The Scientific Method and Its Limitations: From Empirical Reduction to the System of Causality: The Epistemic Shortcoming of the Empirical Scientific Method (1)

(Translated)

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Introduction:

Modern Western civilization, particularly in its capitalist model, has been built upon a materialist empirical vision that sought to understand reality by breaking it down into small, isolated parts that could be studied separately. Although this reductionist approach achieved remarkable procedural success in the natural sciences due to its facilitation of isolating variables within the laboratory, it gradually transformed from a mere laboratory tool into a comprehensive method of thinking and inquiry in life, the human being, and society.

Thus, in Western thought, each human being came to be viewed as an independent individual separate from others, and society came to be defined as merely a collection of individuals, without sufficient attention to the relationships that bind them together such as ideas, emotions, and systems. Over time, this perspective led to the spread of individualism, and the emergence of numerous intellectual, social, and economic problems in countries applying capitalist systems. However, reality in its essence is not merely separate parts detached from one another, but rather interconnected systems in which each part affects the others within an organized and precise structure.

Profoundly deep criticisms have been directed at capitalist thought due to its focus on the individual and its neglect of the system that connects people in society to one another. Among the most prominent figures who diagnosed this issue was Sheikh Taqi Al-Din Al-Nabhani (rh), who demonstrated in his book “The System of Islam” that society is not merely a collection of individuals, but instead that its most important component is the collection of permanent relationships that bind people together, and these relationships consist of ideas, emotions, and systems. Therefore, his critique of capitalism was not merely a political or social objection, but was based on a deeper understanding of the nature of society as a holistic, interconnected system that does not admit of individualistic reduction. Hence, he saw that true reform of society is not achieved solely by reforming individuals on a one-by-one basis, but instead by reforming relationships, especially the systems and ideas that govern people’s lives.

Sheikh Taqi Al-Din Al-Nabhani (rh) criticized more profoundly the epistemological foundation of materialist thought in general, in both its capitalist and communist branches. He discussed the inadequacy of the empirical scientific method in his great book “Thinking,” and demonstrated that this method is suitable for studying tangible matter within the laboratory, but it is not sufficient on its own as a general foundation for all fields of knowledge. Therefore, he called for adopting the rational method in thinking, as the correct normative approach capable of understanding, interpreting, and judging reality in various spheres of life, in the major issues of existence and life - from creed and thought, to politics and society.

The Scientific Method and Empirical Reduction:

Modern Western capitalist civilization has witnessed since the seventeenth century the rise of the empirical method in conjunction with the scientific revolution associated with names such as Francis Bacon, Isaac Newton, and René Descartes. This method was based on the fundamental idea that understanding complex phenomena is not achieved by studying them as a whole, but rather by breaking them down into smaller parts that can be isolated,

measured, and experimented upon within the laboratory. Hence emerged what was philosophically known as “reductionism,” a reductionist tendency that holds that understanding the whole is achieved through understanding its fundamental parts and the laws governing their interaction.

The empiricist school needed this reductionist approach due to the nature of the method it adopts. The empiricist school, especially since Bacon and Hume, wanted to make knowledge based on sensory observation and direct experience. However, complex phenomena are difficult to subject to experimentation all at once, so it was necessary to forcibly simplify reality and isolate some factors from others so that the researcher could ascertain the effect of each factor independently. The scientist within the laboratory typically controls some variables and stabilizes others in order to determine the relationship between a specific cause and a specific effect. Therefore, empiricism required the “disassembly” of reality into simpler units that could be isolated, measured, and controlled in the laboratory.

Reductionism was, for the empiricist school, a necessary methodological tool to transform complex reality into elements amenable to empirical examination. For this reason, reductionism became strongly associated with modern empirical science; because the laboratory by its very nature requires simplifying the phenomenon, removing complex factors, and studying a specific element under controlled conditions. Hence, analyzing things into smaller parts became a practical condition for producing precise empirical knowledge. For example, when studying the combustion of a substance, one controls the amount of oxygen, temperature, and type of fuel, because the goal is to discover the precise causal relationship between these elements. Without this reductionist simplification, the experiment becomes uncontrollable, and it becomes difficult to distinguish between true causes and secondary factors.

This method was among the reasons for the success of the scientific revolution of Western civilization, because it allowed transforming nature from a complex and intertwined reality into systems amenable to examination, experimentation, and mathematical measurement. Instead of studying nature as an obscure whole, scientists began studying motion, force, heat, electricity, and atoms each separately under controlled conditions, which led to the development of physics, chemistry, engineering, and modern technologies. This method achieved tremendous success in studying relatively simple phenomena, especially in classical physics, where many motions and interactions could be explained by formulating them into precise mathematical laws, to the point that reductionism became one of the central foundations of modern science.

The Materialist Empiricist Epistemology:

In the Eighteenth Century, David Hume came to give the empirical method a more radical epistemological foundation, where he determined that causality is not a real necessity we perceive in matters, but merely a constant conjunction between phenomena from which a mental habit has been generated in the human mind. According to Hume, when a person sees fire burning wood repeatedly, he becomes accustomed to linking them, and thus the idea forms in his mind that fire is the cause of combustion, but this relationship in his view is not a true necessity existing in matters, but merely a mental habit resulting from repetition.

This skeptical tendency later evolved with John Stuart Mill and with the positivist and modern empiricist schools, which closed the gates of knowledge behind the walls of induction and direct experience, affirming that everything that falls outside the bounds of sensory verification is cognitive nonsense or metaphysics from which no true certainty can be hoped.

With the Industrial Revolution and the development of the natural sciences, this empiricist view became dominant in modern Western thought, and the empirical method transformed in the eyes of many philosophers and thinkers into a complete materialist ideology; that is, an almost absolute reference in interpreting reality and monopolizing knowledge. As a result, many fields of knowledge not based on direct experience were

devalued, such as philosophy, logic, rational inquiry, and matters of the unseen and religion. Moreover, some human sciences including psychology, sociology, and education were forcibly coerced into the molds of natural empirical imitation, which led to the stripping of the human being of his moral and teleological dimensions.

Over time, the empirical method did not remain for some tendencies merely a useful means of studying nature, but became a complete materialist philosophy attempting to confine knowledge to whatever is seen, measured, and experimented upon only. This led to the marginalization of the role of the intellect as an instrument capable of attaining certainty through reasoning, and opened the door to the spread of atheism, agnosticism, and absurdity, because everything not subject to direct experience became for them a matter of doubt or denial. Thus, the empirical method shifted from being a useful scientific tool to an attempt to monopolize the very definition of knowledge and determine what a person is permitted to believe in or reject.

The Challenge of Systems Science to the Reductionist Empirical Method:

However, scientific progress itself later began to reveal that the reductionist method, despite its great success, is not capable of explaining everything. With the development of the sciences in the Twentieth Century, especially when studying complex systems such as the environment, the economy, the brain, life, and networks, it became clear that knowledge of the small parts alone is insufficient to predict and understand the behavior of the system as a whole. Complex systems produce entirely new properties known as “emergent properties.” Each part may be understood in isolation, yet the behavior of the whole system remains incomprehensible unless the relationships connecting the parts, their organization, and their mutual influence are studied.

For example, knowing the components of the brain each in isolation is not enough on its own to understand awareness and the mind. Knowing individuals each in isolation is not enough to understand the behavior of society, because relationships, organization, and interaction between parts may produce new properties that do not appear in the single element alone.

Hence, in the 1940s and 1950s, new intellectual trends emerged, including systems science and general systems theory, which later evolved with complexity sciences, artificial intelligence, network theory, and cybernetics. These trends confirmed that reality is not understood only by breaking it down into small parts, but also through understanding the overall structure, internal organization, and networks of mutual influence within the system, and through studying structure, organization, feedback, and dynamic relationships that give the system its holistic properties.

At the same time, the philosophical debate on causality returned, and contemporary philosophy saw the emergence of ideas opposing David Hume’s refutative interpretation of causality. A number of philosophers began to speak of what is called the philosophy of powers or the ontology of powers, which holds that objects are not merely silent bodies moving randomly, but that things possess real properties and capacities that enable them to affect and interact. Fire, for example, burns by its very nature which Allah (swt) created in it, and water quenches by its nature, and objects possess real properties that make real causal relationships between them, and not merely a repetition that the mind has become accustomed to seeing.

Thus, modern scientific and philosophical thought gradually began to return to acknowledging that reality is not merely discrete events, but interconnected systems based on real causal relationships within an organized structure. However, this development did not abolish the importance of experimentation or the laboratory, but rather revealed only their limits. Reductionism remains a useful and important tool for understanding simple elements, but complex systems additionally require understanding the relationships, organization, and overall structure of the system. For this reason, many researchers today combine the study of parts with the study of the complete system, which reveals that reality is not merely

scattered, separate matter, but an interconnected system based on precise and organized causal relationships.

The Impact of Systems Science on Modern Epistemology:

The great development in understanding complex systems and their fruitful practical applications clearly revealed that the reductionist method is deficient and insufficient on its own to fully understand reality, especially when it comes to systems based on interconnection, organization, and mutual influence among their parts. However, contemporary Western philosophical thought did not possess the intellectual courage to undertake a radical revision. Instead, it treated systems sciences as mere abstract, practically useful technical tools, without genuinely reconsidering the epistemology that confined certainty to the limits of direct experience alone. This thought remained captive to a dependent materialist epistemology that denies the intellect its independent authority in producing certainty.

It was methodologically incumbent that this scientific shift leads to a restoration of the “rational method of thinking” and to the recognition that man attains knowledge not only through observation and experimentation, but also through rational thinking, analysis of relationships, systems, and causal necessities. Complex systems themselves have shown that understanding reality is not always achieved merely by observing small parts, but also requires understanding the overall structure and the relationships connecting these parts.

However, many contemporary trends have continued to view the intellect as merely subordinate to experience, not an independent instrument capable of attaining inferential certainty. Therefore, the reductionist empirical method has remained dominant in their concept of knowledge, even though scientific development itself has revealed its limits and inadequacy in explaining many complex phenomena.

Hence, the need arises to redefine the true domain of the empirical method, so that it is regarded as an important and useful means for studying natural phenomena amenable to experimentation and measurement, rather than as an exclusive reference that monopolizes knowledge and the interpretation of all reality. In contrast, the need arises to restore consideration to the intellect and the rational method in thinking, as being capable of understanding causal relationships and organized systems, and of attaining correct inferential certainty that does not oppose experience, but rather complements it and transcends its limits when necessary.

To be continued ...