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Postmodernity and Systems Science: An Evaluation of J.-L. Le Moigne's Contribution to the Management of the Present Civilization

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In this text, a French school of systems thought is evaluated with reference to its contribution to postmodernity. The main conclusion is that this system provides some pertinent contribution but that there are also some domains where it does not provide much help. Both these domains are identified and discussed. The text starts with a discussion of the postmodern challenge. This is followed by a presentation and critical evaluation of the theory under consideration. The latter gives rise to the Discussion and Conclusion.

KEY WORDS: postmodernity; Le Moigne's systemics; evaluation; ethics.

1. INTRODUCTION

A French school of systems thought is evaluated with regard to its contribution to postmodernity. The main conclusion is that there are areas where it can make a contribution and areas where it cannot. The following text starts with a characterization of the postmodern age. It proceeds with a presentation and evaluation of the foundation of the theory under consideration. This evaluation goes on to discuss its contribution to postmodernity.

1.1. The Postmodern Challenge

It is frequently postulated that we live in the most advanced age ever and that the advances of the 20th century cannot find any equivalence in the history of the human civilizations. Such a postulate leads to the question, In what manner is the present Western civilization superior to the previous? The proponents might argue with examples like it is possible to send a space shuttle to the moon with a precision of 10 cm or our hospitals can cure people that

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previously where doomed to death, etc. Although there have been some highly sophisticated civilizations previous to the present, it is reasonable to argue that our civilization is the superior one. Yet are people today happier? Considering the amount of hunger, the injustice, the drug problems, the criminal explosion and terrorism, the social unrest created by unemployment, budget cutdowns, inflation, recessions, the environmental problems, etc., what good does the materialistic development bring when people find their lives meaningless and hopeless? In this respect, the materialistic perspective seems to have been overdeveloped, while the normative is not only neglected, but oppressed by the determinative (de Raadt, 1997; von Wright, 1986).

On the other hand, sociologists label the present age of Western societies as postmodern. This is said to challenge the foundations of modernist thought. Hence the works of Feyerabend (1975) and Quine (1964), criticized modernity for being dogmatic when postulating ideas of truth and statements of fairness. Modernity was also criticized by focusing on dilemmas, creating doubts, and being suspicious of the scientific methods of validation. In short, the postmodern era may be characterized by consumption orientation, technological domination, and the dramatic change and erasure of absolute values and norms (Lyon, 1994). This has led to various "types," and we call these the economic man, the mechanistic man, and the nihilistic man, respectively. The deterministic domination—as expressed in the mechanistic and the economic man—over the normative—as expressed in the nihilistic man—manifests postmodernity.

Further, the present era is characterized by increased complexity. This makes the traditional approach to problem solving less suitable, because the solution of one problem may often lead to one or more new problems. Hence, Ackoff (1981) calls the present time the systems age; this is in contrast to the old machine age. The systems age requires, in his words, "management of messes," that is, networks of problems. Such a notion well reflects the nihilistic man, because when norms and rules change and disappear, the societal order becomes less clear, or a mess.

In order to make a complex situation intelligible, adequate modeling instruments are necessary to develop. Such models are crucial because they are used by organizations and societies to represent themselves and then to intervene. Hence, it is of particular interest to justify the modeling foundations that produce these models of problem identification and solution. This argumentation—and also, for example, the argumentation of von Wright (1986)—points to Systems Science, which has presented itself as a science of modeling par excellence (e.g., van Gigch, 1991; Le Moigne, 1977-1994).

Systems Science focuses on the problem of complexity or, taking the other side of the coin, on reductionism. This leads to the challenge, How can we make phenomena intelligible without reducing the essential aspects of these?

For the purposes of this text, two kinds of reductionism may be distinguished. First, there is the analytic investigation, that is, the attempt to make phenomena intelligible by analysis. The misconception of such an assumption has been elegantly expressed by Pascal (1963): ". . .I hold it equally impossible to know the parts without knowing the whole and to know the whole without knowing the parts." Second, there is the problem of incommensurability, that is, the attempt to express phenomena by representations which cannot represent the essential aspects of it. This is often done by transducing a phenomenon of a certain complexity to one of a lower complexity, hence reducing. von Bertalanffy (1968) borrowed a sweet illustration from A. Huxley: "The world is as Aldous Huxley put it, like a Neapolitan ice cream cake where the levels—the physical, the biological, the social and the moral universe—represent the chocolate, strawberry and the vanilla layers. We cannot reduce strawberry to chocolate—the most we can say is that possibly in the last resort, all is vanilla, all mind or spirit." Bunge (1959) gave it the following definition: "A level is a section of reality characterized by a set of interlocked properties and laws, some of which are peculiar to the given domain, and which are assumed to have emerged in time from other (lower or higher) levels existing previously."[2]

Following the challenge of postmodernity, a school of systems thought has been selected in order to evaluate its contribution to this. It is the French school of systems thought that is guided by Jean-Louis Le Moigne at the GRASCE[3] research center. We refer to it as Le Moigne's Systemics (LMS). LMS has presented itself (Le Moigne, 1977—1994, 1990) as being able to contribute to the present age, by making it intelligible in a way that the traditional[4] systems approaches does not. This system of thought has opened it freely for evaluation: "No scientific or cultural authority could have monopoly of determination of ethical value of knowledge" (Le Moigne, 1995). Moreover, LMS is not well known to the Anglo-American systems community, representing a South European intellectual stream.

2. FOUNDATIONS OF LE MOIGNE'S SYSTEMICS

Because of the available space, the following presentation of LMS is necessarily brief. The hope is that it will suffice for the purposes of this text.

LMS is a coherent framework of theories which aims to support systemic modeling. It has explicitly defined its ontoepistemological foundation and a set

[2]The definition is founded on the ontological hypothesis; it may be applied as well to the phenomenological one, however.

[3]GRASCE stands for "Groupe de Recherche sur l'Adaption, la Systemique et la Complexite Economique." It is allocated to Université d'Aix-Marseille III, in Aix-en-Provence.

[4]By traditional LMS we refer mainly to analytic modeling which is equivalent to Hard Systems Thinking.

of cognitive modeling theories and methods. For purposes of the present evaluation, only the ontoepistemological foundations are presented. LMS epistemology may be labeled Projective Constructivist Epistemology (PCE). It belongs to a broader family of constructivist epistemologies. Different names emphasize different properties of knowledge; in LMS' case, it is the dominating teleological hypothesis or assumption that leads us to choose PCE for a name. The whole work of LMS is influenced and founded on the so-called golden triangle, which is J. Piaget, H. A. Simon, and E. Morin (PSM). Piaget's (1937, 1970) theories are probably the most fundamental for the constitution of PCE. These consider knowledge to be actively constructed by the cognizer, who has the role of adaptation. This is done by organization of the experimental world, and not by a passive discovery of an independent reality.

In the following, the epistemological foundation of LMS is presented according to three fundamental questions: What is knowledge? Why is knowledge valid or adequate? and How do we know?

2.1. What Is Knowledge—The Basic Assumptions

This question is answered by LMS' two basic assumptions. These are the phenomenological and the teleological assumptions, discussed in the following.

2.1.1. The Phenomenological Assumption

It states that the human actor knows only artificial representations of subject–object interactions. Knowing does not start by the knowledge of self, or that of things as such, but by that of their interactions. Hence, there is no separation or independence between the act of knowing an experience and the act of self-knowing, as experienced by the subject. This cognitive interaction between the experience and the knowing subject forms knowledge, which is organized and structured by knowledge itself. The mind does not have any direct access to an independent and unmediated reality; it rather accesses the experiences of the neural system. The latter may or may not have been in contact with that reality (Le Moigne, 1994, 1995a,b).

This basic assumption of knowledge has some strong properties. It postulates the constant change of knowing, which implies that knowing is an action, rather than a state. Next, the recursivity of knowing states that knowledge can be self-referential, that is, humans can know about knowing. Finally, knowing is a dialectical process, where the atomist and the opposed holist paradigms interact with each other (Le Moigne, 1995b).

2.1.2. The Teleological Assumption

The second assumption postulates that knowledge is constructed due to the knower's intentions, purposes, goal, aims, finalities, etc. This makes it possible

for the knower to assign meaning to his knowledge and it accepts the free choice of human being, in contrast to the determinist assumption, which implies a preprogrammed behavior (Le Moigne, 1977–1994).

Summing up, the what of knowledge may be expressed as: the knower knows only intentional phenomenon, due to dialectic construction of representation of subject–object interactions, which manifest evolution and recursivity.

2.2. How Do We Know? A Methodological Question of Knowledge Constitution

LMS has developed and adapted a set of theoretical constructions (Le Moigne, 1977–1994, 1990, 1995b) for its methodologies. Below the two most important are presented for the purpose of argumentation. These include the General System (GS) of systemic modeling and the second principle of Inforgetics: the Principle of Intelligent Action (PIA).

2.2.1. The General System of Systemic Modeling

Systemic modeling (SM) is carried out with a set of cognitive instruments. The most central idea is the theory of a General System (GS), a theory of modeling. The elements that SM uses are the product of a merger of the cybernetic (Wiener, 1948) and the structuralist (Piaget, 1968) theories of modeling and are arranged as follows (see Fig. 1): a structure functions and transforms itself and other systems in its environment with the aim of attaining one or several goals (Le Moigne, 1977–1994, 1990). For example, in a university we could say that administrators, researchers, and teachers (structure) produce knowledge and educate people (function) and experience growth and change (transformation), as an organization aiming at increasing the wisdom of people (goals).

The difference between the systemic model of LMS and traditional cyber-

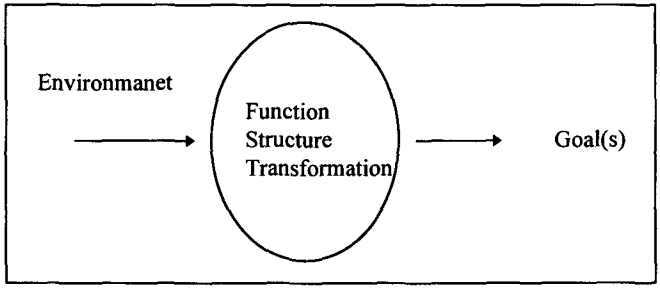

Fig. 1. A principal scheme of the General System of systemic modeling.

netics is that the GS also gives an account of *what* is creating the behavior, i.e., the formation of a system's structure and its mutual relation to the emergent function. In contrast, the cybernetic model considers the same phenomenon to be a "black active box." A cybernetician distinguishes a phenomenon's behavior in relation to a goal and in an environment; for example, a polar bear would be considered as the behavior necessary to survive in a cold climate. In cybernetic terms, the *behavior* (also called transformation) does not see any difference between the function of a structure and the transformation of the same structure, as the systemic notion does. Rather it considers it as one unified action; this is because it has no knowledge of the system's structure; hence the same description may belong to an Eskimo.

2.2.2. Inforgetics and the Principle of Intelligent Action

When attempting to make complex systems intelligible in the domain of mind and social sciences, Le Moigne (1990) follows the critique that Bateson (1971) delivers, concerning the inadequacy of using energetics theories from the domain of physical sciences. As an alternative, LMS presents (Le Moigne, 1990) the inforgetic theories. The latter studies the conceptual domain where information is transformed into organisation, and vice versa, due to a mental decision process. This may be contrasted with the domain of Energetics, which studies the physical conversion process of matter to energy, and vice versa.

LMS' theory of inforgetics presents two fundamental principles, that is, in parallel with the two principles of Energetics (or thermodynamic). The second principle, which concerns decision making, is briefly discussed here. This is called The Principle of Intelligent Action (PIA) and is derived from the works of Newell and Simon (1972). It considers the decision process in three sequential and recursive phases, as in the following: (a) intelligence, or definition of the gap between the projected and the perceived situation; (b) design, or the conception of one or several alternatives that bridges the gap identified in the previous phase; and (c) choice, or selection of a satisfying alternative due to a multicriteria evaluation. This process of an intelligent and adaptive behavior accounts for the teleological and the phenomenological assumptions of knowing. It also accounts for human qualities such as memory, imagination, conception, etc. PIA favors the heuristic, dialectic, and inductive processes of reasoning, which searches for satisfying adequacy and projective feasibility. PIA may be then contrasted with the second principle of Energetics, the principle of maximum-from-minimum, or The Principle of Least Action (PLA). This postulates the existence of a unique and optimal solution. That principle is founded on the deterministic assumption, and denies human intelligence, because the solution is already predetermined. PLA favors algorithmic and deductive processes of reasoning, which searches for an optimal, unique, and objectively true solution.

2.3. Why Is Knowledge Valid or Adequate?

The question of validation is always crucial because it is the aspect of epistemology that is supposed to justify the theoretical constructions, which also includes the theory of knowledge as well. Two criteria of constructivist notions that are generally considered are the subjective and the intersubjective coherence of mental constructions. According to Le Moigne (1995b), however, these are indeed the arguments of the American Pragmatist schools of thought, which provide the criterion of feasibility: the truth is what is useful in practice. In PCE's notion, it is the criterion of "projective (or cognitive) feasibility" (Le Moigne, 1995b) which is compared with the positivist and realist notions of objective truth. The constraints of experienced reality eliminate what is not feasible. They do not, however, interfere with what does not conflict them.

When applying this criterion of projective feasibility to the epistemological foundations of itself, LMS provides the argument of social contract, which is aimed at justifying its epistemological position. This argument is founded in LMS' notion of science, which is considered an autonomous system; that is, at the same time being different and maintained differently from its substrate environments on which it is interdependent. Only then can science be known well enough to self-produce its own foundations (Le Moigne, 1994b).

2.3.1. The Social Contract

Accordingly to LMS, proposing epistemology, and therefore some criteria for knowledge construction, is to propose a social contract for the sociocultural system which is supposed to develop this knowledge. This knowledge should then hold some identifiable value for this culture, expressed in sense, intelligibility, or effectiveness. Therefore, if the validity or adequacy of these criteria is an illusion and the sociocultural system does not accept the fundamental assumptions, then the epistemologically founded knowledge and its ethical value for society no longer have any basis. Consequently, LMS (Le Moigne, 1995b) postulates an exacting and continual examination of the founding assumptions for knowledge construction in order to assure their ethical value. LMS attempts to formulate and reformulate itself openly and carefully.

3. CRITICAL EVALUATION OF THE FOUNDATIONS OF LE MOIGNE'S SYSTEMICS

A preliminary critical discussions[5] of LMS' position is presented here. The evaluation attempts to identify some properties that are drawbacks and some that are contributions to the field.

[5]This critical evaluation of LMS is partially affected by Mingers (1995) critique of Maturana's positions, which the present author would like to acknowledge.

3.1. Some Limitations of LMS' Position

3.1.1. The Intellectual Sources of LMS

LMS' main intellectual parents are the works of Piaget, Simon, and Morin. These are well known to the international community and have generated a certain amount of critique. Here we choose one of these in order to illustrate the argument. Morin's (1977, 1980, 1982, 1986, 1991) epistemological project La Méthode, or the new science of science, is criticized among others by Holmqvist (1993). The critique focuses its uncritical and unsatisfactory acceptance and centralization of scientific results. The impression given is that social problems find their answer or model in biology. Further, the implicit and/or neglected investigations of sociohistorical, political, and philosophical aspects require further investigation. Assumptions, partiality, and criteria are often neglected and hidden behind an acceptance of traditional methods and perspectives. The conclusion questions Morin's claims made for the novelity of what is considered as a new science.

In defense one could argue that the unification and modification of the three theoretical positions within LMS manifest a critical position. It seems, then, that a general awareness and response to the critique of these three positions are included in LMS.

3.1.2. Is There an Inconsistency of Constructivist Theory?

The following argument is frequently delivered against strong relativist theories. These claim that all knowledge is relative to the knower or a group of knowers. Similarly, PCE postulates that no theory may claim objective truth. Thus, this postulate should apply as well to the postulating theory as such.[6] Consequently, others are not compelled to agree with the theory. If the autoreferential quality is rejected, then the theory becomes inconsistent (Mingers, 1995). This argument has been taken up by Anderson (1995), who states, "My position is however, that instead of using the contradiction as a prima facie reason for rejecting radical relativism, we may consider the possibility of generalising the concept of truth so that at least certain kinds of contradictions can be accommodated." Andersen's (1995) argument postulates that if a theory is completely to avoid inconsistencies, then ". . .we have to curtail our means of expression to such a degree that they become dissociated from our daily life." No comment is given, though, on which ". . .certain kinds of contradictions can be accommodated" and which cannot; the criterion for such an exercise would most probably become that which suits a certain theory most.

The argument of self-contradiction may be extended to the act of theory

[6]This autoreferential argument is especially current for PCE, when one of the explicit characteristics of the phenomenological hypothesis is the recursively of knowledge.

generation as such. The constructivist theory in general and PCE in particular state that, due to empirical observation, in biological and psychological domains, no access to reality is possible: ". . . We know only representations of interactions. . ." (Le Moigne, 1995b). Consequently the study as such may claim only phenomenological validity rather than ontological; per definition, the studies studied representations of interactions. It seems, however, that LMS is satisfied with such a position.

Another objection may be posed, because LMS in several statements of its texts seems to imply the existence of a third, i.e., something beyond the mind and its experiences. One of these is the strong focus on the existence of a systems environment, especially due to the influence of the cybernetic model on the systemic one. Further, the argument for knowledge validation—that is, the intersubjectivity or domain of consensus—requires more than one observer. On the other hand, an antiargument could be thought that these distinctions in themselves do not need any ontological commitment and would be effective due to the phenomenological hypothesis; that is, the other actor or the environment is a cognitive scheme that represents an experience only.

Then the realist position (Mingers, 1995) would counter with the accusation of epistemic fallacy, which is concerned with the relationship between epistemology and ontology. Denying the existence of an independent reality due to the theories of the knower, i.e., answering the question of existence purely in terms of knowledge of what exists, implies a reduction of ontological domain to the epistemological one. The realist would argue that human knowledge is not limited to what actually exists or not; rather the reverse, the knower knows because she or he exists. Dancy and Sosa (1992) attempt a clarification of an eventual misconception, however, which may argue for LMS' position: "It is quite unjust to charge idealism with an antipathy to reality, with ontophobia, as Ortega y Gasset called it. For it is not the existence but the nature of reality that the idealist puts in question."[7] The pragmatist notion was similarly expressed by James (1897): ". . .Please observe. . .that when we give up the doctrine of objective certitude we do not thereby give up the quest or the hope of truth itself." It seems that this is the position of LMS (Le Moigne, 1995b): it does not deny the existence of an independent reality, or postulate such an existence; it only denies the knowledge of an independent reality.

Finally, when it comes to the ontological assumption, it seems that Luhmann's (1990) comment is illustrative: "If a knowing system has no entry to its external world it can be denied that such an external world exists. But we can just as well—and more believably—claim that the world is as it is. Neither claim can be proved; there is no way of deciding between them."

[7] Indeed, PCE accepts the existence of reality, but only the mediated one, known due to representations, rather then an independent one.

3.1.3. The Limits of the Feasibility Criterion

It seems that the criterion of projective feasibility, which ultimately ends with the constraints experienced by the cognitive system, has found a way between the relativistic and the absolutist positions. Then it is reasonable to consider the implications of this for human beings in particular and humanity and civilizations in general. Hence the question, Is the projective feasibility feasible for humanity? The criterion seems to be acceptable from a biological point of view, when the project is biological survival, adaptation, and duplication. When the project is humanity, the criterion does not say anything about what is good or bad for humanity, but still feasible for biological species. Then such a notion reduces human beings and civilization to a dimension that they have passed a couple thousand years ago. The history of civilization should provide evidence that the criterion of projective feasibility is doubtful when the project is anything else than biological survival.

3.1.4. Potential Danger

LMS' position may be seen as potentially relativistic when it assigns itself to the feasibility criterion of validation and the social contract: "This knowledge ought to then hold some identifiable value for its culture, as expressed in sense, intelligibility or effectiveness" (Le Moigne, 1995b). The criterion becomes unclear and therefore potentially relative. In a rather drastic example, such an approach would potentially lead to a justification of situations like Nazi Germany during World War II. The sophisticated propaganda machine manipulated the intersubjectivity of the German people, who got different perspectives of what is right or wrong—". . .or hold some identifiable value. . . ."

3.1.5. Epistemic Theory or Cognitive Theory—A Confusion?

LMS' epistemology is founded to a large extent on Piaget's (1970) genetic epistemology. This considers the function of human knowing as adaptive in the biological sense; furthermore, its mission is to provide viability for the cognizing organism. Such a theory may be termed a cognitive theory. This does not provide answers to questions like what is good or bad for human beings or societies, issues on which the ancient philosophers spent much effort in order to provide answers. The answers were to guide the members of civilizations in how to think, what to think about, and—perhaps most importantly—why to think of certain things. This in turn should help man in thinking; for example, how to become a good husband or a good wife. From this point of view, LMS' epistemic theory may be considered reduced to a theory of cognition.

LMS' response could be that, although such a notion has good aspirations, a theory of *episteme*—or scientific knowledge—needs to provide a description and eventually an explanation of how a knower comes to know—in order to be a theory of knowing. The constructivist epistemologies purport to provide such

knowledge.[8] Further, because of the underlying assumptions of constructivist theory, LMS would argue that such answers ought to be given by *fronesis*—or ethics—and philosophy, and not by *episteme*.

3.2. Some Possibilities of LMS' Position

3.2.1. Intention of LMS

The purpose of a certain school of thought may be considered as its existential justification. In LMS' case it states that its aim is to contribute to the understanding of social complex systems in a way that the traditional approaches do not (Le Moigne, 1990).

3.2.2. Antiutilitarian

The second principle of inforgetics, that is, the Principle of Intelligent Action, focuses explicitly on a search for adequate solutions to problems, rather than the search for a unique optimum. The latter, inherited from the second law of thermodynamics, postulates the maximum-from-minimum paradigm. This seems to be imposed by modernism on our culture and is manifested in the economic man but is rejected by LMS.

3.2.3. Antifuzziness of Social Systems

The rather general notion that social systems are less exact than natural or living, and therefore fuzzy, is opposed by LMS, which presents its alternative foundation in the inforgetic theory. It argues that such a misconception stems from the attempt to conceptualize social systems in terms of natural systems (i.e., Energetics). Hence, these conceptualizations were not developed for that purpose but are considered a priori for all kinds of systems.

3.2.4. Epistemological Foundation for Designed Systems

The modernist conception of science, due to its empiricist tradition, may be characterized by descriptive logic, empirical, and analytical investigation, determinative rationality, and postulated neutrality or value freedom. This has for a long time reduced disciplines that study other than natural and living systems to merely applied sciences. For example, the traditional methods of positivistic science, characterized by hypothetical verifications, often have the following structure of actions: (a) observation of a phenomenon to be explained, (b) proposition of an explanatory hypothesis in the form of a deterministic system that can generate a phenomenon isomorphic with the one observed, (c) proposition of a computed state or process in the system specified by the hypothesis

[8] As noticed by von Glaserfeldt (1995), Piaget's theory of cognition does not present any model of consciousness. Hence a question may be posed, Can a generative model of cognitive viability be considered as a model of knowledge? Does not the notion of knowledge imply a consciousness?

as a predicted phenomenon to be observed, and (d) observation of the predicted phenomenon. Already the first action presupposes an existing system to be investigated. What about systems created due to human intentional actions? For example, a car or a kindergarten: these are systems that do not exist until having been conceptualized and constructed by human intervention. Moreover, such a method presumes a deterministic rationality of a system's existence also for systems that are created by humans, i.e., artificial. The misconception of such an approach when considering purposefully created systems may be illustrated by the following illustration of two systems: the first is the fascinating Mayan temple on the Yucatan Peninsula (Mexico), and the second is the powerful Niagara Falls in Ontario (Canada). It is reasonable to consider that the first one was built *in order* to serve as an astronomic observatory building, that is, an intentional human act, while the second was created by natural forces, *because* of certain geological circumstances.

A significant importance of LMS lies in its contribution of well-developed theoretical foundations of designed systems, that is, systems science. These no longer need to be considered merely as applied, second-hand sciences. Systems science can expose its own epistemological foundations as well grounded and coherent as the natural sciences. LMS primers the teleological hypothesis before the deterministic; it opposes analytic modeling with its anatomist attitude; it focuses the imperative mode of logic that allows an ought-to mode, a prescription for designed systems.

4. DISCUSSION: LMS AND POSTMODERNITY

Out of this critical evaluation of LMS, the following conclusion may be reached. First, LMS provides the modeler with an explanation of why the mechanistic man is inadequate—as manifested in analytic modeling. It also provides alternative theoretical foundations: the systemic modeling and the inforgetic theory. Second, LMS explains also why the economic man's maximum/minimum is not satisfactory and again provides an alternative: the Inforgetic theory. This searches for satisfaction and, therefore, is an alternative to the utilitarian approach. Third, LMS' foundation in Piaget's theory of cognition provides a plausible explanation of how it comes that the nihilistic man is possible at all. This occurs by cognitive equilibration, which makes it possible for human values to be transformed, where the old disappears and a new emerges.

LMS does not provide any guidance of an ethnical nature in order to manage the nihilistic man; it only provides a plausible generative model of him. What is right or wrong? To this question the readers have to search elsewhere for an answer. This characteristic of LMS may be considered less satisfactory when attempting to make intelligible and manage postmodernity. Ethical concern is found in two other recent schools of systems thought: Critical Systems

Thinking (Flood and Jackson, 1991), based in part on Habermas, and Multimodal Systems Thinking (de Raadt, 1991), based on Dooyeweerd. Even from LMS' standpoint it may be considered important to study the ethical realm when it associates itself with an imperative mode of logic rather than just a descriptive. Also, the constructivist foundations manifest the impossibility—in the biopsychological sense—of any waterproof border between the realms of epistemology and of ethics as the empiricist position maintained for a long time, postulating objectivity and value independence. LMS seems to have understanding for this issue itself: "But epistemology is best placed of all disciplines to recognise and to show questions on the value of knowledge by which, in some way, it assures the scientific status. It is important that it assumes this responsibility of permanently reformulating hypotheses, on which these attainments of knowledge are based, are also of discussing the ethical significance of knowledge it produces" (Le Moigne, 1995).

In conclusion, then, LMS seems to provide some pertinent contributions to the management of the present age. However, it does not give any guidance for its compass needle. This is perhaps the most important issue of today.

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