COGNITIVE FOUNDATIONS OF ECONOMIC INSTITUTIONS: MARKETS, ORGANIZATIONS AND NETWORKS REVISITED*

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Abstract — The present article discusses the trade-offs between markets, organizations and networks in terms of the cognitive means and the values underlying them. It is claimed that the regulative ability of the market is inextricably bound up with the numerical codification of economic activity supported by the utilitarian world view. Numerical objectification and utility constitute the ontological prerequisites for the creation of marketable objects. Modernity coincides with the transformation of markets from places to set of functions or mechanisms. It is this way that the market overcomes the limitations of context-embedded exchange and becomes a major form of regional, national and global socio-economic coordination. Organizational relationships on the other hand are heavily dependent upon the medium of natural language, escaping thorough numericalization and retaining a plurality of values. Formal organization can and needs to act on the world on the basis of ambiguous signals that resist quantification whereas the market collapses without quantifying techniques that assign numerical values, i.e. prices, to objects and activities. Networks reclaim the regulative power of communal dialogue freed from the cognitive closure of the market and the social rigidity of authority mediated relationships.

Key words: Codification, exchange, epistemology, values, networks, markets, organizations, cognition.

INTRODUCTION

Markets and organizations have traditionally been considered as the major institutions for the allocation of resources and the coordination and control of instrumental activity. Any informed attempt to reflect on the limits of, and the factors that impinge on, the trade-off between these two basic forms of coordination halts at the recognition of the momentous importance and the interdisciplinary character of the issues involved. By and large, economic policy and the political ideologies of modernity have evolved around the regulative ability and distributive justice of these institutions (e.g. Burchell et al., 1991; Hayek, 1960; Lindblom, 1977). For the economist with a neoclassical background any form of regulation other than the price system is to be considered as an aberration, or at best a deviation, from the ideal state depicted in the models of perfect competition. Alternative forms to the market develop whenever the market fails — or rather is made to fail — to monitor effectively the activities of economic actors. But even within this framework there has been a steadily increasing awareness that the market mechanism, despite its importance, is incapable of meeting the entire spectrum of demands that make up modern societies. Alternative forms to the market are required to correct, complement or supplant its limitations (see e.g. Arrow, 1974; Sen, 1987). This is how the issues are framed from the theoretical horizon of economics. A different set of questions might appear, however, if one opts

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for relaxing the initial assumptions of the economic discipline. The price system does not appear any longer as the natural point of departure, the central locus and yardstick to which any other system of organization must inevitably be referred to and against which it must be assessed. The very existence of the market, or any other system whatsoever, needs to be accounted for and explained (see, e.g. Bell, 1973; North, 1981; Perrow, 1986).

Although the present article evolves from the context of the questions raised by this debate, it departs markedly from it. For it attempts to connect the coordinative ability of markets and organizations with the codifying procedures which such forms privilege, in order to frame and represent their respective domain activities. Markets and organizations differ vastly in this respect. Price, for instance, is a numerical conversion of value which ideally, but not necessarily, reflects the priorities and means of a cultural community, its so-called preference–scarcity condition (see, e.g. Lindblom, 1977). The functioning of the market is inextricably bound up with the numerical conversion of value. This last is a fundamental prerequisite for the comparability and exchange-ability of objects of value, and for the emergence of the modern, impersonal or decontextualized exchange that we refer to as the market. Formal organizations and other organizing forms (projects, networks) employ an impressive amount of numerical techniques of representation, albeit without limiting themselves to such techniques.

It seems quite plausible that a system’s predilection for and its perception of the issues relevant to be considered and addressed, are closely connected with the representing codes and the cognitive means which the system in question is apt to use. Recent attempts to create internal or quasi-markets, i.e. to superimpose the principles of the market mechanism on those of planning and to use the logic of the price system internally as a basic mechanism for creating an awareness of resource scarcity in organizations (Ackoff, 1993; Hasselbladh, 1994; Jönsson, 1992), bear witness to the fact that the procedures of codification and representation have, or are believed to have, a significant impact on the behavior of different systems. Codification may however be too modest a word. Representation and the procedures of codification are not innocent techniques that copy a reality anterior and exterior to themselves, but have a formative and constitutive effect on the aspects of the world which they supposedly refer to. In an age of revitalized liberal discourse it is important to understand and appreciate the constitutive relationship between the cognitive means and operations and the values that sustain the institution of the market. Interpersonal comparisons, in terms of quantified utility, posit the world in a very particular way (Rawls, 1982; Sen, 1987) which needs to be contrasted with the world views privileged by institutions alternative to the market. Reflection on the organizing ability of the major forms of social and economic coordination, which does not take into account the far-reaching effects of the techniques of representation, ignores a highly relevant and important dimension of the contemporary social scene.

I have thus used the term “epistemology” to refer both to the representing codes and the underlying values and considerations that sustain the cognitive behavior of markets, organizations and networks. This somewhat deviant use of the term “epistemology” is motivated by the character of the effects with which it is here claimed to be associated. Epistemology defines the cognitive means whereby social actors frame their reality and act upon it, thus forming an indispensable part of economic activity. As Mary Douglas puts it “for a convention to turn into legitimate social institution it needs a cognitive convention to sustain it” (Douglas, 1986, p. 46). The aim here is to attempt to link epistemology and its formative effects to the organizing ability of markets, organizations and networks. Market epistemology, as already suggested, relies heavily on the numerical description and coding of economic activity, on the background of the ethical — and often implicit — standpoint that utility is the only thing that counts. Organizations and networks, on the other hand, make use of diverse regimes of signification and plural and redundant semantic
categories embodied in verbal representations. We need, then, to understand how the domains of numbers and words relate to the functions and operations and the coordinative ability of markets, organizations and networks. Institutional patterns of cognition provide the means whereby aspects of reality are selected and priorities and targets posited and acted upon. Epistemology, then, has far-reaching effects, not only on how effectively something is done but also on what is done, i.e. on the set of questions perceived and addressed. When institutionalized and systematically applied, apparently innocent modes of codifying and representing tend to become world views, fundamental ways of framing and acting on the world.

The formative power of social cognition and the semiotic logic of different systems of representation have not been given a prominent place in contemporary theorizing on the coordinative trade-offs between markets, organizations and networks. Occasionally, perhaps in the wake of Simon’s work, social cognition has been equated with information and information processing (e.g. Schotter, 1981), which implies a very narrow view of cognition indeed, whereas at other times it has been connected with ideology (North, 1981). The cognitive or epistemological foundations of economic activity assume a particular significance today as modern technologies and forms of communication, with their enormous time–space bridging ability, are becoming increasingly capable of detaching economic action and exchange from their oral embeddedness and their face-to-face interaction and are structuring the preoccupations of economic actors by resorting to electronically mediated abstract data. The mobility and condensation of resources that electronic representation allows signal an important shift in the framework of economic activity. It is thus necessary to investigate the logic of different systems of structuring and mediating economic values and their connection with existing forms of governance and coordination.

However, it is not my intention that this article should be read as a statement within economics but rather as a statement about economics, or, more correctly, about organization in its broadest sense. The article draws on an interdisciplinary framework and seeks to connect the semiotic logic of verbal and numerical systems of representation with the functioning of the main institutions or forms of economic accomplishment and coordination. After some brief preliminary remarks on the intellectual antecedents that seem to bear on the present project, the article presents its basic argument and attempts to connect the regulative ability of the market with the descriptive and surveying power of numerical representation and to trace out some of the consequences of such an approach. Market epistemology is, thus, contrasted with organizational epistemology, which is constituted by numerical and linguistic representations that are claimed as giving organizations the potential for a greater cognitive flexibility. Such a cognitive flexibility, however, may remain latent or even be curtailed by the institutionalization of power relationships that coincides with the formation of organizations. Networks differ from markets and organizations in some important respects. Being often embedded in particular contexts of socio-economic life, networks reclaim the regulative power of communal dialogue, freed from the social rigidity of authority relationships and the cognitive closure of market exchange. The article closes with some comments of theoretical and empirical relevance.

MARKETS, ORGANIZATIONS AND NETWORKS

Reflection on the trade-offs between markets and organizations has diverse theoretical and empirical antecedents. The work of Simon (1959), March and Simon (1958) and Cyert and March (1963) and the notion of bounded rationality have had a considerable impact on the reconsideration of the behavioral assumptions of the neoclassical framework. Taken together or separately
March and Simon’s works constitute a comprehensive intellectual body whose impact can be traced along different lines. Suffice it to say that bounded rationality, whether as a detached scheme for representing and evaluating alternatives (Simon, 1969) or as a mode of action (March, 1988), inevitably associates cognition with economic behavior, since it connects the cognitive or epistemological limits of economic actors with the structural or institutional arrangements that result from — or seek to accommodate — these limits. Lacking omniscient rationality and internal consistency, markets and organizations appear as staggering and conflict-ridden systems whose cognitive behavior needs to be investigated rather than assumed.

Another thread of research that bears on the present project is represented by the work of Coase (1937) and Arrow (1974) on transaction costs and market failures. Both this tradition and that represented by March and Simon could be said to have found a place in Williamson’s theoretical framework and his systematic and persistent attempt to reflect on the coordinative trade-offs between markets and organizations (Williamson, 1975, 1981). Briefly, Williamson’s approach repositions the unit of analysis from the commodity to transactions and the costs that then accrue (Williamson, 1981). Bounded rationality, opportunism and existing forms of competition (be it perfect or imperfect), coupled with asset specificity, interact in such a way as to suggest that either the market or the organization is the efficient alternative framework of economic activity. Intermediate forms of collaboration, e.g. contractual agreements, develop whenever the market and the organization fail to provide efficient solutions. Considerations of costs alone, developing at the buyer-supplier interface, constitute the ultimate factors that decide which of these forms will be likely to prevail. No other costs, e.g. production or operation costs, are taken into account in explaining the pattern of economic activity.

A third line of thought goes back to the sociological tradition of exchange theory and the work of Homans (1950), Emerson (1962) and Blau (1964). The conceptual strategy of methodological individualism and the principle of atomistic competition have no place here. Transactions and exchange, the control and regulation of social activity are not determined by the free responses of unconstrained and independent actors to prevailing prices. Rather, and this applies particularly to Emerson and Blau, interaction and exchange are mediated by power relationships which are ultimately rooted in the division of labor and the resource dependencies of social actors. A great many observations appear to support and empirically substantiate the idea of intermediate forms of coordination developing in the regulative void left by the operations of markets and organizations (Burt, 1982; Cook and Whitemeyer, 1992; Hägg and Johanson, 1982; Pfeffer, 1981). The network concept has been regularly used as the figurative vehicle for conveying the idea of actors and practices linked across the boundaries of firms and organizations by means other than prices or authority.

The picture is no doubt much more complex, but this incomplete theoretical trajectory nevertheless provides an important part of the intellectual antecedents which have sought to accommodate or surpass the limitations of the neoclassical framework in particular, and economic thinking in general. The whole idea of the network, suggested as a plausible alternative framework for economic activity as opposed to markets and organizations, needs to be considered further. For, however suggestive it may be, the network concept seems to have been fuzzily defined and have remained ambiguous, not having yet acquired the theoretical coherence that characterizes the other alternative research traditions. Markets have always been connected with the regulative ability of instantaneous, monetary exchange and organizations with authority. It is by means of these basic mechanisms that coordination is accomplished. I suggest that the network concept lacks the delineation or at least the systematic consideration of a comparable mechanism. The idea of exchange, as employed in exchange theory, provides no more than the overall frame-
work for locating social activity rather than the delineation of a specific mechanism of social coordination.

A close examination of the theoretical and empirical corpus that utilizes the network concepts reveals three distinct conceptual frameworks drawing on different theoretical and paradigmatic assumptions, postulating a number of coordinative mechanisms (see, e.g. Kallinkos, 1989). Very briefly, networks have been conceived as resource-flows, information-flows and webs of signification. As the metaphors suggests, the first two approaches are concerned with the shape of pathways along which resources and information flow, whereas the third might be said to lend priority to the cognitive and normative codes and the behavioral orientations that link social and economic actors to their instrumental targets and activities (Burt, 1982; Hägg and Johanson, 1982; Kallinikos, 1989). In the context of these broad preoccupations, power, learning, consensus, trust and friendship and perhaps many others, all appear as mechanisms that, more or less explicitly, are opposed to those of exchange and authority. We need to return to these issues.

MARKET EPISTEMOLOGY

Though the idea of an epistemology of the market might sound odd, it can nevertheless be justified on many grounds. Epistemology refers to patterns of cognition and perception, the means by which a system comes to know and act upon its world. Epistemology embraces a reactive (perception) and an active or constitutive (conception) component. In this respect market epistemology might be said to refer to the cognitive means and coding procedures (prices, i.e. numerical conversion of value) whereby the market mechanism conceives and codifies market conditions and describes its own domain (the values of product and services). The epistemological dimension of the market can be juxtaposed to the quasi-behavioral and agonistic dimension of the market, i.e. the different forms of competition and their implications. These last have so far been the main focus of attention, at the expense of what I here call the epistemology of the market. However, the impersonal or decontextualized character of the modern institution of the market (Bell, 1992) puts a premium on the cognitive means whereby this institution mediates and bridges the spatio-temporal and cultural diversity of social and economic actors. Lacking the information provided by the traditional sources of oral exchange and communication (Ong, 1982), economic actors become highly dependent on the kind of information that is codifiable and effectively transmittable across time and space. I mean to suggest that market epistemology acquires a novel significance, as the traditional sources of verbal and iconic communication which characterize context-embedded exchange fade and are replaced by the standardized and abstract constitution of numerical representation (Lane, 1991). Electronically mediated market exchange stands here as the epitome of silent exchange far removed from the traditional sources of information and discourse associated with context-embedded interaction.

Thus, market epistemology directs attention to the notion of price and the implications stemming from the conversion of human accomplishment into numerical values. Of course, prices are not simply numerals. Prices result from a dual operation: first, they are supposed to reflect the value of goods and services, i.e. the preference–scarcity relation. Prices epitomize the encounter of the objective condition of scarcity with the subjective state of preference. Real prices can deviate from this ideal (equilibrium) state, yet such a deviation is to be understood and assessed with reference to the essential relations dictated by the preference–scarcity condition. Secondly, prices convert values into cardinal numbers, i.e. they numerically represent the value accruing from the preference–scarcity condition within the social and cognitive framework provided by the insti-
tution of money. Prices have, so to speak, a social and a cognitive component. The apparent simplicity and "naturalness" of the numerical representation of value makes the cognitive dimension of the price system readily and easily overlooked. However, except in the limited cases of trading in kind, the numerical conversion of value is the basic cognitive medium that designates the exchangeability of a product or service (its relations to money and other products), and is an indispensable condition for decontextualized exchange and the adequate functioning of a market economy. It is therefore important to look fairly closely at the epistemological status of this conversion. Numbers and numerical values establish a particular regime of signification and represent only a portion, albeit an important one, of the cognitive means by which humans conceive, posit and act upon the world. Numbers are standardized, abstract and semantically impoverished entities, and the conception, description and instrumentation of activities in terms of numbers have both positive and negative implications. Social comparability based on numerical visibility is achieved at the expense of variety and implies the extensive closure of the social and economic world. Again, the question might at first glance seem irrelevant, since economics can legitimately be viewed as coinciding historically with the spread of numeracy and the establishment of the domain of numbers as one of the principal means of national and regional governance (Arendt, 1958; Cline-Cohen, 1982; Rose, 1991).

However, a closer look at forms of coordination representing alternatives to the price system shows them to be inextricably connected with the cognitive limitations of this system, in the sense that they occupy a social and economic terrain which the market fails not only to coordinate (recall the notion of externalities) but even to conceive, render visible or address. Contractual agreements and interorganizational relationships are based more on the model of dialogue than on that of market exchange. Both dialogue and exchange are basic forms of human interaction, but market (spot) exchange dissolves preferences, rights and obligations into numerical equivalences. Forms of interaction and exchange other than the price system resort to other means. Verbal representations, be they within the framework of authority or interorganizational relationships, are necessary to keep the social game modestly structured and the terms of exchange open when uncertainty and ambiguity prevail. It is not equivalence but reciprocity that makes more sense here. If planning and coordination by means other than prices, however limited, are neither vices nor social perversions, then they would seem to testify to the fact that economic actors need to act upon the world on premises other than — or additional to — those provided by prices or numbers. On its own, quantification imposes severe cognitive limitations that need to be supplemented by invoking alternative social epistemologies (Arrow, 1974; Sen and Williams, 1982). The plural and redundant semantic networks of natural language can step beyond the requirements imposed by the management of ambiguity, and provide the cognitive means for surpassing the ethical closure and monism of utility, giving attention and consideration to issues extending farther than the epistemological capacity of the utilitarian world view (Lane, 1991; Sen, 1982).

The semiotic logic of numeracy

It is a semiotic commonplace nowadays that there are important epistemological differences between various modes of describing and representing the world. In this regard, words and numbers differ vastly. There are important trade-offs between the information richness of qualitative representations on the one hand and the precise and standardized character of quantitative representations on the other. Such cognitive trade-offs inevitably impinge on and shape the information needs of actors and the interaction patterns that seek to accommodate these needs. An assessment of the ability of different forms of governance and coordination inevitably leads us to an
examination of the logic intrinsic to these two principal modes of representing and signifying, i.e. those conducted by verbal means on the one hand and numerical on the other.

Both numbers and words, numerical and verbal means, have an intrinsic ordering capacity. Both reduce complexity and ambiguity, yet they accomplish this by relying on quite different techniques and operations. It is important to recognize that the cognitive entities we call numbers deal with purely formal relations which are then transposed onto facets of the empirical and tangible world. Numbers do not deal with the complex totalities of concrete and tangible things: "... the first prerequisite for the understanding of number lies in the insight that number deals not with given things but with pure laws of thought" (Cassirer, 1955, p. 227). The conceptual as opposed to the empirical nature of number is intimately connected with the formative or constitutive capacity of numerical epistemology and the ontological status of the market. The non-tangible regulative operations associated with the invisible hand of the market largely coincide with the application and transposition of these "pure laws of thought" onto a particular domain of social life, i.e. that of production and consumption, whose intrinsic variability and heterogeneity are rendered commensurable and exchangeable by reckoning them on a cardinal scale.

Cline-Cohen (1982) and Rose (1991) noted that numbers reduce complexity and bring order along four distinct dimensions. First, they standardize different objects and processes in the sense of emptying them of their intrinsic qualities. Quantification is homogenization in one particular dimension; i.e. in answering the question "how much" or "how many" we are disregarding all but a few of the intrinsic properties of the objects counted and/or the processes quantified. Now, words also homogenize, as, for instance, when apples and oranges are subsumed under the higher category of fruit, but such homogenization is different from numerical homogenization in that it retains important qualitative characteristics of the referred objects. Numbers are abstract entities that order selected aspects of the world in the direction of simply more or less (Cassirer, 1955). Secondly, numbers can be combined, added, subtracted, transcribed, etc., in ways that are inconceivable for words or any other kind of cognitive entities. This is just a consequence of homogenization and standardization. Numbers form what we refer to as a cardinal scale. Accordingly, they bring together and relate different realms of experience that would otherwise have remained unrelated, as, for instance, when medical and administrative inputs are described in terms of costs or revenues. Arithmetical operations emerge here as the grammar and syntax of numbers. Thirdly, numbers give a visibility to composite aspects of the world by sorting out and decomposing totalities and complexes into distinct, delimited and quantifiable parts or steps. Thus a product or service can be described in terms of the costs of the input materials in its production or a process in terms of the costs or any other quantitative dimension pertaining to it. Again, words can also decompose complex and composite aspects of the world, although in fundamentally different ways. Words decompose semantically by describing different qualitative aspects of inputs but they do not count them. Semantic decomposition creates incommensurable groups. Qualitative distinctions do not obey the laws of arithmetic, i.e. cannot be added, subtracted, etc. Finally, numbers can describe and manage time by assigning probabilities to future events. They thus introduce the notion of risk which is so important to economic action.

The comparison and contradistinction of numbers and words might give the false impression that numbers can exist independently of linguistic consciousness. It is thus of utmost importance to note that numbers are always assertions about concepts (Frege, 1950). Quantity is always of something. Costs, profits, revenues are semantic categories, i.e. they demarcate a conceptual space amenable to numerical objectification. But these notions or concepts can be described by other means than the numerical and they form a fundamental prerequisite for the operation of counting. There is no counting prior to the creation and definition of semantic categories. Thus,
numbers always presuppose a conceptual organization and operate within the interior, as it were, of concepts. It is important to keep this in mind, because quantification silently implies a predilection for certain aspects (semantic categories) of the world, i.e. those to be counted. Within the context of economic exchange and accomplishment there seems to be a hidden tension but also a constitutive complicity between particular groups of verbal and numerical representations, where a handful of concepts, amenable to quantification, monopolize the description of the world. The numerical conversions of the price system emerge against the background of meaning derived from the semantic horizon of utility. In this light words or concepts emerge as more inclusive whereas numbers appear as more abstract cognitive entities. The predilection or propensity of the different forms of economic coordination for the one or the other, thus bears witness to the central assertion of this article that markets and organizations (and networks) are separate institutions of unlike order of inclusiveness or generality, dealing with different facets of the economic world.

The market as numerically mediated coordination

Together the four aspects of numerical description mentioned above constitute the formidable power of numbers, and help to explain why and how numbers have intruded into almost every walk of social and economic life. They have in this way determined important dimensions along which the contemporary world is constituted. For the conceptual and standardized character of number indicates that numbers do not simply describe a world anterior and exterior but that they dictate part of the conditions and modes on a basis of which this world is conceived, segmented and posited. This is the constitutive power of numbers and therein lies the epistemology of numeracy. The governability and manageability of the modern world are extremely dependent on the visibility, combinability and standardization of human activity which is made possible by numerical epistemology.

According to this view, the market can be seen as a gigantic communication system which informs economic actors with the help of the language of numerical equivalences. The notions of price and monetary exchange imply that the heterogeneous and concrete results of human activities are stripped of their intrinsic qualities and rendered homogeneous and comparable along the single dimension of satisfaction or utility. The market is — and needs to be — an abstract and decontextualized system, since what we call commodities, products or services are abstract entities in the sense of being always substitutable for or exchangeable with one another in terms of value coded in money. Expectations, desires and intrinsic qualities cannot enter the circuit of market exchange unless they are homogenized as utilities and numerically codified. What cannot be thus objectified and codified does not exist, in the sense of not being capable of being perceived and handled by the perceptual and information-processing apparatus of the market.

Numerical objectification and utility are the ontological prerequisites for the creation of marketable objects, i.e. commodities. It is by means of such descriptive homogeneity and numerical comparability that the market transcends the time–space boundedness of local contexts, and extends the regulative ability of its invisible hand to a regional, national and international level. Understood in this way the market emerges as a mechanism and not an entity. A mechanism is always concerned with relationships between entities, not with the entities per se. The market is a specific mechanism, i.e. a price mechanism, regulating economic relationships between the entities we refer to as products and economic actors. Again following Cassirer and Frege, I claim that the market (relationships) is not observable at the level of immediate sensation but that it always has to be reconstructed, inferred from a complex total of contextual observations and other data (see also Bateson, 1972, 1979). Even at the most concrete and mundane level of a town mar-
ket or a stock exchange, what one notices is not “the market” but a totality of people and human artefacts engaged in a variety of actions that make sense when set in a framework of economic rationality and exchange. Modernity, or capitalism as it is sometimes called, coincides with the transformation of markets from places to a set of functions or mechanisms. It is only in this way that the market can overcome its context-embeddedness and become a major form of regional, national and global socio-economic coordination in modernity.

I am aware that such a shift in emphasis away from the context-embedded character of market exchange is at odds with both common assumptions about the market and with the theoretical ideas associated with early Anglo-Saxon tradition and the Austrian school (see, e.g. Hayek, 1937, 1960; Smith, 1976). After all, no institution can exist or survive without the vitalizing fluid that human activity provides. The market and the other mechanisms of socio-economic integration considered here are ultimately dependent on how human actors interpret the messages and information mediated by these mechanisms and how they act on them. And yet such interpretations can be systematically biased, depending upon the very forms by which information and knowledge are structured and mediated, and the expectations imposed upon individual actors from the overall framework of each particular form of integration. In light of it would be a severe limitation to equate the functioning and regulative ability of the market with the idiosyncratic interpretations, or even the reactions, of particular actors. As a societal institution the market is neither reducible to, nor understandable in terms of the specific conditions surrounding context-embedded exchange, no matter how important the latter may be. Rather, context-embedded exchange acquires its meaning from its insertion into the wider framework of significations mediated and guaranteed by the market (Baudrillard, 1988). To use a post-structuralist language, a particular exchange cannot be defined but by the absence of all other actual or potential exchanges which, taken together, constitute the socio-economic matrix, i.e. the institution of profit-driven exchange.

It is therefore an essential function of the market to bring broad visibility to the landscape of production and distribution by inserting objects, materials and activities into the melting pot of numerical homogenization, whence they emerge as commodities, i.e. numerical equivalences. By providing a common denominator the price mechanism bridges the material and functional diversity and incommensurability of human effort rendering it visible, inspectable and substitutable (exchangeable). The institution of the market could be compared to an immense blackboard on whose surface the variegated world of economic accomplishment is represented as an arrangement of labels and numbers (prices). In this light, homogenization emerges as the major drawback of market’s formidable coordinative capacity. A comparison of the performative trade-offs between markets, organizations and networks in such a perspective is destined to bring to the surface dimensions other than those that have so far been discussed in the literature. Such a task demands a consideration and exposition of the epistemology of formal organization and deliberate planning.

ORGANIZATIONAL EPISTEMOLOGY

Contemporary organization theory offers no single or dominant model of the way formal organizations function (Morgan, 1986). It is very common, though, to consider organizations as involving a secular authority relationship, i.e. a contract between the employer and the employee, in place of the market’s independent traders (see, e.g. Arrow, 1974; Lindblom, 1977). Compared with the instantaneous character of exchange, the employer–employee contract is a long-term
relationship that cannot but leave fairly open the specific forms in which the employee's labor
dpower and competence can be used. It is an imperfect equation with only one of its sides numer-
cally specified (wage). It replaces the transparent equivalence of market exchange and the inde-
pendence of the traders by a vague specification of duties and an asymmetrical distribution of
responsibility (hierarchy). In this respect the authority relationship could be regarded as an insti-
tutional form that attempts to allow for and master ambiguity by means of relatively flexible and
open relationships which are supposed to multiply the organization's behavioral responses. Such
a cognitive or, more correctly, an information-based interpretation of the authority relationship
is common, indeed very common, and goes back via Simon to Frank Knights's work on risk and
uncertainty (see, e.g. Coase, 1937; Demsetz, 1992).

However important the recognition of authority as an alternative to market exchange may
be, it leaves organizations resembling black boxes and disregards the question of why coordina-
tion needs to be crystallized in this way, assuming a hierarchical form (North, 1981). Many of
these are intricate questions that extend far beyond the aim and jurisdiction of this article. Yet we
need to know more about what is going on in organizations, if their coordinative ability is to be
assessed other than superficially. The information — or uncertainty-based — interpretation of
authority needs to be enlarged and recast in cognitive terms which bear on the variety of prac-
tices — instrumental or ethical (value rational) — that characterize formal organizations.

A reasonable point of departure would be to recognize that the quasi-open character of the
authority relationship provides a social space that allows for the development of techniques and
practices, i.e. for the man-machine and man-to-man interaction, to assume on the manifold of
forms necessary for mastering those exigencies of the transformation or production process
which cannot be referred to the market and dissolved into the numerical equations of market
exchange. To put it another way: the authority contract does not simply absorb uncertainty. It
actually exchanges a state (wage) for a process, thus transforming the static or synchronic equi-
librium of exchange into a system of diachronic relationships. It needs to be underscored that such
a system does not simply contain time and manage uncertainty and opportunism; just as impor-
tantly accomplishment — like speech — needs time to unfold. Social interaction and the con-
ceptual and material organization of the world under these circumstances demand recourse to
epistemologies that are capable of accounting for processes rather than states. In this respect the
semantic flexibility and pluralism of natural language emerges as the basic medium which struc-
tures and conveys the multiplicity of criteria and considerations that surround the process of
accomplishment (Kallinikos, 1992a,b; 1993).

Numerical and linguistic representation

It is obvious that formal organizations use a huge amount of numerical documents and repre-
sentations. Cost accounting and budgets, other financial documents and statistics all constitute
ubiquitous and important means whereby organizations segment, count and evaluate the complex
totality of their activities. And yet, alongside this extensive arsenal of numerical techniques, or-
ganizational tasks also involve an equally huge amount of activities that have to be mediated by
means other than the numerical. Not only are organizational tasks infinitely more complex than
anything that can be recaptured by numerical technologies but the institution of formal organi-
ization is also altogether different in character from that of the market. Historically, formal orga-
nization stems from the domain of politics and law and, despite its profound instrumental muta-
tion, still retains strong elements derived from these traditions (Brunsson, 1991; Habermas, 1987;
Tsivacou, 1994). Formal organization is certainly an economic institution, but it is also a politi-
cal and legal one. No matter how deeply they may be embedded in organizational contexts, num-
bers fail here to saturate or fully resolve the texture of organizational relationships into numerical statements. This is a fundamental difference, representing a powerful criterion for distinguishing markets from organizations. For the vision of utility governing monetary and decontextualized exchange cannot avoid resorting to the codification of the relationships which prices represent. No matter how ambiguous or uncertain it may be, market exchange always ends up in an arithmetic equation, coinciding with or departing from efficiency prices. Market conduct is certainly not devoid of ambiguity, yet the price system cannot handle this unless it can be transformed into the notion of risk and be given numerical expression. I would like to insist on this simple and fundamental yet elusive difference. Organizations may opt for being monoethical, relying on the exhaustive numerical codification of their physical and social space, but the market is so by necessity.

The question to be asked is not, of course, why human beings resort to linguistic categories, for this obviously needs no explanation; the issue at stake is how the semantic plurality and redundancy of natural language are inextricably connected with the institutional origins of bureaucracy and the diachronic character and multiplicity of tasks and considerations that make up the texture of accomplishment (production in a broad sense). After all, numerical descriptions apply to conceptual "material" supplied by linguistic categories. Organizational action unfolds upon the linguistic segmentation of the world which, in certain respects, is it capable of closing and quantifying. The diversity, the flux and the reversibility of organizational tasks cannot however be accounted for by the encompassing semantic categories (abstract concepts) that are amenable to quantification. These last abstract from the concrete and particular, and describe and evaluate generic objects, states or processes. No matter how formal and impersonal it is, organizational accomplishment cannot altogether circumvent the issues raised by the recalcitrant and messy character of the transformation process, whose manageability is associated with the mastery of innumerable shifting details requiring recourse to a conceptual organization which is flexible and resilient (Kallinikos, 1992a, 1993). Numerical epistemology is simply incapable of doing this becoming meaningful only as a distillation of a prolific conceptual organization. Numerical descriptions are second — or third — order descriptions of the world. In this light, markets and organizations can be described as coordinative forms of different orders, each one obeying its own regulative logic and regarding the other as simply an ensemble of external constraints, i.e. as environment (Luhmann, 1982, 1989).

The quantification of diverse objects of value produces, as noted, a descriptive homogeneity, in that it tends to dissolve the qualitative differences captured in semantic categories of a given level into higher-level or more abstract concepts (e.g. the notion of cost abstracts from the particular details or traits that make up different products or activities). Recourse to encompassing and quantified semantic categories tends to close and reduce the diversity of objects of value (Taylor, 1982). Of crucial importance, however, is the fact that, in the context of economic exchange and accomplishment, quantification is involved in constitutive complicity with a limited number of semantic categories (costs, prices, revenues, profits, etc.), which tend to monopolize the description of the world. After all, numerical epistemology coincides with the dissection of the world in terms of an impoverished semantic system that is amenable to quantification. In the economic context quantification is always an assertion about the primacy of certain concepts, whose common denominator is perhaps captured in the notion of utility. As noted, such a reduction is an essential prerequisite for the comparability and exchangeability of all objects of value, i.e. commodities, that enter the circuit of market exchange.

Quantification dissolves meaning in an even more radical fashion. In the avalanche of prices that characterize contemporary markets, preference and utility are lost. The individual character
of objects of value dissolves into the numerical equations of monetary comparisons. The very existence of prices, as the activities of marketing and promotion show, tends to define preference and utility, rather than the other way around. From having been codifications of value, prices now take on a life of their own, effacing utility and defining expectations and desires according to the logic peculiar to themselves. The signifier takes precedence over the signified, the form over the substance (Baudrillard, 1988). Preference and utility are dissolved, as it were, from the inside. Such is the power of numeracy. It is important to recall, in this context, Arendt’s distinction between utility and meaningfulness. As she puts it: “utility established as meaning generates meaninglessness” (Arendt, 1958, p. 154). Organizations experience the same fate. However, no matter how numericalized they are, organizational relationships seem to escape the effects of thorough rationalization, and, in their pluralistic semantic network, to retain many elements of meaningfulness which the function of the market proper dissolves into numerical values.

Given this view, organizational governability can and must leave room for the nonquantifiable, the incalculable and the ambiguous. It is important to recognize here the fundamental difference between administration and market transactions, between planning and orchestrated action constituted and organized by diverse structures of signification on the one hand and market exchanges that obey the unambiguous and transparent logic of numerical values (prices) on the other. The semantic plurality and flexibility of administration tolerates the nonquantifiable, in the sense that administrative action can function and act upon the nonquantifiable on a basis of signs or signals other than the numerical, whereas the very institution of the market collapses without the whole arsenal of numerical codings that assigns numerical values to objects and activities (i.e. makes them into products and services). Note that I am not saying that numbers are irrelevant to organizations, rather that organizations can survive the lack of numerical transparency. Empirical evidence suggests that organizations do act and need to act on the world on ambiguous and often contradictory premises (March, 1988; March and Olsen, 1976, 1989; Weick, 1979). But these characteristics are not residual elements of a deficient and backward social technology. Formal organizations are not aberrant versions of a precise formal technology which they fail to realize and embody; they are essential complex structures whose semantic plurality allows for the management of the complex and ambiguous fabric of tasks and ethical considerations that surround the process of accomplishment. Ambiguity and diversity cannot be handled except by a system characterized by cognitive, behavioral and ethical plurality. By contrast, the market cannot exist without the transparent object and social landscape of numbers. Coordination by prices or administrative decisions is not simply a question of costs, risk, profits and related considerations but also, and this must be stressed, one of potency and ability. What can be done by means of administration cannot be accomplished by the market, and vice versa.

Framing the inability of the price system in terms of market failure (Arrow, 1974; Williamson, 1975) tends to mean attributing to the market certain functions and characteristics which are foreign to it, creating false expectations about the range of activities that can be organized and governed by means of the price system. After all, failure can always be repaired. It is suggested in the present article that accomplishment and exchange, production and distribution, presuppose one another, but that they also represent different ensembles of tasks and operations. No matter whether exchange creates or simply redistributes value, it provides only the horizon of accomplishment. Prevailing prices may reflect the preference–scarcity relation, but for accomplishment this is no more than a point of departure, a calculation of parameters which impinges only indirectly on the nature and organization intrinsic to it. To put it another way: transaction or exchange costs need to be supplemented by what Demsetz (1992) calls performance costs, i.e. the cost of transforming inputs into output. Organizations economize on performance or operation costs.
Further consideration of the nature of the transformation process shows it to be too complex a process to be gauged simply in terms of costs. As noted, organizations are certainly economic institutions but they are also political and legal institutions. Performance costs do not exhaust the range of activities collectively performed. Organizational activity coincides with an extensive and plural conceptual segmentation of the world, and needs to respond to signals whose cognitive status is ambiguous and context-embedded and which cannot be captured in the abstract, semantically impoverished and ethically closed nature of numerical descriptions.

Numerical comparisons are no doubt inevitable in a world that increasingly relies on abstract symbolic artifacts for instrumenting and coordinating its activities (Cooper, 1993; Rose 1991). Numbers have a formidable capacity for representing and summarizing complex aspects of social and economic life. Therein lies the power of the market and of economic coordination by means of the price mechanism. But there are trade-offs not only in costs but in orientations, values and considerations. For abstraction implies, by definition, a disregard for the concrete and particular, and numerical abstraction implies a disregard for the qualitative. Numerical description lacks the capacity to reconstruct or capture the heterogeneity and variability of the world which has to be "accounted for" by other means of signification. This last assertion becomes even more important as contemporary structures of work (e.g. the postindustrial society, the whole idea of services and of symbolic work) are increasingly permeated by diverse systems of knowledge that cannot be recaptured in the one-dimensional character of quantification (Bell, 1973; Lash and Urry, 1987; Reich, 1992).

NETWORKS AS LIFEWORLDS

Against the background of the observations made so far, it appears that coordination by means other than those enabled by the price system is an important and indispensable part of social and economic life. Transactions within organizations and also across markets necessitate the use of cognitive means that surpass the one-dimensional summarizing ability of quantified utility. The pluralistic semantic dimension of natural language and the dialogue form complement or supplant market exchange and numerically mediated coordination. However, organizations are not free-flowing linguistic devices. As noted above, the cognitive flexibility of organizations is always mediated by institutionalized power relationships. The rigidity of authority mediated relationships is very often exchanged and confused with organizational action in general, thereby concealing the cognitive differences between markets and organizations. To be sure, from a certain point of view markets appear as, and indeed are, much more flexible than organizations and yet only behaviorally lacking the cognitive flexibility and even ethical plurality of organizations. Health Care and Housing represent two vital sectors of contemporary society where these issues are constantly confused by laymen, politicians and social scientists alike (see, e.g. Hassebladh, 1994; Rogers, 1991). Behavioral effectiveness and cognitive flexibility need to be kept conceptually apart, and social epistemology provides the rationale and the means for doing so.

It is only against the background of these differences that networks can be properly understood. Neither the price mechanism nor authority-mediated linguistic representations can account for the formal or informal concatenations of economic actors across the boundaries of organizations and alongside the market mechanism. It would be reasonable to assume that interorganizational linkages provide a medium for getting around the rigidity of administrative systems, and underline the need of economic actors to complement not only the information ability of the price mechanism but also the priorities and the time horizon of decision-making and planning, which reflect the premises of a legitimate and institutionalized power structure. However, as indicated
earlier, the network concept seems to have been only vaguely defined in current literature. The market and the organization rely on the institutions of monetary exchange and authority, which in turn privilege numerical and verbal epistemologies. But what about the network? Is there an institutional mechanism in this case that assumes a regulative role somewhat equivalent to that of authority or the price system? Trust, consensus, dialogue, power, learning, negotiation are all conceivable candidates.

Unless carefully defined and systematically compared to the functioning of authority and monetary exchange, the notion of the network remains no more than an amalgam of diverse and often incompatible ideas and perspectives capable of creating a number of paradoxes, such as that entailed in the conception of market as network (Hägg and Brunsson, 1992). After all, anything could be regarded as a network, if the concept is only treated loosely enough to be synonymous with simple or complex socio-economic links. Such a view is substantiated by a recent survey of the literature (Cook and Whitmeyer, 1992) in which a distinction is made between network theory and exchange theory, and the authors advocate confining the concept of “exchange” to exchange of valued items, be it resources or symbols. In their view, network theory differs from exchange theory proper in that it is “much more catholic and allows a variety of types of ties independently of any exchange of valued items.” Regardless of whether or not one agrees with them, their conclusion, based on an extensive review of the literature, bears witness to the fact that the approaches subsumed under the inclusive concept of the network remain far too heterogeneous to constitute a single well-defined body of theory.

Social epistemology provides an analytical framework that could contribute to the clarification of some of these issues. As noted, the decontextualized character of contemporary markets (i.e. exchange decoupled from particular localities or even monetary media) and the institution of formal organization, can be regarded as emerging out of the informal communal world of oral face-to-face interaction which they attempt to reorganize and coordinate by having recourse to socio-cognitive technologies other than the haphazard social intercourse based on tradition and mediated by speech. Both are formal mechanisms of integration which are active in an enlarged time and space and which coincide with the transition — if only partial and incomplete — from the locally bound and communal world to the spatio-temporally extended social world (Asplund, 1991; Habermas, 1987). Networks, then, reemerge as counterbalancing reactions to the alienating effects of markets and of large centralized bureaucracies, reasserting the significance of economic action which is adjusted to local conditions and the shifting relationships of the highly differentiated late modern world. Observations about the economic vitality of what Piore and Sabel (1984) call flexible specialization anchored in specific and often limited regions of the world, lends empirical support to this argument. Flexible specialization is juxtaposed to the industrial model of mass production — entailing large organizations on the one hand and impersonal markets on the other — and describes a mode of economic activity dominated by small, flexible and specialized firms producing their products in close interaction with their clients in a climate of mutual responsibility, often supported by the institutional-political structures and the social values of the regions in which they operate. In Piore and Sabel’s account the fertility of the structural solutions of the modern or industrial world implicated in such venerable dichotomies as producers-consumers and economy-society, is called into question. Economic activity is sustained by the normative orientations and the institutions of community, which thus provide the social glue for the integration of economic actors.

The revitalization of the quasi-communal forms of interaction that we associate here with networks, seems to suggest the reemergence of the communicative rationality of the lifeworld as a basic form of economic coordination. As understood here, communicative rationality is neither
narrative knowledge nor an all-embracing system of social values (Habermas, 1987), but rather a local game sustained by the normative orientations and validity claims of particular communities (e.g. occupational, geographical, economic or cultural communities) and mediated by language and other forms of knowledge. Such a game remains highly heterogeneous and is adjusted every time to the diverse circumstances that make up the highly differentiated contexts of socioeconomic life. Networks thus conceived remain tied to relatively limited contexts. The vitality of their integrative and regulative capacity is counterbalanced and considerably curtailed in terms of speed, time and place, by the cognitive and ethical complexity intrinsic to them. The integrative power of communal dialogue can thus be contrasted with the numerical representations of the price mechanism and with the authority-mediated linguistic and numerical representations of administrative rationality. Much of what is assumed to go on across the boundaries of organizations and alongside the market mechanism, seems to be related to the demands created by the skewed distribution of knowledge and information, and to the orientations and cognitive means by which these are codified and conveyed. Such a situation is partly the result of the abstract and decontextualized structural solutions of the market and the formal organization. For, despite its difference from the market, when formal organization is compared with networks it does emerge as a detached and decontextualized system of relationships (Kallinikos, 1992b; Zuboff, 1988). In this light, markets, organizations and networks appear not so much as alternative but as complementary forms of governance and coordination. This view does not of course imply that the distribution of the tasks assumed by these three forms of coordination is settled and fixed once and for all. Redistribution and restructuring do occur, but not only as the effect of numerical considerations (i.e. trade-offs in efficiency); they are also the result of activities that seek to accommodate the normative orientations and the cognitive and information needs created by the epistemological ability and shortcomings of each particular mode of coordination.

NUMERICAL OBJECTIFICATION AND SOCIAL VALUES: SOME CONCLUDING REMARKS

The preceding analysis suggests that the price mechanism is undeniably a powerful and efficient system for the allocation of resources and the coordination of human effort. Yet by definition its heavy and indispensable reliance on the numerical coding of human activity leaves open a wide social territory, wherein actors must orient themselves by cognitive means other than those provided by the price mechanism. The question about the conditions under which the main forms of regulation assume their coordinative role cannot therefore be answered solely in terms of utility or efficiency, measured in quantitative terms. Or if it is so answered, it captures only a part of the considerations, values and preferences of the social actors. Let me acknowledge here that the identification of markets, organizations and networks with the mechanisms of monetary exchange, authority and presumably dialogic negotiation, entail considerable simplification of the complex texture of social and economic life. None of the three basic forms of social intercourse and coordination (market, organization, network) can be reduced to and equated with a particular mechanis. But, abstraction, as we all know, is inherent in the intellectual activity of inquiry. The crucial issue, then, is whether the proposed mechanisms (exchange, authority, dialogic negotiation) help to disclose essential characteristics of markets, organizations and networks. I suggest that they do. It is perhaps important in this context to recall that what I sought to do is to retrace the differential propensities of exchange, authority and dialogic negotiation for particular forms of conceiving and representing the social and economic reality.
The cognitive or semiotic framework employed in this article opens up a net set of questions concerning the forms of social and economic coordination. The representing and codifying techniques privileged by markets, organizations and networks play a far more important role than the one that economic and sociological analysis has hitherto accorded them. Rather than being adjacent or auxiliary, these techniques coincide with the modes through which actors conceive and frame social and economic issues, and act upon them. Social epistemology, thus, underlines the need for a systematic exploration of the conditions and factors that influence different epistemological attitudes and shape the information needs of decision makers, as well as the way they make their decisions and the way they act upon them. Empirical research could be very useful in this connection, for the investigation of different instrumental contexts has the potential to reveal instances of particular ensembles of terms, categories and numerical representations geared to the specific circumstances and purposes that make up these contexts. However, theoretical reflection on the epistemological trade-offs of the various regimes of signification and the way they are related to instrumental issues has its own value, and is in any case intimately connected with successful empirical undertakings.

The epistemological orientation advocated here reframes and, in a sense, bypasses the intransigent discussion about the motivation of social and economic actors. The different versions of utilitarian psychologism certainly need to be scrutinized and criticized (see, e.g. March, 1988; Perrow, 1986; Sen, 1982, 1987; Sen and Williams, 1982). But again, social epistemology lays open a new set of issues. It is no longer a question of whether instrumental action is conducted on rational, bounded-rational or irrational premises, or why decision makers are motivated by one or another set of preferences and assumptions. Even assuming with the economists that motivation and individual preferences predate the social world, it is still obvious that these need vehicles of expression if they are to be communicated and are to reach the social sphere. In a social subsystem that relies heavily on numerical objectification, individual values and preferences have no other means of reaching the social sphere but through the throttling bottleneck of quantification. The diversity of individual and social values is squeezed into the narrow vision of cardinal utility. But even that vision, I have claimed, tends to be dissolved and effaced, as the fetichism of numbers gradually erodes the last vestiges of the utilitarian edifice of meaning and imposes a meaningless logic of reified calculations.

Social epistemology, thus, reverses the traditional logic of utilitarianism. Structure (price system) produces events (individual choices); the system generates individual behavior. One does not need to be structuralist or to adhere to a narrow and deterministic vision of life and history, to be able to recognize that the utilitarian ghost is summoned up and continuously reproduced by the reified logic of numerical codification. Quantification, utility and self-interest maximization and competition implicate one another. “The ‘free’ market”, Weber claimed (1978, p. 637), “is an abomination to every system of fraternal ethics”. The abstraction of the self-interested maximizing individual and his values is not prior and exterior, or transcendental, to use the words of Sen and Williams (1982), to the price system, but is implicated and reproduced by it.

The intrinsic or immanent character of calculative logic, implicated and reproduced by the price system, relates in an obscure way both to the positive coordinative ability and the shortcomings of the market mechanism. I have referred several times to the advent of numeracy as a dominant characteristic of modernity and as a basic medium of regional and national governance. However, contrary to statistics (the science of the state) which imposes its numerical dissections upon the social body from the outside, economic thought and practice gestate and reproduce numerical reasoning, as it were, from within themselves. Political and organizational action relies on numerical data whereas economic behavior is fabricated by them. Numericalization is intrin-
sic, part and parcel of economic exchange. This basic fact radically differentiates the market mechanism from other forms of social and economic coordination (Hirschman, 1977, 1986; Luhman, 1982, 1989). Utility and numeracy constitute and define the social territory of the market mechanism. They fabricate an individual who, in a characteristic Foucauldian way, normalizes and disciplines himself through the internalized panoptic gaze of numerical objectification and calculation (Foucault, 1977, 1991; Burchell et al., 1991).

There are, then, cognitive and ethical limits to quantification. Within the complex tangle of social and economic life, the abstract and homogenizing nature of quantification reduces — one might say eliminates — the variety of criteria on the basis of which different areas of focus are conceived or selected, and different priorities and targets are set and acted upon. The recent debate concerning the reformation of health care in Sweden and other Scandinavian countries, and its insertion into the monetary circuit of market exchange, reveals a number of puzzling questions that substantiate the relevance of the theoretical observations advanced in this paper. For if the price system is to make an inroad into the health care system, then it is somehow necessary to achieve a comparability of illnesses and treatments on a national or at least a regional scale. For comparability is an essential requirement for quantification and pricing and, of course, competition. The cognitive problems are as severe as the ethical ones (Arrow, 1963; Brooks, 1991; Hasselbladh, 1994). Similar problems arise in housing, and in the recent attempts to regulate this highly ambiguous and vital sector by means of the price system. Experience in this sector reveals that the manageability and surveyability of numerical representations of the price system tend to relegate other vital issues, architectural design and greening included, to a subservient and secondary role (Kallinikos, 1994; Rogers, 1991).

Health care and housing are just two particular contexts of the contemporary social scene. Important changes in the postindustrial world also seem to suggest limits to quantification. As noted, the ongoing tendency of contemporary work contexts to employ diverse systems of knowledge and information has been referred to as one of the more radical changes of our time. Knowledge as a means of production and an end-product (e.g. a service) cannot be divided into, and quantified along, those dimensions on which the standardized and comparable products of mass production have been measured. No doubt industrialism faced similar problems, but the separate and separable character of industrial products and the greater divisibility of tangible resources have long maintained the illusion that cost accounting was objectively measuring the results of human effort and quantifying a real, tangible world “out there”. It is a commonplace today that over a century cost accounting has been failing to conceive, account for and quantify the environmental pollution and the employee ill-health and alienation that were and still are externalized to the health care and welfare systems and other institutions of the modern state (see, e.g. Seidler and Seidler, 1975; Reich, 1992). Such issues represent no more than a small sample of the puzzling questions posited by the complex and intangible character and the pluralistic constitution of activities that make up contemporary instrumental contexts, and which go far beyond the traditional issues concerned with the divisibility of public goods. They underline the need for alternative estimates that can incorporate multiple criteria and qualitative elements.

Social epistemology shows the inevitability of making decisions and acting on them by relying on premises provided by diverse structures of signification. Semantic information and considerations structured and mediated by verbal means are not only necessary, they are inevitable, no matter how far the world becomes technicalized. To act upon the world on premises other than those provided by quantified utility is not simply a question of motivation, it is one of potency and ability, in the sense of being able to constitute aspects of the world that cannot be captured in the cognitive act of quantification. However, the argument presented in this article should not
be taken as an attack against quantification and the price mechanism *per se*. Rather, it seeks to open up a series of questions bearing on the revitalization of the liberal discourse and the expansion of the domain of economics into almost all spheres of human life. Numbers and the relatively recent invention of digital computation are surely with us to stay and are certain to expand their respective domains and applications. Perhaps numeracy as Cline-Cohen (1982) puts it is "the new literacy of the twentieth century." Both numeracy and economics have helped to render visible and comparable important aspects of the contemporary social landscape, aspects that would have remained otherwise obscure. Nevertheless there are limitations that need to be understood and evaluated against the complex fabric of values, intentions and means that make up the instrumental orientations of contemporary societies.

**REFERENCES**

Ong, W., *Orality and Literacy* (London: Routledge, 1982).
Sen, A. and Williams, B. (Eds), *Utilitarianism and Beyond* (Cambridge: Cambridge University Press, 1982).