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EPISTEMOLOGICAL ASPECTS OF THE ECONOMIC CONTROL

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Abstract: Epistemology is essential for probing the fundamental issues of the management sciences, included the 'economic control process'. The paper aims to highlight the connections between *economia aziendale*, the typical Italian research program, as well as the traditional research programs of Continental European Countries, with a theoretical reconstruction founded also on modern epistemological issues. One fundamental question, for instance, is about the 'true' information or knowledge conveyed by a financial statement, taking into account that *economia aziendale*, the general system, was conceived as consisting of interrelated sub-systems of *management*, *organization* and *data gathering for planning and control*. The 'economic control', both *antecedent*, *concomitant* and *subsequent*, refers to the *azienda*, the economic entity, that is to every kind of economic unit, not only to the business enterprise.

The 'economic control' is concerned with social responsibility, ethical conduct, as well as with 'evidence', 'proof', opinions and judgments. The credibility of a hypothesis depends on the associated evidence, so it is not independent from the strength of the entire argument, 'evidence plus hypothesis'. The 'degree of confidence' implies probability, specifically the bayesian approach for modifying early *prior* valuations in the light of further information, obtaining revised *posterior* probabilities. The essential requirement of a proof is that it is 'psychologically satisfying'; the problem of the controller's independence stresses the controlling ethical standards. The code of ethics and rules of conduct should serve to identify responsibilities and aims involved – greater accountability through better information about ends and means – and to underline the need for a theoretical foundation about ethics of accounting and economic controlling. Of particular interest is the dichotomy 'subjective-objective' related also to economic reality, every kind of reality, included physical as well as cultural ones. This brings directly in the field of accounting and 'entity economics' metaphors. The economic controlling process is tightly connected to interpersonal analogy and to the 'social agreement approach' to 'objectivity' and scientific methodology. There is often no possible control through 'correspondence' with definite aspects of reality, economic-financial events themselves. System theorists employ many concepts that correspond to 'independent reality' only through 'indicator hypotheses' such as 'business income' magnitude, the best proxy of the economic efficiency of the 'business entity'.

Key words: 'Economia aziendale', Economic control, ethical standards, probability, scientific methodology, reality.

ASPECTOS EPISTEMOLÓGICOS DEL CONTROL ECONÓMICO

Resumen: La epistemología es esencial para explorar las cuestiones fundamentales de las ciencias de la gestión, incluido el "proceso de control económico". El documento pretende resaltar las conexiones entre la *economía aziendale*, el programa de investigación típico italiano, así como los programas de investigación tradicionales de los países de Europa continental, con una reconstrucción teórica fundada también en temas epistemológicos modernos. Una pregunta fundamental, por ejemplo, es sobre la información o el conocimiento "verdadero" transmitido por un estado financiero, teniendo en cuenta que la economía, el sistema general, se concibió como un subsistema de gestión, organización y recopilación de datos interrelacionados. Planificación y control. El 'control económico', tanto antecedente, concomitante como posterior, se refiere a la *azienda*, la entidad económica, es decir, a todo tipo de unidad económica, no solo a la empresa comercial.

El "control económico" se refiere a la responsabilidad social, la conducta ética, así como a la "evidencia", la "prueba", las opiniones y los juicios. La credibilidad de una hipótesis depende de la evidencia asociada, por lo que no es independiente de la fuerza de todo el argumento, "evidencia más hipótesis". El "grado de confianza" implica probabilidad, específicamente el enfoque bayesiano para modificar las valoraciones previas tempranas a la luz de información adicional, obteniendo probabilidades posteriores revisadas. El requisito esencial de una prueba es que es "psicológicamente satisfactorio"; El problema de la independencia del controlador enfatiza los estándares éticos de control. El código de ética y las reglas de conducta deben servir para identificar las responsabilidades y los objetivos involucrados (mayor responsabilidad a través de una mejor información sobre fines y medios) y para subrayar la necesidad de una base teórica sobre la ética de la contabilidad y el control económico. De particular interés es la dicotomía "objetivo-subjetivo" relacionada también con la realidad económica, todo tipo de realidad, tanto física como cultural. Esto trae directamente en el campo de la contabilidad y las metáforas de la "economía de la entidad". El proceso de control económico está estrechamente conectado con la analogía interpersonal y con el "enfoque de acuerdo social" con la "objetividad" y la metodología científica. A menudo no existe un control posible a través de la "correspondencia" con aspectos definidos de la realidad, los eventos económico-financieros en sí mismos. Los teóricos del sistema emplean muchos conceptos que corresponden a la "realidad independiente" solo a través de "hipótesis indicadoras", como la magnitud del "ingreso de negocios", el mejor indicador de la eficiencia económica de la "entidad de negocios".

Palabras clave: *'Economia aziendale', control económico, estándares éticos, probabilidad, metodología científica, realidad.*

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1. Introduction

The epistemology deals with the foundations and boundaries of knowledge and is together with methodology the main constituent of the philosophy of science. The task of epistemology is to look at science not as an isolated body of sentences, but as an entity embedded in the total environment of human values and actions. Epistemological research is indispensable for probing the fundamental problems of the management sciences, included the ‘economic control’. So the focus of the paper is on the implications of epistemological issues on the controlling process within the broader discipline of *economia aziendale*, the typical Italian research program, or generally within the traditional frameworks of Continental European countries, such as the German *betriebswirtschaftslehre*, the Dutch *bedrijfseconomie* and so on. Thus in Zappa’s school of thought *economia aziendale* was conceived as consisting of interconnected sub-systems (*management, organization and information systems for planning and control*) that revealed the entire *azienda* in all its complexity.

To summarize the basic problem of epistemology in a single question, one might asks: ‘when does a statement (for instance a financial statement) convey true information or knowledge?’. The traditional philosophy of science tries to answer this question with the help of criteria such as ‘degree of confirmation’, ‘degree of confidence’, ‘degree of corroboration’, ‘falsificationism’, or even ‘degree of coherence’.

Epistemology is relevant to accounting and economic controlling because their ultimate reason is accountability and this requires ethical not less than economic, social, political and ecological considerations; recently business disciplines became also a cultural manifestation by themselves, just as other pure or applied sciences. Furthermore without a profound inquiry into the reality that one discipline tries to represent, though in a pragmatic way, as well as how and to what extent it actually achieves such representation, the business disciplines are prevented the opportunity to pursue new insights. Of course it is necessary to clearly distinguish between the *epistemological* vs. the *ontological* vs. the *methodological* problems posed by accounting and business representation.

2. Controlling process, opinions and judgments

The strength of any discipline lies in its foundations. Controlling is concerned with social responsibility and ethical conduct as well as with the gathering and evaluation of ‘evidence’¹; it emphasizes ‘proof’², so its main roots are in logic on which it leans heavily for the methodologies. On the other hand, the conceptual foundations of accounting are to be sought in “entity economics”, law, social psychology, socio-linguistic and generally in all the social sciences. ‘Control’ needs adequate and comprehensive standards for reaching opinions and judgements. Divergences from standards must be determined and evaluated so that an opinion of adequacy can be rendered.

Mathematicians, logicians, statisticians, and philosophers are interested in the more abstract aspects of evidence and proof³; it is relevant to present an account of the character of proof in these

¹ Cf. Bunge (1967: 180): “...we believe a datum constitutes an evidence in favor of a theory and we assign the theory some credence because it accounts for or even predicts that evidence”. For the ‘production of evidence’ see widely Bunge (1974).

² “When a valid inference is made from premises held as true or accepted by convention, the inference is called a *proof*” (Bunge 1967: 291).

³ The *confidence* in a hypothesis is *dependent on the evidence* with which it is associated, hence it cannot be asserted independently from the strength of the entire inductive argument (evidence plus hypothesis). By adding certain statements it is even possible to convert the inductive argument into a deductive one. The ‘strength of the argument’ could be an objective and logical relationship (degree of *confirmation*) or a merely psychological and subjective matter (degree of *confidence*, personal actual belief, and so on). If the strength of an inductive argument is a relationship of logic, then, like the deductive argument, the inductive one is a conditional statement and its strength does not depend on the truth of the

fields and the kinds of evidence that are available to the controller (Knechel *et alii*, 2013: 395-96). Emphasis is placed on the psychological basis for proof and on the psychological attitudes necessary for the support of credibility, degree of confidence⁴; the quest for discovering ‘absolutes’ and for invariant relationships has been a relevant part of intellectual activity. In mathematics the truth of some statements appears to be obvious, but the truth of a statement that it is obvious to a layman may be highly uncertain to a trained mathematician or *vice versa*.

On the other hand epistemology gives only wide limiting guidelines for the achievement of empirical knowledge which is based primarily on beliefs that vary more or less between the extremes of certainty and uncertainty; credences are tightly connected to expectations and an investigation of expectations is a fruitful way to approach belief problems; both credence and opinion, treated as identical, are closely related to their psychological supports⁵. The function of the controlling process is also to produce beliefs and opinions in others, specifically the stakeholders. Doubtless science has depended heavily on extrinsic items and accountants, business economists, have deep faith both in externally produced data, also from related fields, and in evidence (Masini, 1979: 447-66).

The historical tradition is rarely a strong basis for supporting opinions and credences. To comply with tradition is one way of controlling answers to changing social needs and conditions. It has also economic costs in the form of late responses to stakeholders’ needs, which are compared with the eventual benefits from stability. This compliance with the tradition tends to smooth and stabilize eventual fluctuations in beliefs, reducing the turmoil of rapid changes; a similar logic is for income smoothing methods, secret reserves and ‘conservatism’ in general.

The combination of expectations and judgments may vary from simple factual inferences to complex constructions, and it is necessary to arrange and report these credences, using style, in a convincing way, in order to justify the controlling social function⁶. As far as control is concerned, Besta (1891, 1910, 1916)⁷ and Limperg (1926, 1932-3) essentially contributed to this area, although in a fairly unconventional way. They were opposed to the traditional controlling process of mere routine verification, but recommended an economic approach that demanded greater social responsibility and ethical awareness on the part of the controller (Cf. Ponemon and Gabhard: 1993)⁸.

premises, but the actual belief of a specific person, the controller, in this hypothesis would depend on the truth of the premises.

⁴ Among the social sciences psychology is particularly prominent in dealing with measurement problems. Also the well known notion by Stevens (1946) who regards measurement as “the assignment of numerals to objects or event according to rules”, arose in psychology and has become prominent in all social sciences, including accounting. *Economia aziendale*, ‘entity economics’, rejects such a definition of accounting valuation, and certainly is better of talking about value ‘determination’ or ‘assignment’ instead of value ‘measurement’.

⁵ Bunge (1985: 80, ff.) speaks of different types of psychological explanations: tautological, teleological, mentalist, metaphorical, genetic, developmental, environmental, evolutionary, neurophysiological, mixed.

⁶ To my mind the *mentalistic aspects* – e. g. beliefs, intentions, norms, goals, purposes -- and *materialistic aspects* (e. g. events, properties, points of location and time) belong to different epistemic categories. It is most relevant to realize that in economics the factual observations themselves are the result of interpretations and value judgements.

⁷ Besta defined accounting as a *science of economic control*, applicable to every sort of economic entity – family properties, the owners’ equities of firms or public utilities and government entities. His notion of economic control included the *antecedent and the concomitant as well as the subsequent*. That meant ‘control’ included not merely all the calculations, estimates, conjectures and final balance sheets that threw light upon the stewardship of management, but also the ‘administrative enforcement’ or those acts that compelled managers, employees and workmen to carry out their duties with care and precision (cf. Besta, 1922: vol. I, 30-41; *passim*). See widely Andrei (2010), Sargiacomo *et alii* (2012).

⁸ Wyatt (2004) offered a profound insight into the ethical development of the public accounting profession. He illustrated how this profession was originally dominated by the ‘auditing partners’ with their traditional ethical standards, but from 1980s onwards the more lucrative consulting business became increasingly relevant to public accounting firm. Steve Zeff

The works by Clarke *et alii* (2003, 2004, 2014) constitute attempts towards a theoretical foundation for the ethics of accounting and economic controlling. They demonstrate, by means of a series of corporate failure in Australia, that (a) the reporting of traditional book values permits management excess borrowing, and (b) consolidated financial statements enable management to hide losses of poorly performing subsidiaries; they also regard the present standard-setting process unethical, and call for inflation adjusted disaggregated financial reporting⁹.

The philosophic as well as a behavioral basis rests on the insight that “the most fundamental of human judgments” are those concerning *belief* (knowledge, expectation, probability, and so on) and *usefulness* (preference, utility, and so forth). To this must be added the further revelation that this two kinds of judgments, although different in some respects, have certain analogies, and above all are more closely connected to each other than one might expect.

The public accounting profession is based on the value of independent opinion (Devine 1999: 159-63) and independent judgment. The transition from analytic or logical inference to inference from empirical facts is not an easy one, and there is a specious aspect to the drawing of conclusions from a formal set of premises with the rules of transformation given¹⁰. How are opinions formed and judgments rendered are fundamental questions related to Braithwaite’s admission and rejection rules (1955: 153-63; *passim*). Furthermore the controllers must communicate the ‘feel’ for evidence and belief so that an appropriate degree of uniformity is achieved¹¹. The degree of ‘clearness’ that satisfies a person and justifies a conclusion is psychological, but it does not follow that controlling deals entirely with private opinions; the rules are determined by the professional bodies in response to what they believe to be social needs (Cf. Gaa: 1988). All this means that the controller is so preconditioned that the attitudes to be communicated are doubtless ‘public’.

A subsidiary purpose is to emphasize the need for systemic, high level research in the behavioral aspects of this problem and for a general framework¹².

(2018: 135) speaks of “the widely documented decline of professionalism – in favor of commercialism – in the big N public accounting firms during the last three decades of the past century”. He quotes Brewster’s noteworthy book *Unaccountable: How the Accounting Profession Forfeited a Public Trust*.

On comparing audit independence as related to non-audit services see Francis (2004: 364): “To restore public confidence in auditing, and to possibly increase actual audit quality as well the public perception of quality, accounting firms can signal their unambiguous commitment to audit quality by voluntarily stopping the provision of other (non-audit) services to audit clients in order to convey in the clearest possible manner that independent auditing is the core value and the core business of public accounting firms”. Cf. also Simunic (1984).

⁹ On the control failure that has shocked financial markets worldwide cf. also Cameran *et alii* (2017: *passim*). Many interesting cases of consultancy, ‘expert evidence’, and ‘professional advice’ are in Clarke *et alii* (2019: 144-47).

¹⁰ Prof. Ray Chambers, quoted by Clarke, Dean and Persson (2019: 21) discussed, for professional fields generally, the need for ‘independence’: “...it is the function of academics to act as the ‘auditors’ of practice...as the ‘conscience’ of the professions (all of them), and to pursue the logic of their fields without fear of the prevailing state of opinion”; he continues asserting that in accounting “the vast majority of academics seem to spend more time wanting to appear ‘on the side’ of prevailing professional thinking and practice, than trying to advance the quality of both”.

¹¹ It is worthwhile to stress the interrelationships between the so-called ‘belief system’ and the ‘knowledge system’ as illustrated in Bunge, *op. cit.*

¹² Valuable frameworks are offered by the literature. Knechel *et alii* (2013) describe general frameworks for control quality and provide a blueprint for synthesizing and realizing research connected to the primary attributes of an audit (incentives, uniqueness, process, uncertainty, and judgment) as well across the different aspects of the audit (inputs, process, outcomes, and context). De Fond and Zhang (2014) provide a framework for valuating strengths and weaknesses of proxies for audit quality; they review the main models and conclude that the research would benefit from more conceptual guidance in disentangling these constructs. Francis (2011) presents a general framework for investigating factors connected with management level audit quality, necessary to better understand the multiple drivers in this regard.

3. Probability, confirmation of confidence and control

The early concept of probability was associated with the problems of evidence and confirmation of confidence (cf. Galassi 1974: part second, ch. 3), which is a crucial issue in controlling¹³. The scientific research has long used statistical methodologies; the total process consists, at least partially, in drawing of inferences from the evidence available, and consequently this aspect of probability theory has critical implications for scientific methodology (Ackoff 1962: ch. 7-11; Churchman 1971: 113-14).

Probability is always a measure of expectancy or, more precisely, of one's 'strength of confidence'. And *empirical* scientific knowledge is such a kind of credence, because it always implies probability, which rarely if ever achieves the degree of total certainty. Above all the *provisional* belief can be adjusted in the face of better evidence, which even must be corrected accordingly.

It is generally accepted that information is identical with evidence, data, by which "the expectation, or probability distribution, of a person, or group of persons, is changed with regard to a specific statement, hypothesis". This definition uses the insights of J. M. Keynes (1921) and R. Carnap (1950) and refers to the relationship between evidence and hypothesis. According to this, a hypothesis is merely 'supported' by evidence, it is not identical with it but reaches beyond the evidence; *the relationship of strength of an inductive argument between the premises and the conclusion might increase with accumulation of appropriate evidence, and which ought to be measured*; its strength does not depend on the truth of the premises, but the 'actual' belief of a specific person, the controller, would depend on the truth of the premises.

The advanced statistical methodologies force controllers to face up the chances they are willing to take of an 'unwise acceptance' or an 'unfair rejection'. Moreover controllers are forced to value the relative relevance of different errors and weight them in some sort of subjective decision scheme¹⁴. In this regard it is most fruitful the bayesian approach for modifying early prior valuations in the light of further information, likelihoods, and obtaining revised posterior probabilities: a formalized scheme for revising opinions after further information is extremely valuable. In valuating singular items the initial probabilities may need to modify drastically as experience accumulates and regularities appear.

Controllers review the system of internal control for determining the configuration of probabilities for definite errors and draw elementary prior judgments, probabilities. The controlling process can be started with this *a priori* probabilities. Further information comes from the actual

It is interesting the examination of controlling in the light of modern accounting theory (*e. g.* Ijiri and Kaplan 1971; Moonitz and Stamp 1978) and to mention publications on the 'history of auditing' as, for example, Adelberg(1975). An excellent survey in the area of business auditing research is by Felix and Kinney (1982).

¹³ See Carnap (1950:182-3): "The etymology of the word 'probable', and corresponding words in other languages,... shows clearly that these words were used originally in every day speech for something that is not certain but may be expected to happen or presumed to be the case. It is easily seen how this common use led to the similar but somewhat more specific use in early books on probability, where the term 'probability' was met in the sense of 'evidential support for an assumption (or event)' or 'rational credibility of an assumption', and, more specifically, as 'numerical degree of this support or credibility' "

¹⁴ According to Knechel *et alii* (2013: 396): "...subjective probabilities phrases lead to lower levels of consensus among auditors...and systematic errors in judgment". On information technology control quality and control risk cf. Mazza *et alii* (2018:123, ff.)

Bunge (1985: 305-6) rejects the concept of subjective probability: "[In decision theory]... probabilities and values are *subjective*, hence usually different for different people. Since subjective probabilities are usually groundless guesses, it is irrational to act on them".

operations and effectiveness of the control system during the controlling process; the added information can change the judgments, probabilities, and consequently the course and extent of the controlling process are changed to meet the varied judgments.

The subjective approach to probability with his provision for assessing utilities and incorporating new knowledge in a systematic fashion is useful for the 'controlling process'. The subjectivists reject the notion of a *logical* concept of *rational* belief, but are willing to describe a person's degree of *actual* confidence in the form of an *a priori* probability distribution. The latter ought to be derived empirically from the person's *betting* or action behavior.

The accounting process for generating data hardly fits with the usual assumptions for applying probable error techniques; the applications of normal varied techniques to test for bias meet similar difficulties. Many measurement rules and definitions have 'built in' bias while others do not.

The bayesian approach makes use of utility assessment. The concept of utility is entirely subjective, and the positive or negative income may be a poor approximation of the individual utility function; as a starting point it may often been assumed that the utility schedule is linearly related to gains or losses. Changes may then be introduced for deviations, critical areas, 'non monetary' objectives and so on. The usefulness of utility assessments is increased by providing a framework for judging widely changing probabilities and consequences. Utility theory is fruitful because the concept of expected utility is a guide for valuating complex risky situations on the basis of simple ones¹⁵.

The approach to utility assessment may provide a framework for weighing the complex hierarchy of errors (not all errors are equally grave) and, when combined with the logic of *prior* probabilities, likelihoods, and *posterior* probabilities, may permit the controlling process to examine its own structure for opinion formation and change; but being good subjectivists is not sufficient. It is necessary also the knowledge of sociology and 'social psychology'. The proof, establishing of confidence, is 'socially determined' and the rigor of the required proof has to consider the consequences of wrong conclusions and the cost of added rigor¹⁶. Always the balance is between the additional cost of an added increment of rigor with the expected benefits from the added tranquility from higher confidence levels. In general the seriousness of accepting as satisfactory a set of circumstances which are in fact unsatisfactory, or the contrary, would always be related to the expected level of confidence.¹⁷

4. 'Objectivity', subjectivity and 'reality' of the economic control

The point of interest here is that the entire 'controlling process' may be approached as a tremendously complicated communication network, which contains a web of internal tests for consistency and accuracy and should be considered with attention to the sanctions that support it.

¹⁵ The effects of modifications in audit risk standards on the conduct of financial statements controls in a European setting are presented by Niemi *et alii* (2018: 33, ff.).

¹⁶ Francis (2011: 143), for example, points out "the economic consequences of audits on financial analysts who are a primary information intermediary". Yet it is relevant "that earnings are of higher quality when audited by a Big 4 auditor, which in turn makes the earning more useful for information intermediaries".

The big N literature provides evidence that big N auditors offer higher audit quality than non-big N auditors. But for Jiang *et alii* (2019) this issue remains a debate.

¹⁷ 'Values systems' and judgments are learned in a continuous education process, explaining the kind of proof and the relationships of evidence to proof. An analytical investigation of evidence may be by source, by functions, by ordering in time, and by many other attributes.

The broad dynamic ‘system of values’ complicates the aspects of responsibility of professionals, especially accountants and business economists, in their position of preparers and controllers of financial statements. Doubtless the problem of independence position places stress on the controlling ethical standards (Cf. Gaa: 1994)¹⁸, just because it is uneasy to oppose the group that engages and compensates the controlling firm¹⁹; professional standards should be formed with the general objective to supply faithful, unbiased, fruitful information at all levels. The code of ethics and rules of conduct should serve to identify the responsibilities and the aims involved.

The need for reliable information is evident and there should be a ‘net social gain’ from the ‘raised confidence’ in the accuracy of the controlling reports. The controller qualification may show honesty and integrity, but the results cannot fulfill the social need; it is the responsibility of the ‘controlling process’ to do the work correctly and justify the expectations it determines²⁰.

The essential requirement of a proof is that it be ‘psychologically satisfying’, convincing, for the users to be convinced. It is interesting to speculate about the sociological forces that shape professional attitudes toward proof and establish the necessary evidentiary requirements, specifically in the field of controlling.

Accountants, controllers and other non specialists in the field of formal logic or mathematics are often surprised that the laws of logic and the rules of inference are ‘conventional’, where the term is meant to imply that the procedures are generally accepted in the same sense as “generally accepted accounting principles” and “generally accepted auditing principles”. For the controlling process it is fundamental to remember that there are reciprocating rules of logic and that the current acceptable ones are the result of judgment and confidence in their usefulness and congruence.

In induction and statistics the kind of evidence and proof becomes more obvious and their relationship to the ‘controlling process’ becomes more clear cut. Thus it is relevant to stress when the controllers concede that the magnitudes for balance sheet and income statement items are substantially congruent. Typically a controller has a great complex hierarchy of beliefs; none for him are certain, others are less sure, rarely he has no opinion on the subject at all. The problem and its answers are mainly behavioral. This does not deny that all methods of ordering probabilities and valuating evidence are to be explored and that to neglect them is to give up to valuable instrumental tools; as afore mentioned, confidence is a psychological reaction and proof is a definition, a name given to the ‘level of confidence’ which is convincing and satisfying to different classes of interests involved.

¹⁸ Interesting remarks about ‘ethical objectivism’ and ‘ethical subjectivism’ are in Bunge (1989: 205-7).

¹⁹ The long standing problem of controller’s independence and the public accountants’ concern for the benefit of management, rather than that of stakeholders and the public at large, is related to the problem of ‘corporate governance’. This seems to be reflected in the accelerating trend to shift from the high-risk, and sometimes unrewarding, task of controlling to the more profitable task of management consulting. For these and other aspects of the organizational climate in public accounting firms see Cameran *et alii* (2017: 4-12). Interesting consideration in this regard are in Simunic (2019: 354).

²⁰ Consider the typical short form opinion: “in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year”. It should be noted that the term ‘consistency’ indicates some acceptable stability through time; to be consistent, for example, in employing the same controlling team period after period is hardly a relevant purpose. The term ‘conformity’ possibly indicates the usual meaning of consistent. ‘In conformity with’ presumably assures the reader that the recognition and measurement rules actually used are consistent with the guiding rules accepted by the profession. The difficulties to improve this part of the statement and its purpose are that the guiding principles are so vague that it may result difficult not to be in conformity with some of them.

It is interesting pointing out the relationship of ‘objectivity’ and ‘subjectivity’ to evidence²¹. Accounting, especially the public one, is concerned with opinions and management plans and perspectives. The private kind of purpose and the desire for relative uniformities in valuating economic financial situations and predictions have encouraged entity economists and accountants to connect their own ‘rules of evidence’ to experiences that may be shared and valued by others. Therefore the interest of an independent controlling process is almost identify with external groups. The convergent interest is in adopting rules which reduce interpersonal variety in both controllers and users. It follows a possible preference for the ‘social agreement approach to evidence’²². All the controllers credences and judgments are conditioned with reference to the kind of evidence and its congruence; the test is in terms of observed ‘relative uniformities’ from repeated experiments and there is no reason to assume that the perceived and influential abilities of different experimenters are identical; in any case there cannot be certainty of full homogeneity.

Of particular interest is the opposition of ‘subjective’ and ‘objective’ with reference also to ‘reality’ (Bunge 1974: 183-86). The concept of reality is an illusive construction with widely differing interpretations, and the ‘subjective - objective dichotomy’ requires recognition of similarities between past and present experiences and the ability to recognize the stability of feelings. The real world itself may be considered a model constructed from various feelings and likenesses, but the problem of valuating similarities and differences still remains. Science requires some concept of reality, necessary as basis for credence. It is easier to agree on the defining properties and relations essential for reality, but as Richard Mattessich²³ and others (*e. g.* Bunge, *op. cit.*) have pointed out, agreement on reality and objectivity is difficult and there is no final solution in this regard.

Furthermore the awareness of reality is based on the interdependence of the ‘objective’ and the ‘subjective’, in which the former constantly adapts the latter step by step. Of course this position sees reality through glasses colored by the utilitarian trend of the evolutionary process. This does not imply that what is ‘seen’ is unrelated with such a reality.

The traditional philosophical base of accounting and ‘entity economics’ is ‘simple realism’. The resemblance is that the accounting entries represent ‘something’ about external events, exchanges (variations of economic values over a limited area, an economic entity), not the objects and events themselves; usually accountants and business economists do not accept irregular forms of ‘representative realism’ in which the words declare their physical counterparts. The usual limiting rule of reality is to consider only realities that result in transactions which isolates some aspects of reality that merits economic recognition. In other words for many accountants and entity economists it does not exist a physical reality, things, but only values (Masini, 1979: 112, ff., 163). The small relevance of physical realities comes from the help to realize the underlying logic of value changes

²¹ A crucial point is in Masini (1961: 73): “The value definition with quantitative method does not suppress the indefiniteness...but it limits subjective or arbitrary only to some points stated by the valuation procedure: in the meaning here cleared we accept the term ‘objectivation’” (translated from Italian).

²² Mattessich (2014: 54): “...but in an applied discipline such as accounting, it is ultimately...the user’s consensus, that decides which method is considered to be...effective – even at the risk that it may not be...efficient at a scientific level”. In other words “the decision to use or not to use [the valuation] model must be determined by a consensus of the major users of these tools...If the consensus is rigged in favor of a certain social group, an academic solution cannot be imposed, but a political solution must be thought”.

²³ Mattessich (2014) has tried to present a string of ontological inquires and explorations designed to clarify the notion of reality and what is behind it. He shows that reality is ‘structured’ and that there exist different kinds of realities.

and the levels of value potential²⁴; for instance, the physical inventory movements serve as easily recognizable anchoring points for value judgments and engendering confidence in predictions and opinions. Very few accounting concepts are related directly to ordinary physical reality or better to events that users can recognize as substantial elements in their own existence. The classification between tangible and intangible is connected to confidence in the assigned values rather than to the corporeal kind of the thing, which the source is of predicted ‘revenues’ and ‘income’. The concept of ‘production condition’ is one of the most abstract in economics, and generally in every field; this concept implies abstraction from all aspects except predictions of flows of benefits. The revenue concept and *a fortiori* the income concept, as the net increase of wealth from operations, are on the same level of abstraction²⁵.

Critical appraisalment of the income magnitude is a process of determining whether the ‘event recognition’ and ‘value assignment methodologies’ for recognizing and measurement have been followed. Other problem is whether the income figure determined by the conventional methods is a congruent surrogate²⁶ for the connected concept of ‘net value added’, increase of predictions over time; we are completely in the field of accounting metaphors²⁷: harmony is now between accounting statements and the reality far different from that made of ‘physical things’²⁸. Anyway it is relevant properly distinguishing between the ‘real level’, the ‘conceptual level’, and the ‘semantic level’. In examining issues of value and valuation Richard Mattessich (2014: 47, ff.) illustrates that valuation is not an ontological but a methodological problem²⁹.

²⁴ According to Mattessich (2014: 114; *passim*) such accounting items, as inventory, machinery, buildings, and so on, are a physical reality but though they may be ‘physical’, in the sense of ‘concrete’, they do constitutively belong to the *social* and not the physical level of reality – they certainly are not the subject of theoretical physics.

²⁵ On the discussion about abstraction, theory and facts see Zappa (1957, tome first: 12, ff.). For Churchman (1961: VIII): “The distinction between the so-called ‘world of fact’ and ‘world of value’ has been based on a naïve understanding of the facts about human value. The distinction is, in fact, untenable...”. Cf. Galassi (1978: 34). On the abstract quantities, such as ‘income’ and ‘owners equity’, see also Azzini (1982: 110-14); Ferrero (1968:289-96); Masini (1979: 109-12); Onida (1963. 467-75).

²⁶ Indirect observability leads to the question about what Ijiri (1967) call ‘proxies’ or ‘surrogates’ or what is known in modern science as ‘indicators’ and ‘indicator hypotheses’.

²⁷ When thoughts get too abstract and might become meaningless, our mind evolves in a way to employ consciously or unconsciously ‘metaphors’ that make unfamiliar ideas comprehensible through familiar ones, thus giving meaning (Masini 1961: 2; 16; *passim*). A metaphor exploits structural similarities, but one of the most creative functions of a metaphor is to play on structural ‘similarities as well as ambiguities’. And in our time the ‘information analogues’ encountered in biology, neurology, linguistics, computer science, and so on, are examples of this stimulating function of metaphors. Even the ‘reality model’ discussed in Mattessich (2014: ch.9) was initiated in this way as the term ‘onion model of reality’ vividly suggests. This OMR is a metaphor based on distinguishing between physical, biological and social-cultural reality; and the emergence of novel properties is closely related to it. The purpose of this metaphor is to facilitate a better understanding of the notion of reality as well as of the nature of conceptual and linguistic representation in relation to our ‘common sense’ notions and scientific perceptions. The ‘onion metaphor’ is used to convey a rough image of the hierarchical evolutionary structure of reality as a whole; furthermore the term ‘onion model of reality’, originally introduced as a suggestive metaphor stands ultimately for the ‘evolutionary’ approach to ontology.

Cf. Bunge (1974: 27): “Metaphor can be a pragmatic asset: it may have heuristic value and may also be of some use in teaching but it can be terribly misleading precisely for being highly subjective”. See same Author (1985: 86-7): “The fourth type of psychological explanation in our list is the *metaphor*...In the absence of laws - *i. e.* generalizations included in theories and confirmed empirically – one tends to resort to metaphors or analogies”.

²⁸ The ‘social-cultural reality’, in its way, is no less real than physical reality, which some people have subconsciously in mind when talking about ‘real phenomena’.

²⁹ Further measurement issues must also consider ‘indirect’ measurement as well as the constraints frequently imposed on measurement by the cost-benefit criterion, particularly as accounting measurement is usually undertaken for practical rather than scientific purposes.

On the other hand measurement demands identification, similarities, relative uniformities, achievement of purposes and a set of operations of this kind. All operational definitions determine instructions, which require discriminations and psychological overtones. Certainly all moments of interpreting an abstract system or ‘calculus’, the so called ‘rules of correspondence’, involve psychological moments; in this meaning it appears astonishing that most invariably scientists and interested parties on scientific methodology are deeply concerned with ‘objectivity’, social agreement, and the need for confirmation by others. As a matter of facts, at the extreme, the field of science has been identified as the field of ‘the language of science’³⁰

5. ‘Values system’, economic controlling process and structural ‘analogues’

In accounting and ‘entity economics’ many events can be repeated, but no one makes the identical events occur again; controllers need to draw inferences to support their beliefs. Faith in these inferences becomes the basis for judgment and confidence. Many operations that are considered objective are those most highly subjective. Valuations and predictive services for each individual resource imply a conjunction with the valuation of all other resources and facilities that is the ‘system of values’³¹.

The controlling process is tightly committed to interpersonal analogy³². A single controller is less likely to find his own errors; the danger may be less when different controllers are included³³. Controllers feel comfortable with inferential credences when other controllers interpret outcomes similarly³⁴. The need for interpersonal consensus and interchange is postulated by all who take the ‘social agreement’ approach to ‘objectivity’ and scientific methodology. The attribute of scientific knowledge demands that all statements of empirical science be capable of test by reference to ‘evidence’ which is public, that is which can be secured by different observers and does not depend mainly on a single observer³⁵.

³⁰ The requirements of the applied sciences in general and specifically of accounting may have to be satisfied with less rigorous testing procedures than those of the pure sciences, though the resulting theories need not forgo ‘objectivity’. Since we can hardly attain absolute truth, our ‘objectivity’ is rarely, if ever, pure but usually tainted by human elements. Newton’s corpuscular theory of light was accepted as highly objective in the eighteenth century, whereas to-day, in light of the quantum-wave theory of light, it appears less objective and only partially true.

Any discipline broad enough to enunciate conclusions dependent on value judgments has to be regarded as non-objective, and could forfeit its status as a science; the ‘objectivity’ of a theory is best served by disclosing all of its value judgments, and by offering a comparative analysis of their effects as far as this is reasonably possible.

³¹ As to one of the primigenial concept of *system of values* we refer the reader extensively to such publication as Masini (1955).

³² Two fundamental issues of the economic science are as yet unresolved, namely (a) the ‘argument by analogy’ which in economics and ‘entity economics’ seems to form the predominant mode of induction (Onida 1951: 344-48), (b) the problem of hypothesis and theory testing, the complexity of which is greatly enhanced when arguments rest on analogies (Cf. Masini 1961: 16; *passim*).

³³ The results of Haark *et alii* (2018: 55-80) have great interest to those debating the benefits and costs of joint audit as compared to single audits. Knechel *et alii* (2013: 407) stress that “[f]inally, audit quality is ultimately dependent on the *judgment* of a team of auditors... virtually every so-called ‘audit failure’ can be traced to an error in judgment - whether unintentional or not - made by the audit team during the course of an engagement”.

³⁴ The quality of the control by an auditing team depends on the sum of the skills of individual personalities. On the other hand single controller’s judgments and outcomes are affected by the interactions within the controlling team (cf. Cameran *et alii* 2018: 13, ff.). For the multiple drivers of auditing process quality see Francis (2011).

³⁵ Cf. Myrdal (1970: 55): “The only way in which we can strive for strict objectivity in theoretical analysis is to expose the evaluations into full light, make them conscious, specific and explicit, and permit them to determine the theoretical research”.

Apparently the agreement is usually put in opposition to authoritative pronouncements and the ‘weight of evidence’ becomes persuasion and ability to perform an experiment³⁶. ‘Objectivity as a social agreement’ helps to break the boundaries of tradition and authority –social consensus is to some degree an agreement of an *elite* group (cf. Devine 1999: 130-33). The concept of authoritative support helps little at operational level, even if role leaders for the accounting and economic fields, such as ‘entity economics’, have been at times mathematicians, statisticians, sociologists, historians, philosophers and so on. The shift from ‘principles based on authority’ to ‘generally accepted accounting and auditing principles’, which are instructions to accept practice as the standard, is a significant progress, because fits better the contemporary scientific approach based on agreement and with the temporary control instead of absolute truth.

The ‘correspondence approach to truth and belief’ is not far from the fields of accounting and ‘entity economics’ (see Mattessich 2014: 40-45; Onida 1951: 355-59; Zappa 1937: 3-7); the faith in the truth of a proposition, or in the efficiency of an interpretation, is founded on the conclusion that a broader enclosing system, has explanatory power (cf. Masini 1979: 14-24; Mattessich 1978: ch. 7). Many concepts are accepted, treated as reality, because their logic is consistent with that of related theoretical systems. There is often no possible control through ‘correspondence’ with definite aspects of reality³⁷.

That either formal or informal languages can be brought into a one-one harmony, correspondence with the world of facts, was discovered by Wittengstein (1961/1922). Consequently he left only to hope that the scientific theories are more than ‘sentential pictures’ of reality, that they are perhaps ‘structural analogues’ which depict reality, more accurately than purely linguistic configurations are able to do: *the belief is that the most reliable methodology to represent existing entities is still by means of isomorphic structures*³⁸ (cf. Mattessich 2014: 42-45; 96).

Reliance arises from coordination rather than direct correspondence with the economic and financial events themselves. Exchanges are facts in the modern scientific perspective because they can be separated by their effects on value variables such as assets, equities, costs, revenues, and so on. The controlling process of the ‘values system’ operates through reported numbers, with little reference to underlying ‘productive conditions’, and must offer a fair opinion on the economic-financial situation of the entity, reflected by the financial statements.

The control process operates on the past and the recent past, known as present, about facts and events. The user – in formulating his judgment, that includes material from a broader environment³⁹

³⁶ For instance, authoritative personalities are Fabio Besta and Gino Zappa in Italy, Eugen Schmalenbach and Fritz Schmidt in Germany, Theodore Limperg in Netherland, William Paton in USA, Raymond Chambers in Australia and so on.

³⁷ Doubtless a relevant point in the preliminary acceptance of many hypotheses is the extent to which it complies with related facts and theories. Mattessich (2000: 8-10) proposed a ‘multiple-dimensional’ testing programme in which the ‘positive evidence’ of empiricism, the ‘lack of negative evidence’ of critical rationalism and the ‘coherence theory’ supplement each other. Every of these can be applied depending on the particular situation (cf. Devine 1999: 115-17; Masini 1961, § 1).

³⁸ This isomorphism refers to ‘essential structuralistic features’. It leads to the structure of the system which in the language of science and philosophy goes under the name of ‘empirical theory’. The idea of ‘essentialistic isomorphism’ is not bound to lead to an uncompromising ‘correspondence theory of truth’. As long as one admits the imperfections of this correspondence and as long as one searches for means of improving them by seeing the world in a more holistic way, there exists a solid bridge between the systemic ‘correspondence theory’ and the ‘coherence theory’ of truth.

³⁹ Issues of environmental liabilities and contingencies, for instance, are tightly connected to the international accounting and auditing standards (cf. Moonitz and Stamp 1978), business policies on environmental control and environmental auditing as part of an integrated controlling process.

with reference to different auditing companies and among various supervisors within each company – must relate them to the future and establish the predictions, where the information system has to facilitate the extrapolation.

All uncertainty cannot be removed by the expert controlling process and users must accept uncertainty with every decision⁴⁰. The controller can contribute to the social welfare by decreasing uncertainty and adding faith on the determinations actually operated by the management. The implications on the accuracy and reliability of the statements much depend by the collaborative attitudes and relationships. Liang and Zang (2019) point out and demonstrate that to generate a more ‘objective’ accounting report, accounting systems should be designed to be less vulnerable to intentional managerial intervention.

6. *Economia Aziendale*, system methodology and ‘independent’ reality

The emphasis on *Economia Aziendale*, the typical Italian research program, means that the entity is observed as an institution for coordinating different classes of interests more than an instrument for solving conflicts. In this perspective it is a cooperative entity, with participation consistent with shared aims and institutional ends (cf. extensively Masini 1960; 1964). *Economia Aziendale* fosters an equilibrium between contrasting but convergent interests; the controller can approach the inspection of the entity system differently; in any case all these relationships may be shaped as a game, not as a zero-sum game, with benefits for all classes of interests, because the controlling process and the connected control system reduce dysfunctions and the cost of incoherent aims structures.

Economia aziendale theorists have adopted system theory methodology and argue that the part has to be reconducted to the whole, the economic entity, *azienda*, and that definite aspects of the entity cannot be interpreted only in terms of its components; the system of investigation is broader to include observers and their structuring abilities. Zappa’s approach was that of an institutionalist, as he emphasized typical institutions such as the family, the business enterprise, a public body or a cultural institution. For him the *azienda* was the ‘economic entity’, a concept that covered all kinds of economic units.

The efficient control structures (domination of different various phenomena), that is control of decisions and actions, refer to *antecedent* as well as *concomitant* and *subsequent* control (in modern words *strategic control*).

The *azienda* is considered an open system in its interactions with the external environment in which it operates – i. e. the markets to which it contributes, and the needs of society it has to satisfy (Cf. Zappa 1937, 1957; 1962: paragraph 13). The examining of markets and environment gives meaning to the economic decisions related to *management*, *the organization* and the *control* of each individual *azienda*. The *azienda* is compared to a tree from which various interdependent sub-systems branch out on different levels. The first level is that of ‘*traditional management*’, as well as the ‘*organizational*’ and ‘*quantitative and qualitative determinations*’ sub-systems. The second level of

Richard Mattessich (2014: ch. 10) examines the differences and similarities between the recent ontological-evolutionary approach in accounting and its counter part in economics, with extension to ‘ecological economics’ and the ‘critical-realist school’ as well as the ‘new Keynesian school’.

⁴⁰ Knechel *et alii* (2013: 407): “Studies of audit outcomes have shown that *uncertainty* can manifest in potentially negative ways, *i. e.*, levels of accruals, restatements, and the nature of audit reports. Further, the degree of uniqueness has been shown to manifest as variations in risk, controls, audit procedures, and evidence. The audit *process* attempts to compensate for the uncertainty and uniqueness an auditor faces but has also been shown to influence audit quality in unforeseen ways”.

sub-systems derives from a different aspect of the economic entity functions, for example from its ‘*managerial and organizational control*’ that is ‘*strategic control*’.

System theorists employ many concepts that correspond to ‘independent reality’⁴¹ only through ‘indicators’ derived from consistency with broader operations and theories. For instance in accounting and entity economics costs expiration is through complex methods related to sacrifices, contributions, service expectations, matching costs and revenues, and finally *income*. The ‘economic result’ in turn is an operational definition of ‘value added’ and a system, the best indicator, of the economic efficiency of the business entity.

This means to adopt a synoptic view through which the subject can be fully comprehended in its entirety, to consider every issue in the light of joint interrelationships, to penetrate beyond fortuitous accepted beliefs, to the implicit premises of its reasoning and to predict its prospects and purposes. Goals and norms hardly can be comprehended without tracing their reasons and their effects through at least some steps of the system hierarchy. This holistic point of view rests on the credence that a part viewed in isolation cannot be understood well, than when viewed (a) in its environmental setting and (b) under consideration of essential interdependences with other parts. Under such circumstances the representation of reality makes sense only if all of it, also the realm of ‘value judgments’ is taken into account.

Following Steven Strogatz (2008: 127), quoted in Mattessich (2014: 227), who conceived a hierarchy of systems with different steps or degrees of complexity, let us mention: (a) *regular deterministic systems*, simple in time and space; (b) *chaotic deterministic systems* (chaos theory, in the proper sense, is not probabilistic but deterministic), complex in time but simple in space; (c) *turbulent systems*, complex in time and space; (d) *fibrillating systems*, also complex in time and space; (e) *complex systems*, indeterminate and with a huge number of variables which interact in an unbelievable way. “As to a major difference between *non-chaotic* vs. *chaotic* systems, it is the impact of *initial errors* or *conditions* that it is decisive. In non-chaotic systems that impact remains negligible, while in chaotic systems this ‘butterfly effect...increases exponentially with time’”. Doubtless ‘chaos theory’, together with ‘relativity theory’ and ‘quantum theory’ is considered the third major scientific revolution of the twentieth century.

⁴¹ There is the question whether mental processes (thinking, conceptualizing, idea creation, and so on) should be recognized as either ‘autonomously real’ or ‘dependently real’. Provided the distinction between autonomous and non-autonomous reality, Mattessich (2014: 143) recognizes mental processes as *real*, though as *dependent* on more basic brain variables, “particularly as it would offer the possibility of regarding *ideal reality* as a reality *dependent* on brain processes”.

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