexibilization of the 'causal explanation' and of ‘universal laws’ can orient an adequate conceptualization of theory for disciplines in the social area: administration, accounting, etc.

Historically, it is possible to sustain that scientists first try to identify relevant variables, singular data, which they seek to classify in some appropriate manner. They then formulate hypotheses, even if highly conjectural at the start. Loosely associated, these arise naturally in an attempt to establish the relations among variables and explain singular data. As the investigation advances, the hypotheses can gain the status of a pretense of a theory, to be recognized after confirmations from new evidence and investigations conducted by other scientists. It is no exaggeration to state that a system of hypotheses can be the embryo of a theory. Calling again on Hegenberg (1976), we can say that generally at the start certain ‘raw’ generalizations arise, the ‘empirical generalization’ – tests of the hypotheses – after which come more ample generalizations, then the ‘discovery’ of logical relations among known results, the admission of certain ‘assumptions’– axioms in the case of the natural sciences – to systematize the body of knowledge, leading finally to theory.

Assertions made by theories aim to systematize what is known about the world around us. Theories have the pragmatic objective of effectuating people’s intellectual adjustment to their surroundings, enabling them to comprehend what happens around them. When in a given sector investigations have already been conducted that allow the construction of a solid body of knowledge encompassing empirical generalizations, theories arise as the key to our understanding of phenomena, explaining the previously noted regularities.

As pointed out by Vera (1983 p.146):

> The culmination of scientific activity is the formulation of a theory, which constitutes the highest level of abstraction based on the formulation of the initial protocol statements. A theory is a system of scientific laws, a logical complex of invariant relationships that, at the same time, generalize and explain systematically the formulation of these laws. From a logical standpoint, we can establish a relation of implication between the set of laws (considered the antecedent) and the theoretical conclusions (which represent the consequence).

Further according to Vera (1983), the construction of a scientific theory in the hard sciences can be done in two ways: a) starting from observations and hypotheses; or b) axiomatically. In the first case, the construction starts with formulation of protocol statements, and the approach followed is inductive-deductive, or more correctly put, hypothetic-deductive. In the second case, the construction emerges directly from the postulates, and the methodological approach is purely deductive. It is easy to conclude that the ideal method for the formal sciences is, indubitably, the latter, and for the applied social sciences, the former is more suited.

Different theories produce different instruments, different observations and interpretations, and most importantly, different results. They constitute different nets to try to catch reality. The ruptures with pre-scientific explanations, or explanations oriented by common sense, are given by the theory. Research and theory develop in indissoluble lockstep. If one wants to reach pertinent conclusions that transcend common sense, one cannot disregard the theoretical guidepost inherent in all valid empirical research.

> Theories attempt to explain what we know, and also tell us what we want to know, that is, they offer us the questions whose answers we seek. Theories give us a coherent picture of known facts, indicate how they are organized and structured, explain them to us, forecast them for us, furnish reference points to observe new facts (Bruyne, 1991 p. 102).

The conceptual analysis has the task of defining and clarifying the key terms that will appear in the theory, without however losing sight that 'a set of concepts does not build a theory.' Concepts figure in a theory that will be defined essentially by the formal connections that unify these concepts, forming them into propositions. Verification – the empirical testing of theories – is a primordial requirement. All theories must be open to challenge in their totality by the facts they investigate.

According to Bruyne (1991, p.104):

> The true function of a theory, conceived as an integral part of the methodological process, is to be the most powerful instrument of epistemological rupture with the preliminary notions of common sense, due to the establishment of a body of systematic and autonomous statements, of a language with its own rules and dynamic that imbues it with a fecundation role. A theory thus conceived impregnates the whole concrete process of research, it emanates from all empirical observation; all experimentation, in the broadest sense of confronting reality, is a question posed to the real object, on which the investigation rests, in function of the theory constructed to apprehend it.

And he adds:

> When a theory works harder on its own self-justification than the meticulous preparation of its confrontation with the experimental facts, this pseudo-theory turns ideological, that is, it becomes an attempt to conserve and justify an 'established order', conceptual and/or material. Not being speculation, but rather construction from scientific practice, a theory must imply empirical research, the confrontation with the real that it endeavors to grasp.

It is necessary to observe carefully all that occurs, perform experiments, establish hypotheses, do more experiments, formulate laws, build theories and then group these theories into systems. Statistical modeling helps the testing and evaluation of hypotheses. Alone it does not create laws or theories. Its great value is in acting to furnish support, enabling the researcher to use the relevant information in seeking to build or verify theories.

1.2 Functions of Theories

The most important function of a theory is to explain: to tell us why, how and when the phenomena occur. Another function of a theory is to systematize and impose order on the knowledge of a real phenomenon. A third function of a theory – associated with the function to explain – is to make predictions. This means to make inferences about the future, orient us about how a phenomenon will turn or take place, given certain conditions.

All theories offer knowledge – explanations and predictions of reality – starting from different perspectives, but some are more developed than others and better fulfill their functions. To decide on a theory's value, one can according to Sampieri (1996) consider the following criteria: (1) ability to describe, explain and predict; (2) logical consistency; (3) perspectives; (4) logical fertility; and (5) parsimony.

2 Meanings of Models

One of the marked characteristics of contemporary scientific discourse is the rigor of the language and use (and abuse) of models. The frequency of employing models, far from clarifying the precise meaning of a concept, has been contributing to obscure it, confuse it, and more worrying still, banalize it. The polysemic nature of the word 'model', due to its introduction into different scientific contexts, and especially the multiplicity of its uses, winds up aggravating this confusion.

As already affirmed, theories form the essential core of science, without which it cannot advance. Besides basic elements of the classical vision of theory – calculation and rules of correspondence – thinkers have introduced a third element into theory: the model. Models, according to this understanding, describe the fundamental ideas of theories, with the help of concepts we are already familiar with before elaborating the theory.

It is necessary to make a distinction between scientific and nonscientific models, and once again we can call on the teachings of Vera (1983, p.151):

> A nonscientific model is a miniature – more or less realistic – of a real or imaginary object. Examples of this type of model are the display boats in travel agencies, little girls' dolls, or the toy airplanes little boys build with their erector sets. The vulgar use of the term takes in other meanings: the model as archetype to be imitated, and the model as a copy of reality. An example of the former is the latest high-fashion dress, and of the latter is an artist's painting.

Specifically, everything that can or should be imitated, even the most complex example, also cannot necessarily be considered a scientific model. Model and example are synonyms only in popular language. The concept of model is not unique. Its significance depends on the finality for which it will be used. A model can serve to demonstrate a theory's consistency, as for instance when the consistency of non-Euclidian geometries was proved by demonstrating that Euclidian geometry is a model of them. In this sense a model is an element of a theory – characterizing the fundamental ideas of the theory. Or put another way, a scientific theory can be considered consistent if it has a model.

The notion of a model is relative, closely related to the concept of system or theory. Some authors refer indifferently to models and theories as synonyms. According to Vera (1983, p.152), by this interpretation:

> (...) a model is a set of isomorphous signals to a theory, i.e., whatever the relations between two elements of the system or theory, there should exist a corresponding relation between the two respective elements of the model.

Explaining: two systems of signals are isomorphous when their elements are in biunivocous correspondence, and it is said that two sets of entities are in biunivocous correspondence when each element of one of them corresponds to another element of the second system, and vice versa.

The confusion and lack of clarity between the concepts of model and theory come from the view that a theory is, in fact, a model of reality, that is to say, that its concepts or signals correspond biunivocuously to the objects of the empirical world. Form another point of view, some authors hold that model and interpretation are synonyms, meaning that models are understood as interpretations of a theory. An interpretation and a model are two ways of 'translating' a theory. The former acts in the plane of language and the latter in at the ontic level, i.e., related to objects or entities. Another interpretation is given by those who consider that a model as an interpretation of a theory. Hence, a model as interpretation and a model as explanation can coexist, favoring more precise and clearer analyses. According to Abbagnano (1970), a model is one of the fundamental types of scientific concepts and precisely that which consists of specifying a scientific theory that consents to the description of a restricted and specific zone of the field covered by the theory itself. Models are not necessarily mechanical in nature, nor must they necessarily be visible. A model of a system or process is constructed with a few manageable variables-factors so that the most significant relationships can be identified and studied.

2.1 A Typology of Models

There are diverse classifications of models. This is a taxonomy with some redundancies:

Explicative models: consist basically of concrete and specific structures that are isomorphous in relation to a theory, or part of a theory. For example, the biological theory of the central nervous system is partly substituted by a cybernetic model that permits simplifying complex relationships and better understanding them.
Physical models: are specifications of explicative models, generally constructed with concrete materials and to scale, for example, an architectural scale model.
Formal models: consist of abstracting the logical form of concrete (physical) models, in this way attaining a broad generality. They are also called theoretical models. Mathematical models are, at the same time, a formalization and a symbolization of theories or concrete models.
Iconic models – correspond to representations in reduced scale of a real object, incorporating the significant properties of its reference.
Analogical models – correspond to a set of properties used to represent another set of properties associated with the system that is being represented.
Symbolic models – correspond to mathematical expressions that seek to reflect the structure of the system they represent.
Taxonomic models – aim to structure procedures to classify events, entities or data. The utility of these models is particularly related to individual analysis of classes of phenomena and in comparing between classes, seeking to explain differences.
Explanatory or descriptive models – seek to explain some phenomenon so that it reveals itself or its functions. The utility of these models rests basically in the possibility of resolving a specific problem of decision.

Predictive models – are constructed with the explicit purpose of predicting the behavior of future events in function of a set of decisory and environmental variables.
Normative models – this class of models deals with questions related to 'what a given decision should be', thus referring to optimization of a given variable.

It is generally thought that physical models are more singular and easier to build, but I believe a mathematical model is easier, because it eliminates all the factors of perturbation outside the process itself, as in the case of engineering models: the friction, vibrations, etc. It is easy to note that forecasting an eclipse by calculations carried out through a mathematical model (evidently based on experimental observations) is much more precise than any prediction that might be made with a concrete model.

2.2 The Value and Limits of Models in Research

Particularly in engineering, the prestige of models is evidenced by the instrumental and programmatic aspect of the notion of model. Airplane designs are tested in wind tunnels, with the models reduced proportionally in size. It is natural that experimenting with a model alone is not enough to obtain, through reasoning by analogy, all the information sought on how the full-size airplane will behave in flight, but the testing is an important and economical base. It is necessary to stress that the notion of model rests more in the factoring or abstraction than the reduction of scale. Generally formal models – both in logic and in mathematics – are isomorphous abstractions of theories, not reductions of objects.

The use of models in research presents a characteristic that varies slightly according to the scientific plane adopted. In the field of the factual sciences, for example, models are only considered valid if they hold up when faced with the facts, i.e., if they are verified. The history of the natural sciences offers a constant dialectic between data and formal models.

As explained by Vera (1983, p.155):

> In the biological sciences, there are many data, but few theoretical models (this disproportion is even more acute in medicine). In economics, the relation is the opposite: good theoretical models but a dearth of corroborating data. In the hard sciences, success depends on a good fit between models and data.

Vera's understanding can, with propriety, be extended to other disciplines of the factual sciences such as administration, education, accounting, etc. Constant approximations between data and models are the rallying cry of scientific investigation in these areas of social investigation. The pedagogic sense of using models is common. We only need recall the anatomical models, planetariums, DNA models, models of the atom, etc. The use of cybernetic models can be useful to philological or psychological studies, and even studies of certain epidemic infirmities. A great advantage of the use of models in investigation lies in the possibility of treating precise and well-determined questions, even if this is also the main cause of their disadvantages, since this precision depends on deliberate abstraction of the characteristics under study. The modeling – construction of a model – comes after the clear definition of the problem under investigation, and particularly, the variables, attributes and characteristics of the object sought to know/describe/predict.

A danger of the construction of a symbolic model is overestimating the value of mathematication and technification, at times conferring an undeserved prestige on the model. Just like a boy on a wooden horse who thinks it's a real horse, or a girl playing with a doll who imagines it's a real baby, a researcher also can 'fall in love' with his or her model and feel it is the only way of knowing or dealing with reality, according to Vera (1983).

The validity of a model in the field of the factual sciences must come from verifiability – confrontation with the facts. Verification does not make 'truth' or 'falsehood'. Models are neither true nor false; they are only more or less suitable for certain uses. The value and significance of a model are not given by something intrinsic. They depend on the field in which they will be applied, that is, they will be neither true nor false, but rather useful or not useful. According to Vera (1983, p.159):

> The drastic difference between a model and a theory, or between a model and reality, can be seen through a pair of expressions: a model is neither reality nor theory; it must be understood as if it were this reality or theory. The model appears like that which it models only in its structure: all those characteristics of the system alien to its structure also are it with relation to the model.

We can distinguish between endogenous and exogenous properties when comparing models and theories (or systems). Endogenous properties are inherent to the structure, and as such, are invariable. Exogenous properties are outside the structure, and for this reason are contingent variables. The same theory can be interpreted through various models, all of them having the same endogenous properties but varying infinitely in their exogenous ones. It can be said that a model is a scientific metaphor, logically manageable, and strictly oriented by analogy. The theory of models provides scientific research with a valuable instrument, as long as the researcher accepts their limitations, making sure they conform to the mirror of reality. Köche (1997).

Taking as a reference the master's dissertation of Mazzon (1978), we can add other interpretations of models. Thus, a model can be:

- A way to obtain knowledge;
- Used to analyze, explain or predict the behavior of phenomena;
- A simplified structuring of reality that supposedly presents important characteristics or relationships in generalized form;
- A subjective approximation, since models do not include all the observations and elements of reality;
- The comprehension of characteristics of the real world in a more simple, accessible, observable form, relatively easy to be formulated or controlled, from which conclusions can be drawn that, in turn, can be reapplied to the real world.

2.1.1 Functions a Model Can Perform:

- A selective function, permitting complex phenomena to be visualized and understood;
- An organizational function, which corresponds to classifying the elements of reality according to a scheme that: (a) adequately specifies the phenomenon's properties or characteristics; and (b) has mutually exclusive and exhaustive categories;

- A fertility function, showing the wayto other applications in different situations;
- A logical function, permitting explaining how a determined phenomenon happens – the power of explanation;
- A normative function, permitting prescriptions;
- A systemic function.

2.1.2 Steps in Constructing Models

- **CONCEPTUALIZATION** – the search for theories that can help to explain the phenomenon that is being represented;
- **MODELING** – the process of burnishing and enrichment by elaboration of simpler and more effective representations. The process of establishing associations or analogies with previously develop theoretical structures;
- **SOLUTION OF THE OPERATIONAL MODEL** – Refers to the interdependence between the operational model of the system and the solution obtained or desired;
- **IMPLEMENTATION** – The adoption of the results obtained by the operational model's solution. This evidences a process of transition, organizational change, requiring adaptation. It should be a continuous process through all the phases of the workflow;
- **VALIDATION** – The model's capacity to explain and predict. Indicators of efficacy of the conceptualization, modeling, solution and implementation steps.

CONCEPTUALIZATION will depend on:

- The researcher's world view (cosmovision): opinion and understanding of humanity, society, the organization, etc.;
- The level of abstraction;
- The capacity to think in overall and intuitive terms – 'divergent thoughts';
- The capacity to formulate concepts, definitions, constructs, postulates, problems relevant to knowledge of the reality being investigated.

Considerations on **MODELING** and the **SOLUTION OF THE OPERATIONAL MODEL**

- There is no one pattern to be followed to build models;
- It is a process of enrichment or elaboration, starting with very simple models, seeking to move toward more elaborate models;
- The modeling activity cannot be understood as an intuitive process, even if it contains a strong component of art. The modeling process must be understood dynamically in terms of a space-time compatibility and a continuous process of enrichment – learning;
- It is analytical, meticulous, and for this reason formal, relying on abilities;
- It requires a capacity for 'convergent thinking';
- It needs ingenious work with categories that help explanations, particularly analysis-synthesis and induction-deduction.

On the **Conceptual Model of Operations Research**

The classic conceptual model of operations research (OR) is normative and involves six steps, namely:

- Defining and formulating the problem;
- Modeling: building the model – components/variables/relations/functions;
- Obtaining the solution;
- Testing the solution;
- Developing controls for the solution;
- Implementing and accompanying the solution.

As stated by Wagner (1985): **The construction of models is the essence of the operations research.** As already said, the word "model" has many gradations of meaning. Thus, in the operations research context, a model can be a substitutive representation of reality, such as a scale model of an airplane or locomotive; model can imply some type of idealization, frequently incorporating a simplification of details, such as a model plan for urban development; and the verb "to model" can mean to show what will happen if a model is used. In OR, a model is nearly always a mathematical representation, and necessarily will be an approximation of reality.

3 Some 'Models' (Examples) of Theories and Models in the Accounting Sciences

3.1 Theories About Net Worth

The oldest approach to net worth (or net equity) is, without doubt, the **theory of the owner,** which was the way imagined to imbue double entry bookkeeping with its formal logic (Iudícibus, 1997). This way of understanding net worth facilitates the application and explanation of the functioning of the accounts and has been much in evidence. According to this theory, the owner is the center of attention of accounting. Revenues are considered as increases in equity and expenses as decreases. The net profit, the difference between revenues and expenses, is added directly to the owners' equity. Dividends represent withdrawals of capital and accrued profits are part of the equity. Dividends paid in shares only represent a transfer from one part of equity to another; they do not represent profit for the shareholders.

According to the **theory of the entity**, on the other hand, it is above all else necessary to clarify that the entity has a life distinct from the personal activities and interests of those that own portions of its capital. The entity has its own personality. The big difference between obligations and net worth is that valuation of the rights of the creditors can be determined separately or independently of other appraisals, if the company has a good solvency level, while the rights of the shareholders are measured by valuing the assets originally invested, plus reinvested profits and any subsequent asset revaluations. According to Iudícibus (1997), Paton and Littleton, cited by Hendriksen, affirm and explain well the basic characteristics of the entity theory: "The emphasis on the viewpoint of the entity (...) requires the treatment of a firm's gains and profits as profits of the entity itself until their transfer to the individual participants has occurred by declaring dividends."

According to the **theory of the ordinary shareholder**, we describe a variant of the entity theory. From this point of view we are halfway between the theory of the entity and of the owner. According to this theory, all investors in a corporation, except the holders of common stock, are considered outsiders, while from the viewpoint of the pure entity theory all investors are outsiders. There is more information for the common shareholders. It is a useful theory for financial administration, considering the preferred shareholders as outsiders. The payments to these shareholders are by this theory equivalent to expenses. Although viable for purposes of evidencing the calculation of leverage and for financial alternatives, this theory cannot be totally accepted by accounting science, because it is going too far to claim that the preferred shareholder is in the final analysis tantamount to a lender of money. The rights and obligations of the two are similar, it's true, but even so, the preferred shareholder has an ownership title more than a credit.

According to the **fund theory**, the personal relationships that underlie the owner theory, and the personalization of the firm as an artificial legal and economic entity, implicit in the entity theory, are both abandoned. The fund is the nucleus of interest. According to W.J. Vatter, its idealizer, the capital invested represents a financial or legal constraint on the use of the assets, i.e., the capital invested must be maintained intact, unless specific authorization has been obtained for a total or partial liquidation. The liabilities (in the strict sense) represent restrictions against specific or general assets of the fund.

According to the **theory of control,** an alternative suggested by Goldberg (Iudícibus, 1997), the main attention of accounting science should be focused on effective economic control of the resources by a company's managers, or "commandants". The financial statements are prepared in the form of a progress report, expressing the results of the activities of the 'commandants', and the ways used to mobilize resources to attain these results.

There is also the **stakeholder theory,** which however is an extension of the concept of the entity theory, in the sense that the company is a social institution maintained for the benefit of many interested groups. It is a logical 'social' extension of the entity theory.

3.2 Kanitz's Model for Predicting Bankruptcy

Developed by my colleague Stephen C. Kanitz, the bankruptcy prediction model (or "insolvency thermometer" as some have called it) was constructed through a multiple linear relation of financial indices (standardized independent variables) and the dependent variable – the insolvency factor. Realizing statistical significance tests for equality of the means between financial indices (balance sheet ratios) of "healthy firms" and "insolvent firms", Professor Kanitz identified five 'discriminating variables', namely: Net profit/Net worth; General liquidity; Acid test ratio; Current liquidity; and Total liabilities/Net worth.

With these variables he constructed a multiple linear regression model, obtaining the following standardized coefficients (respectively): 0.05; 1.65; 3.55; - 1.06; - 0.33 (Marion, 2002). He determined that the solvency region extends from 0 to 7, the undefined region from 0 to –3, and the insolvency region from -3 to -7.

4. Final Considerations

The basic characteristics of the sciences are to explain, understand, interpret and predict the phenomena of reality. Both theories and models are excellent, and necessary, alternatives to practice and develop the work of science. In the applied social sciences – among them accounting – the construction of a scientific theory starts with the formulation of protocol statements, and generally the approach followed is inductive-deductive, or more precisely, hypothetic-deductive. As the investigation advances, the hypotheses can gain the status of pretense theory, to be recognized after confirmations from new evidence. A system of hypotheses is an embryo of a new theory. Different theories produce different instruments, different viewpoints and interpretations. They constitute different nets to capture reality. The epistemological rupture with pre-scientific explanations (common sense) and preliminary social notions is given by theory. A theory is formed by a gathering of interconnected and coherent concepts, definitions, hypotheses and laws. Theories offer a coherent picture of known facts, indicating how they are organized and structured, as well as explaining references for new observations and knowledge of new facts. The intellectual and instrumental fertilization function of a theory is due to the establishment of a body of systematic and autonomous statements, of a language with its own rules and dynamic. The theory thus constructed impregnates the whole method of research, guiding empirical observations and experiments. All theories offer knowledge – explanations and predictions about reality – starting from different perspectives. But some are more developed than others and fulfill their functions better. The concept of method – fundamental in developing and putting to use the applied social sciences – is confused with the meaning of theory when considering just the aspects of the theory's order of procedures.

One of the interpretations of the concept of model is to understand it as an explanation of theory. A model is the theory of a system. A model of a system or process is constructed with a few manageable variables so that the most significant relationships can be identified and studied. This involves a simplified structuring of the reality that supposedly presents, in generalized form, important characteristics or relationships. A model is neither reality nor theory; it must be understood only as if it were a reality or theory. The validation of a model can be attested by evidence regarding the basic functions of a model: selectivity – choosing the main parts of complex phenomena; organization – classifying elements of the reality, specifying properties and characteristics through mutually exclusive and exhaustive categories; logic – rationally explaining the phenomenon; fertility – showing the way to other applications in different situations; and norm setting – permitting prescriptions.

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