Rational Choice, Scientific Method and Social Scientism

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Abstract

The eighteenth-century introduction of the scientific method of the natural sciences to the study of social phenomena draws a line between moral philosophy – that aspect of ancient and medieval philosophy that dealt with social issues – and the social sciences as known today. From the onset, the emerging social science, or rather, its epistemological orientation to 'social scientism,' was vigorously challenged by many critics who saw it as a reductionist and mechanistic understanding of human beings and their society. In recent times, this criticism has narrowed down to the critique of the rationalist assumptions or rational choice theory on which much of social scientism is built. Critics of the natural science ideal in the social sciences argue that the subject matter of the social sciences – human beings, their society and interactions – is so complex and different a system that subjecting it to the crucible of the scientific method of the natural, positivist sciences not only limits its understanding but leaves it with an abrasive and distorting impact. In the same manner, critiques of rational choice theory argue that it is a reductionism that does not account for a significant proportion of human actions and motives. What seems to be advocated for is a sort of social science method that addresses the shortcomings of the scientific method applied to social phenomena and employs a more robust model of human action that supersedes the rational choice model. This paper however posits that rationalist assumptions or rational choice theory is not peculiar to social scientism but lies at the foundation of modern and contemporary science and its method. We trace out the centrality of individual rationality assumptions in the general epistemology of the scientific method and social scienticism within the context of the centuries-old debate on the limitations of the scientific method in the social sciences. Our thesis hints at the impossibility of a modern and contemporary scientific model of either nature (physics) or society that does not assume individualist or subjective rationality.

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1 Rationality in Science

It is often said that the distinctive feature of the Enlightenment, which revolutionized science and accumulation of technological capabilities, lies in its exaltation of human reason, that is, rationality. The emphasis on reason, according to this thinking, distinguished the resulting modern science from what had preceded in the ancient and medieval era. While this is true, it is only part of the story. A philosophical excursus into the nature and process of science understood to mean either knowledge (from the Latin *scire - to know*), or organized body of knowledge, shows that science presupposes inter-subjective rationality. Although knowledge is possible by tenacity, faith, authority, and intuition, what distinguishes scientific knowledge in the strict sense is its reliance on inter-subjective rationality. The history of the theory of knowledge from Aristotle to Thomas Aquinas and through Kant to the logical positivists, presents the process of knowledge as a cognitive process of an active, rational subject. Therefore, not only modern science, premodern, ancient and medieval science also proceeded on the basis of reason. The major distinguishing element lies not just on the rationality emphasis, but rather on their orientation: While modern and contemporary science proceeds from the basis of the individual, subjective rationality as the ultimate basis of certainty;[1] ancient and medieval science was oriented towards the divine within a system that subordinated and hence, limited, human rationality and actions to that of an ultimate being.

The Copernican revolution which Kant carried out in philosophy was instrumental in ushering in a new epistemological model that emphasized the agency of the human subjective intellect in the acquisition of knowledge. For Kant, the subjective intellect in knowledge is active vis-á-vis the object. This theory of knowledge overturned the traditional model that holds the conformity of the human mind to reality in a manner in which the subject is but a passive receptor of the object as given in experience. In Kant's Copernican Revolution, understanding became a process by which the mind exercises it faculties over the object, by subjecting it to ápriori conditions in order to render it intelligible. This means that 'we can know ápriori of things only what we ourselves put into them.' Knowledge is no longer to be conceived as a reception of reality as it is given, since for Kant, things as they are in themselves, are unknowable. Intelligibility is thus a function of the ápriori faculties of the subject that empower him to receive the object.

Kantian epistemology admits the presence of both the rational faculties of the

subjective intellect, as well as the objectivity of the object of sense experience. This admission offered to resolve the long-drawn rationalist and empiricist debate. However, it does retain the Cartesian dualism of mind or subject on the one hand, and body or object on the other. The process by which the subject "captures" the object as in the context of "experience" is now construed as an activity, an exercise of force which wrests the object from its "given" position, imposes on it subjective, a'priori conditions in order to know it (Kant, 1995). This, in a way, is an extension of the Cartesian method defined as "rules for the direction of the mind." The subject is intentionally directed to the object and does not just seek to know it, but more importantly, to put it to good use. This epistemology, in its individualistic and utilitarian orientation, has become one of the defining characteristics of modern scientific method. But in this formulation, the modern and traditional epistemology of knowledge seem to have parted ways.

Traditional Aristotelian thought, expressed in the medieval period by the scholastic thinkers, had a different conception of the process of experience which was articulated in the various conceptions of the role of the agent intellect, the need for *species* in perception and in thought, the reliability of the cognitive apparatus of induction, the nature and function of memory, and so on (King, 2004). Aristotle takes experience to be generated from (repeated) sense-impressions, or, more precisely, he takes it to be the product of cognitive processing, by memory and perhaps imagination as well, of (repeated) sense-impressions.

Thomas Aquinas, proposes that the comparison or collation of impressions is a function of what he calls "particular reason" (*particularis ratio*), that is, reason applied to particulars (or the sense-impressions thereof), and thereby is proper to humans (Aquinas, 1950, *In Metaph.* 1.1.15). Aquinas argues that, since the forms of material objects (given in the sensible species or the phantasm) are only potentially and not actually intelligible, there must be an active principle which makes them actually intelligible, and this reduction from potency to act requires an agent cause, which Aquinas identifies as the agent intellect. The agent intellect has two distinct and logically sequential functions: (a) preparing the sensible species so that it is actually intelligible; (b) 'impressing' this prepared sensible species, called the 'intelligible species,' on the possible intellect (*Summa theologiae* I^aq. 79 art. 3).

Sense, thus, has as its medium the sensible species, which is particular, and the intellect has as its medium the intelligible species, which is universal. Mediation between the two takes place through abstraction, that is, by removing the individualizing conditions from the particular sensible species. These individuating conditions do not alter the formal content of the nature of the object they individuate but merely render it singular, distinct from others of the same kind; formal differences only occur at the specific and generic lev-

els. Hence the process of abstraction does not formally alter the nature, but simply removes or cancels its surrounding individuating conditions. Yet because the individuating conditions do not alter the content of the form in the individual, the form in itself must have the abstracted features, that is, the characteristics revealed through abstraction, though in combination with the appropriate principle of individuation the form is individualized in the object: the form in itself is universal. The end result is that "reason"(in the person of the agent intellect) automatically removes individuating conditions from the sensible species, allowing the human mind to have experience of a world that is divided into distinct natural kinds, and all of this takes place prior to conscious experience.

Whether this is an accurate account of human psychology of knowledge is beyond the scope of this paper, but suffice it to say that these outlines of the traditional and scholastic epistemology has a lot in common with the modern Kantian epistemology in their abstractivist and transcendental tendency that turns on the rationality of the agent intellect. Thus, rationality is a foundational premise of both the traditional and the modern theories of scientific knowledge and not a peculiar distinctiveness of the later as is commonly assumed. The major difference lies in the fact that modern and contemporary scientific epistemology is oriented towards the individual, and turns on positivism. This is captured in the rational choice theoretical construct. Rational choice is therefore, neither a unique distinction of modern and contemporary scienticism, nor is it a preserve of modern and contemporary social scientism, as typified by economics, political science and sociology. It is rather an essential moment of modern scienticism, referring to the method and epistemology of modern and contemporary science. This is trashed out in the next section.

2 The Rational Choice Theory

In its most basic formulation, rational choice emphasizes methodical individualism or thorough-going self-interest, intentionality, consequentialism and optimization. In essence, the theory turns on the theory of human agency with roots into ancient Greek thinkers. Protagoras's man measure principle is perhaps the earliest expression of subjective individualism. But for ancient and medieval thinkers, the divine - not man - constituted the focus of attention and the goal and basis of all understanding [2]. Cartesian rationalism, the Copernican Revolution of Kant and the general world view of the Enlightenment once again, re-established the focus on the individual person as the originator of intentional action and a free-choice, responsible agent. As we argued previously, in Kantian epistemology the subject is an active taker, rather than a passive recipient, of objects of knowledge as had been taught by scholasticism. Whereas Descartes had isolated the subjectivity of the subject in the

"cogitating I", thus laying the foundation for the "methodic doubts" that lead to "clear and distinct ideas", Kantian transcendental philosophy built on that foundation to delineate the fundamental, ápriori conditions that enables the subject to know the object.

While Cartesian and Kantian philosophies provided the foundation for rationalism, Bacon's ideas in empiricism championed an opposite world view that argued the supremacy of the factual and evidential reality. Both rationalism and empiricism were the two schools of thought that shaped the Age of Reason, and had wider ramifications for other fields of knowledge, including the natural sciences. Belief in the power of human reason alone to reach valid judgments about objective reality which both rationalism and empiricism advocated led to the birth of the scientific method. The role of rationality in grounding intelligibility and therefore, knowledge, was further amplified in Hegel's absolute philosophy in which he identified reality and reason. For Hegel, "the real is the rational" and the "rational is the real" and both are absolute (Hegel, 1977).

Application of the scientific method by researchers became an epochal transformation, that catalyzed the rapidity of progress in the evolution of scientific theories, new discoveries and technological inventions which came at the aftermath of the Enlightenment. Such unprecedented increase in knowledge occasioned by the scientific method further enhanced its validity and established it as a universal epistemology, governing the process and practice of science in such a way as to suggest that knowledge that does not pass through its rigor is, *ipso facto*, nullified.

What distinguishes rational choice from the epistemic rationality sketched above is its purposefulness; it is teleological. It is not simply, reason exercised for its own sake and in accordance with the human inclination to know. It is rather purposive, rational action exercised for the sake of self-serving ends in which the agent intellect is freely choosing between alternative ends. In this, it is not difficult to see the influence of the Enlightenment's doctrine of liberal individualism. It is not merely, as is often suggested, to bring reason to bear on reality such as subjecting morality and politics to a rational enquiry. Rational choice is a liberation of man's reason which seems to have been held hostage by religious dogmas and superstitions. It is part of the libertarian current of thoughts that engulfed the Enlightenment society, politics and history. It places the subjective, individual, agent intellect at the center of reality such that things are only relevant in respect to his needs and desires. The rational choice agent is the realization of the cartesian thinking subject with the overriding ambition "to render ourselves the masters and possessors of nature." Seen in this perspective, rational choice also underpins modern and contemporary positivist science no less than the social sciences as we articulate below in sketching the various moments of the scientific method.

2.1 Moments of the Scientific Method

The scientific method is a manner of operation of the rational, ends-oriented subject. Its unparalleled success in its application in modern and contemporary science and technology in engineering a near complete mastery of the earth establishes it as the sole criterion for validity in knowledge. Fundamental to this scientific epistemology is the cartesian thinking,"*rational*", subject that stands distinct from external,"*social*", objects (Schrieber, 2002). The cogitative power of the cartesian subject is a foundational axiom of universal validity, and constitutes the necessary precondition for universally, valid truths. Thus, the method of science is an epistemology whose objective is to render the world intelligible. For this reason, modern science has been characterized as the "theory of the real" (Heidegger, 1977c). Its foundational axiom is the thinking "I" (the "Cogito") which, for Descartes, is the first and only thing that is certain for sure, and lays the road map for accessing truth. This thinking subject is both the criterion and the arbiter of truth - the source and collector of what is as such and thus, the existential foundation for the scientific method.

The scientific epistemology imposes on the object, dissects it in order to confirm prior assumptions or find causal relationships in order to build theory, captures it and exercises power over it. The distinctive moments of this process include objectification, mathematization or idealization, research, power and authority, controllability and predictability.

2.1.1 Objectification

Objectification involves representation, classification, quantification and measurement of objects of science. Representation is the manner in which the external object is apprehended by a knowing subject (Heidegger, 1977a). The *knower* knows that which is present. That which is not "present" and cannot be "represented" in the manner of knowledge readily accessible to the subject, is not accountable. This implies that to be known scientifically, reality must be "objectifiable". Objectification is the process by which the real is rendered countable, measurable and determinable. This seeks to materialize the object in order to render it intelligible to the material senses. It captures the real as a material substrate and imposes on it, subjective à priori conditions of intelligibility.[3] The consequence of this in the age of the scientific epistemology is that all fields of knowledge strive to represent reality as object and as data amenable to measurement and calculation.

2.1.2 Mathematization and Idealization

Idealization of reality through mathematics is another distinctive moment of modern science. Beginning with Descartes, method, as in "rules for the direction of the mind," came to be seen as the distinguishing characteristic of true science such that scientific method became in cartesian formulation, the "method of the real". As a method aiming towards precision and exactitude, its major distinctions are measurement and calculation. To measure precisely and calculate exactly means that the method of science is necessarily axiomatic and therefore, mathematical. But mathematics, designating the system of logical relations between entities that are simple abstractions from concrete, material objects, derives its basis on matter that is subject to space and time, and is quantifiable. Let there be 2 dogs and 2 cats adding up to 4 animals in a zoo such that $2 + 2 = 4$ becomes a mathematical formulation of the sum of animals in the zoo. The dogs and the cats are real, individual, material things. But their intellectual representation in the mind as 2 (dogs) and 2 (cats) making up 4 (animals) are abstractions which are thinkable in themselves but derive their meaning only in reference to concrete things (cats and dogs). This implies that mathematics is naturally drawn to quantifiable and measurable matter. Reality that are not easily quantified are thus, mathematically censored. Modern sciences deal essentially with particular matter experienced directly through the medium of the external senses. The abstraction from the particular matter constitutes the realm of mathematics. Hence, it is not arbitrary that modern sciences tends toward mathematization: The particular objects which they deal with can exhaustively be dealt with theoretically in the abstract realm of mathematics. Questions of metaphysics – as that which comes after physics – are of a different order of abstraction which are not related to objects of sense experience. Questions of ethics, justice, love, freedom, values, norms, beliefs etc. cannot be dealt with mathematically and hence, social scientism fare badly in these regard.

Another aspect of cartesian influence on modern and contemporary mathematical science is through his dualism of mind and body – *res cogitans* and *res extensa*(Heidegger, 1977b). Within the cartesian ontology, there is a dyadic, two-node relationship between the thinking subject and the object conceived in essentially, inanimate or "arrational" terms, as nature or extended matter, existing parts outside of parts. Observation as a process from which experience is cultivated is construed in terms that place the observer and what is observed in opposition and at a distance from each other. [4] The cartesian influence makes it be that in science, the subject assumes the status of a conscious observer (thinking subject) of a putatively, assumed "unconscious" phenomena (extended matter) under a controlled environment or its approximation. In this observation of reality, the object of observation, i.e. the extended matter, is as a matter of necessity, captured in the two dimensions of space and time, as a snapshot, and as an isolatable event. [5] Both time and space are re-

ducible to numbers or discrete quantities. Mathematics naturally lends itself for dealing with these numbers.

Extended matter, existing parts outside of parts, is to be known through calculation and measurement which yield numbers. Numbers, as proxies abstracted from the actual objects, can themselves, be investigated and analyzed mathematically to yield knowledge that is precise, exact and verifiable. Mathematics has therefore, become synonymous with modern sciences, to the extent that judgments of scientific rigor and merit is construed in terms of the perceived quality of a study's measurement, modeling, and overall mathematical and statistical initiatives (Heath and Chatterjee, 2004; Sumner and Tribe, 2004). It is this readiness with which matter easily gives-in for mathematical analysis that renders to science its ultimate power over reality and realizes the ambition "to render ourselves the masters and possessors of nature." Unarguably, this has produced tremendous results in the natural and positivist sciences. In the social sciences, however, it does not enjoy comparable success for reasons that will be considered in later section of this paper. It frequently happens that researchers in the social sciences, in faithfulness to the dictates of mathematization, measure, model, and apply things that are invalid and/or non-existent (Heath and Chatterjee, 2004).

2.1.3 Research

Observation of objects takes place within the space - time continuum and captures the data of the object as an event in a snapshot that is isolatable from a system chain of events among interacting objects. Because the event snapshots are independent, they can be isolated as simple events which are replicable. The simple, repetitive events of the natural and positivist sciences make research possible (Beck, 1949).

Through the activity of research science postulates theory which lays down rules regarding the manner of obtaining knowledge of reality and sets a'priori possibilities for the posing of research questions. Theory determines in advance what sort of question is posed for the real. Research proceeds by way of observation of reality in order to organize the facts so gathered in a schema that is pre-specified by the theory. Conclusions are drawn from observations of interacting objects. Consistent results within a laboratory framework are used to provide evidence about the way things work. Thus, science is made possible by the prior hypothesis that inferences can be drawn from observation of particular objects to reveal universal characteristics about the world (Heidegger, 1977c). The search for empirical regularities in the interaction of objects and interactivity of agents is therefore one of the major defining attributes of scientific research.

In the pursuit of science, the subject stands aloof from the object in a manner of disinterested observation. The subject stands over and against the object, conceived as the "other". His role is nothing more than that of a chronometrist who arranges tiny pieces of objects into the dynamic order of the clock piece. Hence, disengagement and cognitive separation are the hallmark of the scientific method(Shapin, 1995). In dealing with the object of science, the subject is to apply only rules and procedures validated within the specific domain of practice, say physics. These rules and procedures are themselves scientific in so far as they are independently verifiable and universally valid. Whether the object of investigation is a stone, lying out there, or a cognitive process such as the process of feeling, the subject-object cognitive and existential separation is necessary.

While this process delivers consistent, verifiable and manageable results it however, limits the scope of what could be investigated. Reality that is not reducible to quantifiable and calculable stuff is ignored and treated as irrelevant thus rendering to measurability the criterion for relevance. This difference between measurable and non-measurable things draws the line between what is regarded as truly "science" and "non-science" in the modern and contemporary epoch. Fields of knowledge where the object is not easily quantifiable, in a manner that renders it calculable, are dubbed "unscientific" and incapable of providing exact, valid and verifiable knowledge. To escape the derogation of "non-scientific" various disciplines strive to tune up to the manner of operation of science so conceived.

2.1.4 Power and Authority

Francis Bacon, one of the ushering-in voices of modern scientific epistemology conceded from the beginning that science is a road to power. The 'knowledge is power' dictum of Francis Bacon is predicated on the desire to explore and exploit 'Nature's secrets'(David, 2004). This understanding of knowledge as power and of science as a route to power, was alien to the pre-modern thinker who rather conceived of knowledge as *logos* (the science of being), in which there was no distinction between the man of arts and man of measurements, as logos manifested itself both in the poems of Goethe and the experiments of Galileo. The Cartesian man, however, appropriated this aphorism of power and exalted the mathematised science as the flowering of rationalism. Inherent in this desire to explore and exploit, is also the power of modern science to order, miniaturise and modularize nature into controllable portions examinable through the refractive lens of repeatable experimentations, with the expectation that these experiments would lead to new insights and add to existing knowledgebase. Because knowledge is restless (Metcalfe, 2003), it continues to stimulate the disequilibria on which modern science thrives. These incessant disequilibria lead to episodic uncertainties characteristic of the spatio-temporal

discovery process of modern science. In order to mitigate these uncertainties the modern scientific paradigm aims towards specialisation.

It is assumed that specialisation would enhance the value of modern science, especially by adding to the certainty of its predictions, thereby providing some sort of stability in its ordering of nature. Specialisation, while supposedly providing an opportunity for in-depth understanding of the particularity of the controlled and miniaturised nature, at the same time creates barriers between different epistemological domains, and consequently orchestrates the professionalisation of knowledge. Since no one person can fully claim knowledge of any miniaturised epistemological domains (because these domains have been further modularized by areas of specialization), the knowledge of a practice domain then resides in the collectivity of its professional practice (Brown and Duguid, 1991). Knowledge and expertise are, therefore, extended and shared by members of the same profession. From these collective professional domains and their antecedent paradigms, accounts of nature are given. Thus the professionalization of knowledge (i.e. community of practice), in turn lends legitimacy to the variety of accounts given by the different epistemological paradigms and professions.

Modern science in its modularised parts requires authority to be coordinated (Brusoni, 2003). Authority comes from capabilities confirmed by the exactitude of predictions to mitigate uncertainties, and is manifested through the discipline of the disciplines to discipline their members. Therefore, the history of modern science has been an account of rivalries of authorities (Ross, 1991). For instance, following the independence of economics, as a discipline, from sociology in the 19th century, the economic paradigm fashioned against the discipline of mathematised sciences became a dominant paradigm of evaluating social behaviours. Firm's behaviours were interpreted from such perspectives as structure and strategy, competition and market structure, bargaining power, transaction costs and contracts. Towards the middle of the last century, the socio-political paradigm re-emerged as a competing paradigm for understanding firm behaviours. Drawing from its portfolio of theories, it relied on such accounts of firms as entities embedded in national institutions, which gave rise to national innovation and business systems. The socio-political paradigm also interpreted firms as bundle of networks, power relations, professions and practices.

2.1.5 Action and Control

Inasmuch as modern and contemporary scienticism is about power over nature, it is is also about action and control. In line with the foundational questions of Kant's transcendental idealism, modern science is not just satisfied, and does not end, with questions of *what we know* and *how we know what we know.*

Most fundamentally, it is preoccupied with *what to do*[6]. Action is therefore, a necessary corollary of the power of scienticism. According to Heidegger, the technological man, is a superman, a man of ranks "...who breaks forth into the unsaid, ... compels the unhappened to happen ... and makes the unseen, appear...."

The practical orientation of modern science has implications not only for the sciences but also for the social sciences as well. Within the sciences, the natural sciences of physics, chemistry and biology are beginning to lose out to their new and applied offsprings due to the latter's emphasis on practicality and utility. In the social sciences as well, research that is not tailored to "policy implications" may not be well received. This in turn has led to the widespread application of engineering concepts to fields lying far away from material objects as organization (organizational engineering), society (social engineering), politics (political engineering) and so on. Having understood the society through the lens of the scientific method, the next is to "engineer" it. At the extreme, this "engineerization" of the society has produced results such as Communism and totalitarianism.

3 Social Sciences and Rational Choice

The 20th century has witnessed something of a revolution within the social sciences especially, in economics, political science and sociology, whereby all manner of behaviour is assumed to be instrumentally rationalizable. It is possible to argue that the rational, methodical individualistic *homo economicus* is the neoclassical social science realization of the Cartesian subject. The rational, self-interested agent is projected as consistently acting for the sake of some pay-off or reward, and is always aiming towards optimizing this pay-off (Ensminger, 1996). In game theory, this rational subject is projected as a calculating strategist, whose actions always spring from what he thinks others think that he is thinking that they are thinking.

The social science axioms of rational choice [7] seem to be a linear transformation of similar axioms of logic [8] and mathematics[9] which are reducible to metaphysical principles of identity and difference[10]. Ouspensky (1922) notes that these axioms are, in fact, abstractions from the phenomenal world which apply primarily to finite and constant magnitudes, and concepts, respectively, and which are invalidated when it comes to matters relating to emotions, subjective feelings and beliefs as has been elaborated by Boudon (2003).

As has been discussed above, the scientific method makes varying assumptions regarding the conditions of both the subject and the object of research. In importing this methodology into the social sciences, these assumptions had

to be modified to suit the nature of social reality in contrast to the objects of the natural and physical sciences. Rational choice theory achieves this end. When considered critically, this approach to human behaviour appears to be a necessary corollary to the radical mathematization of the social sciences that is also one of the major hallmarks of 20th century scholarship. For the laws of mathematics and logic to apply to social phenomena, it is crucial that the assumptions of rationality (rational choice theory) be binding on the agent. Thus, rational choice theory makes predictable and universal assumptions (such as on instrumentality, consequentialism and self-interest) on the underlying motivations for human action – an attempt similar in intent to the replication of a typical "laboratory" specimen, but in this case, of human behaviour, that fits readily into the universal scientific epistemology. The resultant effect is the reductionist, straight-jacketing of social phenomena in ways that ignore or treat as redundant, vast areas of social phenomena that do not easily lend to conscription in such ways that mimic the positivist science of physics. But as von Neumann and Morgenstern (1944) well noted "it is unlikely that a mere repetition of the tricks that served us well in physics will do for the social phenomena too." An obvious reason is the differences in the objects of enquiry: while physics deals with magnitudes of spatio-temporal matter, the objects of enquiry in the social sciences are multi-dimensional. Therefore, because the object of inquiry is not just about inanimate matter as in the physical sciences, but about human beings that are as rational as they are emotional and spiritual, the application of the scientific epistemology in the social sciences encounters many pitfalls.

4 Limits of Social Scientism

Social scientism is the outcome of the overriding ambition to apply the highly successful scientific epistemology founded on rational choice to social reality. Although construed by its proponents to be ahistorical, non-particularistic and universal, history suggests that it was a contextually determined moment, as well as a historically, specific response to a unique set of problems – a response to the 'social question'– emerging in the aftermath of the Industrial Revolution, answers to which, scholars of the period felt, could only be provided by imitating the natural science ideal couched in scienticism. The emergence of the social sciences coincides with that of the features of the modern society in the eighteenth-century – increasing social sophistication and its attendant anomalies occasioned by increasing industrialization, urbanization, rise of commercial capitalism, the birth of competing firms, colonial conquest of nations in search of industrial raw materials and new markets, etc. Faced with the challenges of the new features of modernity, scholars became increasingly disenchanted with the old historical method which, many felt unable

to interpret, let alone, predict. The scientific method of the natural sciences in its capacity for evidence-based analysis, control and prediction presented itself as a compelling alternative to the inane historical method (Ross, 1991; Bernard and Bernard, 1933; Beck, 1949). For many scholars, the only route open to progress in social research is the adoption of the natural science ideal of the scientific method. Yet, this choice was at the same time, vigorously challenged by some others who felt that scienticism was not an ideal for the understanding of man and his society. Among the earliest critiques of social scientism include works by Knight (1924), Hayek (1942, 1943,1944), and Beck (1949).

Despite the criticisms, majority of scholars were strongly convinced that the scientific method was capable of providing knowledge of the underlying principles of social change, providing falsifiable rules of action and operation, and finding regularities as a basis for control and prediction of social phenomena. That this method was mechanistic and deals with external, material, objects rather than human subjects was not of immediate concern. In the twentieth century, the mechanistic vision of the universe fashioned in the natural sciences was imported wholesale into the study of human society. Most of the early twentieth-century sociologists and neoclassical economists like Walras, Marshall, Pareto, and Fisher all had appreciable understanding of classical nineteenth-century physics, and set as their major task, the application of this same mechanistic and mathematical approach to social theory in general and economics in particular (Ganley, 1995; Lieberson and Lynn, 2002). For example, in his *Economics and Mechanics*, Walras traced the origins of his general equilibrium theory to nineteenth century theoretical physics (Walras, 1990).

By analogy, the social and anthropological universe compares to the natural universe such that certain rules and principles apply similarly to both (Hayek, 1943). However, significant differences are still obvious. Whereas the physicist can easily subject physical objects to experimentation to validate a hypothesis or ápriori guess, the social scientist faces severe obstacles in subjecting the social system to similar experimentation. Albeit, statistics and econometrics have developed many powerful and efficient standards for dealing with social data. Yet, the unavailability of genuine, "scientific experimentation" severely limits the applicability of the scientific method in the strict sense. Construction of specific concept of rigor and parsimony in social research only slightly mitigates this problem.

The application of the scientific epistemology in the pure and applied, positivist sciences is straight forward, because they deal specifically with matter that is quantifiable, representable by proxies, and could be observed and calibrated within a laboratory set-up. In this case, laboratory experiments are used to establish causal relationship among network of interacting objects.

Also, the subject-object distinction is readily apparent. In social science fields where the object is not readily available for laboratory experimentation, recurse is made to proxy representation of the object in a manner that renders it quantifiable and therefore, calculable. Once done, the object is subjected to pseudo-experimentation within a pseudo-laboratory context.

In the social sciences too, it has a direct application when the object possesses tangible elements. But in some instances, the object of inquiry may not be an object datum such as a stone, a tree, the flow of the river, the flow of income, the stock of oil or interest rate. Even if it is, may not easily submit to *o*bjectification. Moreover, the subject-object distinction is blurred such that instead of a subject-object relationship, there comes to be a dynamic relationship characterized by inter-subjectivity and interdependence. The *otherness* – cognitive separability assumption – of the object of research , which is a cardinal principle of the scientific method, no longer holds true thus leading to the break down of Adam Smith's notion of "impartial spectator" (Hayek, 1944).

The perceived limitations in applying the methods of science in the social sciences have constituted one of the defining moments of twentieth century debate in the philosophy of the social sciences (Mirowski, 1988; von Neumann and Morgenstern, 1944). In addition to providing a mechanistic interpretation of natural phenomena, the scientific world view seems to have entrenched a dualistic conception of reality which extols its utilitarian dimensions (Anya, 1993; Bronowski and Mazlish, 1970). Despite its achievements, critics argue that it accounts for a limited scope of reality – just the quantifiable aspects of things. Its emphasis on measurement and quantification implies a one-sided focus on the material and physical world, and a treatment of everything as if quantity. It does not account for the full nature of human beings as not only material or bodily entities, but also beings endowed with the mental and spiritual capabilities to project beyond the observable spatio-temporal dimensions of reality. Within the scientific realm, reality is relevant to the extent that it can be subjected to quantification and measurement. This has in turn, produced a mode of thinking that is not as interested in *what* the object is as in *whether* it is quantifiable or measurable and thereby conditioning a manner of thinking that looks just to see measurable and quantifiable things.

Strict application of this world view has no place for things that defy "rational" explanations. The fact was missed that even scientists show subjective preference not only in matters of extra-scientific judgement, but even in their scientific work. While deduction and induction are valid methodologies in science, a well developed scientific imagination and even faith have been part of the conditioning environment in which the break-throughs of science took place (Medawar, 1969).

The nature of the subject matter of the core natural and physical sciences –matter– makes it be that the scientific method has, as yet, no viable alternative. In both orientation and formulation, it is suited to the nature of material objects which most of the sciences deal with. In many cases, the reliability of the its instruments determine the level of validity of scientific research. But because, at the end, the true value or significance of scientific research is a matter of subjective judgment (Medawar, 1969), scientific method must rely on statistics. Recent research has shown that statistics are not fool-proof and sometimes, the interpretation of the results of scientific research are erroneous (*The Economist*, 2005). However, this occurs in scientific disciplines where subjective judgement is required to reach conclusions on implementation such as drugs research, clinical testing, epidemiology, etc.

But for social scientism and its dependence on subjective rationality, various recent experimental researches have shown that strict rationality, as assumed in the social sciences, does not reflect the true nature of human beings (Zak, 2005). In the past, various studies including Fine (2001), Elster (2000)and Boudon (2003) have detailed different types of social phenomena that defy the explanatory power of the rational choice theory, prominent among them are social actions that spring from belief. As a result, modifications such as assumptions of "bounded rationality", game theory formulations under assumptions of asymmetric information, and interaction models (Durlauf and Young, 2001) are gradually being used by researchers to study aggregate behaviors of people. But these attempts still make heavy reliance on the methods of mathematical sciences and physics, which create hypothetical models for which the prospects of suitable empirical data is at moment, a daunting task. Especially, we witness a resurgence of the early attempt by neoclassical economists to import the methods of physics into economics that has already engendered a new field termed *"econophysics"* (Farmer et al., 2005).

At the same time too, we witness rapid progress in ever expanding horizons which seem to be advancing the rational choice project such as in "economics of religion" and "Accounting for Taste" (Becker, 1996; Lawson, 2004), as a way to counter the deficiencies of social scientism. The end result is that at moment, there seems to be no viable alternative to either the scientific method or the rational choice theory version of social scientism.

In conclusion, we note that the scientific epistemology, with its focus on what is quantifiable, measurable and describable, has the great merit of delivering manageable knowledge; knowledge that *works* as in the positivist sciences. It is result oriented, and produces practical benefits in technological advancement. In the policy-oriented social sciences, it helps in the evolution of implementable

policies which, may not be possible otherwise. In spite of these perceived advantages and merits of the scientific epistemology, it shares with other modes of knowledge such as arts, the orientation towards the true, the good and the beautiful - which are the universal objects of knowledge. Science strives towards unveiling the true universal laws of nature, and channeling these laws to ends that serve the good of people. In the same way, the arts employ physical mediums to express and represent both the observable physical phenomena and the unobservable internal dimensions of the human reality.

In the arts, such as sculpture, music, or poetry, the artists strive to capture fleeting events of life in objective media. Michelangelo's sculptor of David and Einstein's theory of relativity may be worlds apart, but both share in the context of being expressions of deeper truths. David projects the true gait of man at a point in time between thinking and action that precedes victory. Einstein on the other hand, discovered the universal laws that underlie the spatio-temporal continuum. Both of these are expressions of objective reality albeit reached via different routes. In other words, the scientific epistemology is just another way of knowing reality alongside arts. Therefore, in the social sciences, especially, when the interobjectivity or intersubjectivity of both the object and subject of research are inseparable, it may be more illuminating to allow the nature of what is investigated to determine the appropriate way in which it should be known rather than approaching it already armed with a pre-defined methodology.

Notes

[1]Descartes' thinking subject can be interpreted as the Enlightenment re-statement of Protagoras' man-measure principle. Protagoras (485 BC - 421 BC) held that "man is the measure of all things"

[2]The concept of faith before understanding *fides quaerens intellectum*

[3]Kant refers to these as the transcendental "à priori" preconditions that empowers the subject to receive the object (Kant, 1995)

[4]Observation involves conscious (or rational) activity on the part of the subject to appraise or understand an object of attention. Even in case of reflexive consciousness, i.e. consciousness turning back on itself, one consciousness, the observer, stands as the investigating, knowing subject relative to the other which becomes the object that is investigated.

[5]The *world picture* according to Heidegger (1977a).

[6]Kant built his transcendental idealism on the three question: What do we know? How do we know? What do we do? and What do we hope for?

[7]Completeness, Reflexivity and Transitivity

[8]A is A, A is not-A, Everything is either A or not-A

[9]Every magnitude is equal to itself, the part is less than the whole, and two magnitudes, equal separately to a third, are equal to each other, etc.

[10]That a thing *is*(Principle of Identity), that a thing cannot *be* and *not be* at the same time (Principle of Difference)

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