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Instituting "Institutional Coherentism" as a Prerequisite for High-Quality Science: Another Crucial Step for Winning the Battle for Consistent High-Quality Science

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Abstract:- This paper is proposed because even though coherentism and internal and external validity are often rigorously pursued in the real-world by researchers and many eminent scientists of repute, the idea of "institutional coherentism" the way we define and understand it in this paper, rarely is. The approach described in this paper probably does not exist in toto or unqualifiedly elsewhere , hence the justification and the basis for this paper. We also provide examples to show why this approach is somewhat different from all other existing theories and approaches in the market, and will naturally, inevitably, and invariably lead us to much better and higher-quality science, and science with a greater degree of consistency as well. We begin this paper by defining what an institution is with respect to science, and provide real-world examples of such institutions. We also revisit various aspects of epistemology like coherentism, holism, internal and external validity, confirmation holism, and methodological holism. Needless to say, this paper constitutes a proper justification of the concept of "Institutional coherentism" as espoused and propounded in this paper, and we hope this will propel science to an altogether higher trajectory, reduce gaps in a multispeed civilization, and lead to scientific progress at the speed of light. This will also we believe, lead to immense cascading benefits for society as a whole.

I. INTRODUCTION

"When a complex system is far from equilibrium, small islands of coherence in a sea of chaos have the capacity to shift the entire system to a higher order." Ilya Prigogine, Nobel Prize-winning chemist

"The only relevant test of the validity of a hypothesis is comparison of prediction with experience." American Economist and statistician Milton Friedman

This paper is proposed and proffered for acceptance by other scholars and researchers because even though coherentism, consistency and internal and external validity are often rigorously and conscientiously pursued in the real-world by scientists of various hues and colours and by most scientists of eminent repute, "institutional coherentism" the way we define, explain and understand it in this paper, (i.e. coherentism across the entire field of study with extensions and expansions to other fields of study) rarely is followed, and not at least in letter and in spirit. The reasons could be many, ranging from lack of commitment to the discipline (or science in general) to unabashed careerism. This approach probably does not exist in toto or unqualifiedly elsewhere , hence the justification, defense and the fundamental basis for this paper. This paper also introduces some concepts that we believe do not exist elsewhere; Implementing this approach wholeheartedly can naturally and invariably lead us to a quantum leap in scientific activity, we believe; we also illustrate common cases and examples to show that this approach is not often followed in the real world by most researchers and scholars. We also provide examples to show why this approach is somewhat different from all other related existing theories, methods, techniques and approaches in the market, and will naturally, inevitably, and invariably lead us to much better and higher-quality science, with downstream rewards for society and intellectualism as well.

We begin this paper by defining what an institution is with respect to science, (followed by a definition of the idea of an establishment in general, and then a scientific establishment) and provide real-world examples for such institutions in various streams of scientific activity. We also revisit various fundamental and foundational aspects of epistemology (which forms the philosophical foundation and the basis for science) like coherentism, holism, internal and external validity, confirmation holism, and methodological holism. We also define and discuss other aspects in scientific method such as methodological individualism and methodological pluralism. Needless to say, this paper constitutes a proper justification of the concept of "Institutional coherentism" as espoused and propounded in this paper, and we hope this will propel science to an altogether higher trajectory and course, and bring about an intellectual revolution of sorts in various societies and cultures with rich rewards for science and society as a whole. It will also reduce gaps in a multi-speed civilization and bring about scientific progress at the speed of light. This paper,

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therefore, seeks to add to our long and growing list of papers and publications on scientific method and methodology. [1] [2]

➢ *Definition of an institution*

There are several different definitions of an institution in the market, and the definitions of the term vary fundamentally and widely based on the discipline it references to and the scope of such definitions as well. We now discuss threadbare, only the more important and the more common ones. An institution is often and commonly defined in layman's terms and in non-scientific parlance as a "humanly devised" structure of rules and norms that shapes and constrains human and individual behaviour. All definitions of institutions typically hold that there is an advanced level of persistence, coherence, internal validity with respect to rules, and continuity. Rules, laws, mores, social conventions and norms are all different examples of institutions. Institutions vary in their levels of formality or informality, their spatial spread, and their form and size as well. It may in some cases, also refer to a well-established law or practise.

Institutions and establishments may also be variously founded for religious, charitable, educational, professional, cultural or social purposes, though we restrict ourselves to definitions of scientific institutions and scientific establishments in this paper. There are many non-scientific institutions too. Including primary and secondary ones; for example, institutions promoting and enforcing political control, legal sanctions or administration are known as social or legal institutions. Examples of such institutions are the courts, the judiciary etc. Some sociologists like Emile Durkheim even see sociology as the science of institutions, dealing with the study of their genesis, and their style of functioning. A scientific institution commonly refers to a large body conducting research such as a research institute or a university. An example of a scientific institution is the Tata institute of fundamental research, or the Indian institute of technology. More developed (and scientifically evolved societies) societies are home to a larger number of scientific institutions, including those established by the government, government agencies, and private entities. The number of scientific institutions in countries like India has been historically low, though that number is now gradually increasing. The quality of research conducted by Indian institutes has also been somewhat low, but there is now a palpable change in the air.[3] [4]

➢ *Definition of an establishment*

An establishment may be defined a group or class of people or individuals with institutional authority in a given culture society such as the military or the clergy. An establishment often has a traditional, and conservation outlook; in extreme cases, it may even be regressive in nature. However, in the scientific domain and sphere, the term establishment may refer to a body or an entity promoting research; it may variously be highly progressive and illuminating or may at times get bogged down into the morass and dogma of bad and rigid dogmatic ideas. The term scientific establishment, however, more commonly refers to the entire body of ideas, ideas, theories, hypotheses, paradigms or frameworks falling within the discipline; it may also comprise the scholars or academicians falling with the purview and ambit of, or practising the disciplines, and their explicit and implicit philosophies and ideas to boot. The social and cultural characteristics (also its mores, ideals and differing and varying value sets) of scientific establishments are invariably and inexorable bound and tied up with those of the social institutions where most of them are located — with those of universities which promote research in addition to teaching. They are also associated with the cultures wherein they are birthed and are reflected in the practices or the practitioners falling within a said establishment, including its formal or informal extensions.[5]

Science is also associated with nationalism; nationalistic causes often push agendas in science. Nationalism and science are two dominant, but tightly inter-related systems of thought and institutions have evolved together over the past several centuries on the basis of these twin ideals. However, this unhealthy association is often detrimental to the best interests of a healthy society, and must be nipped in the bud. Such nationalism may be either institutionalized, or reactionary. Scientific nationalism has been witnessed in different countries in western Europe as well it the USA In countries such as India, scientific nationalism is non-existent because organized high-quality science itself in its infancy here. More recent research has even investigated the existence of scientific nationalism in less important countries such as Hungary. However, scientific nationalism may contrarily lead to a healthy competition among nations, and boost scientific activity as a whole. This approach has also dictated the use of grants, and has in some cases, led to science being hijacked by scientists for their own vested interests. It is also associated with lobbies and lobbying, and such tendencies unfortunately shape science and scientific policy and policy making as well. In the west, science nationalism has been associated with a fear and a paranoia of the more recent display of progress made by several leading Asian nations in various fields of the sciences. [6]

[1] Fundamentals of research methodology and statistics, Yogesh Kumar Singh, New Age International publishers, 2006

[2] Research methodology: Methods and Techniques, Second revised edition, CR Kothari, Second Revised edition, 2005

[3] Hofstede, G. (2001). Culture's Consequences: Comparing Values, Behaviors, Institutions and Organizations Across Nations (2nd Ed.), Sage Publications, Thousands Oaks, California.

[4] Castells, M., 2010. The Information Age: Economy, Society and Culture Volume 1: The Rise of the Network Society. 2nd ed. Oxford: Wiley Blackwell.

[5] Burch, Philip H. Jr. (1983). "The American establishment: Its historical development and major economic components". *Research in Political Economy*

[6] Guibernau, Montserrat 2007 (*The Identity of Nations*) Polity Press, Cambridge UK

Thus, there is a fear commonly harboured and held by Americans and American scientists of Asian and European dominance in science. This is also often associated with western elitism, and the presence of well-entrenched cabals in science. Elitism is generally taken to mean the dominance of a small group on the basis or special skills or abilities. This is akin to the "All pigs are equal, but some pigs are more equal", analogy. (Refer to the book "Animal Farm" authored by George Orwell ne Eric Blair first published in the year 1945; this work was essentially a critique of communism) . A cabal on the other hand, may be defined as a group of individuals or people who are united for the advancement of a non-publicised or a closely guarded goal, and usually to promote their own vested interests without the knowledge of those who are outside their group. We had cabals in Indology right until the 2000's, and many scholars in the field who were cut off from the outside world held their own shibboleths and private views. Scholars of the likes of Witzel have either (and variously) with full and complete justification, or falsely and erroneously accused Indian Indological scholars of strident nationalism and Indo-centrism. [7] [8]

➢ *Definition of coherentism*

The doctrine of Coherentism is a theory of epistemic justification, and deals with justified true beliefs rather than just mere unsubstantiated beliefs or opinions. It implies that for a belief to be justified it must belong to a coherent and a well-aligned system of beliefs forming not just a part of an individual's knowledge or belief systems, but also a formalized and a systematic body of scientific knowledge. For a system of beliefs to be innately and inherently coherent, all the beliefs that make up that system must cohere with, adhere to, or align with, or "hang together" with one another. There are also coherence theories of truth which characterize and distinguish truth as a property of much larger systems of statements and propositions where individual statements and propositions must always logically confirm to a larger and a greater whole.

Thus, if any Indian scholar or researcher makes a statement about a real or imagined Indian epic age, it must also satisfy the principle of coherentism, and draw data or information from all relevant fields or study (and must not misalign with any other body of knowledge). Thus, the principle of coherentism must also be satisfied with respect to research output, and this would distinguish good quality science from poor quality science. Other related concepts are the doctrine of foundationalism which states that propositions must rest on some foundational and non-inferential justified belief, or some secure foundation of certainty; the doctrine of Epistemic coherentism which states that beliefs and propositions are justified if they cohere with the other beliefs a person holds or subscribes to, and each belief is in turn justified if it coheres with the overall system of beliefs; Internalism and externalism: The believer must be in a position to justify a belief through internal knowledge (also known as internalism), or outside sources of knowledge (also known as externalism). We also have the concept of epistemic regress where one belief or concept is based on another belief or concepts, and this sometimes constitutes a long chain of thoughts and beliefs.

We then, also have coherence theories of truth which characterize truth as a property of whole systems of propositions that requires a fit or alignment to all elements within the whole system. According to the doctrine of coherence theory of justification, also known as epistemic coherentism. Coherentism is a theory of epistemic justification. It implies that for a belief to be justified it must belong to a coherent system of beliefs. This coherence may therefore be attained locally (or with a subsystem) or universally. Our approach logically pitches for the latter. According to the correspondence theory of truth, the truth element of a proposition depends on whether it describes the world accurately and holistically and corresponds to it in all respects and dimensions. Our approach also purports to be syncretic and ecumenical; it is also practical, down-to-earth, and seeks to solve real world problems in ways that many approaches cannot. It also seeks to be readily workable and implementable and seeks to serve as a handy and a practicable guide to researchers, scholars and thinkers. This fundamental philosophy, we believe sets this approach apart from other pre-existing approaches in the field. The idea of coherentism can also be brought to bear on the definition of holism; holism is the theory and idea that all the parts of a whole system are in in mutual interdependence to one another in such a way that they cannot naturally exist independently of the whole, or cannot be properly or holistically understood without reference to the entire or the complete whole. [9] [10]

The idea of validly refers to how sufficiently and adequately a scientific test or research endeavour is geared to its actual purpose, or how well it reflects reality and real-world concerns and considerations. Validity is also chiefly classified into two types, namely, internal validity and external validity. Internal validity refers to the extent to which all extracted evidence is valid or effective within the context of a particular study. External validity on the other hand, refers to the extent to which a claim is valid against all other external facts, data or observations. It also refers to whether the results of a study can be vetted or ratified against external ideas or concepts. In case of both internal and external validity, causal relationships must be clearly and properly established. We may also refer to the theory of paradoxes here; any theory, hypothesis or paradigm is effectively useless

[7] Deresiewicz, William (June 2008). The Disadvantages of an Elite Education. "Our best universities have forgotten that the reason they exist is to make minds, not careers." *The American Scholar.*

[8] Robert J. Fogelin, *Pyrrhonian Reflections on Knowledge and Justification*, Oxford University Press, 1994, ISBN 978-0-19-508987-5

[9] M. T. Dalgarno, E. H. Matthews (eds.), *The Philosophy of Thomas Reid*, Springer, 2012

[10] Seevnick, M.P. (2004), "Holism, physical theories and quantum mechanics", *Studies in History and Philosophy of Science Part B: Studies in History and Philosophy of Modern Physics*

if it contains a large number of internal and external paradoxes. Examples of such constructs could include Hindutva or Marxist constructs or Indian history; however, all allegations must be subservient to an assumed epistemology or a structured scientific method. Both coherentism and holism are geared towards singular objective of eliminating and castigating systematic bias. Their success can solely be determined on the basis of how well they satisfy and fulfil these objectives. This idea is also related to the concept of consistency in science which seeks to ensure that the results of a study does not contain innate self-contradictions. The consistency of a study is often measured by means of a consistency proof. Research must also necessarily always be both externally and internally consistent in all respects. In the case of internal consistency, all aspects and elements of the research including data, logic and observations, are internally fully consistent with one another, while in the case of external validity, the research is consistent with other known or observed external data, observations or phenomena. It is also possible to quantitatively and statistically express consistency through the use of co-relation metrics. [11]

In the philosophy of science, the idea or the doctrine of confirmation holism, also sometimes referred to as epistemological holism, is the position or the view that no individual statement can be proven or disproven by a test carried out in isolation, but only holistically after taking all relevant statements into consideration. This idea was proposed by the American philosopher and logician Willard Van Orman Quine who based his ideas on earlier work carried out by the French theoretical physicist Pierre Duhem. This approach is also sometimes referred to as the Quine-Duhem hypothesis. Thus, according to Quine, the entire web of beliefs needs to be studied as a whole. All this boils down to the principle and canon of consistency; Thus, in the words of American business magnate, Dwayne Johnson, “Success isn't always about greatness. It's all mostly about consistency. Consistent hard work nearly always leads to success. Greatness will come, if consistency is ensured." Others have lambasted the approach; the famous novelist Oscar Wilde is said to have remarked, “Consistency is the last refuge of the unimaginative”. Many other great scientists were also known for the consistency, systematicity or coherence either. For example, the then little-known Serbian-American inventor Nikola Tesla famously wrote of the much more famous American inventor Thomas Alva Edison, in an highly critical article he wrote for the New York Times, “If he (Edison) had a needle to find in a haystack he would not stop to reason where it was most likely to be, but would proceed all at once, with the feverish diligence of a bee, to examine straw after straw until he found the object of his search.”

As the great inventor of TRIZ Soviet engineer and inventor Genrich Altshuller concludes,”_Although people who had achieved a great deal in science and technology have talked incessantly of the inscrutability of creativity, I refused to be convinced and disbelieved them immediately and without argument. Why should everything but creativity be open to scrutiny? What kind of process can this be which unlike all others is not subject to restraint and control? What can be more alluring than the discovery of the nature of talented thought and converting this thinking from occasional and fleeting flashes into a powerful and controllable fire of knowledge.” Therefore, control and judgemental vigilance against incoherence and inconsistences will always be necessary in the pursuit of knowledge; science is not just an uncontrolled labour of love; it requires harmony and balance. As the famed British polymath Michael Polanyi likewise states, “Our reliance on the validity of a scientific conclusion depends ultimately on a judgment of coherence; and as there can exist no strict criterion for coherence, our judgment of it must always remain a qualitative, nonformal, tacit, personal judgment.” [12] [13]

➢ *Principles and benefits of this approach*

The following are the core and intrinsic principles, and the benefits of this approach. We believe that this approach does not exist in toto elsewhere; hence, the justification for institution. Of course, this approach may be meaningfully and beneficially combined with other approaches in scientific method along with the papers we had written on scientific method and all the different ideas we had vigorously championed all along. [14] [15] [16]

- No new endeavour may be justified unless necessary: At the core and the heart of our approach is that no new endeavour may be justified unless necessary. Of course, there may be errors of omission and judgement, and inadvertent duplications. However, every new endeavour in science must be consciously and rigorously be reconciled with every other existing oeuvre in science.
- To synthesize and validate with existing research: Therefore, any new scientific activity must be synthesized and validated with existing research. We see a new class of individuals emerging who are devoted and dedicated to this activity.
- To synthesize with work in allied disciplines: Therefore, any new scientific activity must be synthesized and

[11] Field, H., 1977, “Logic, Meaning and Conceptual Role”, The Journal of Philosophy, LXXIV(7)

[12] *Clark, Ronald William (1977). Edison: The man who made the future. London: Macdonald & Jane's: Macdonald and Jane's. ISBN 978-0-354-04093-8.*

[13] *Rupp, A. A.; Pant, H. A. (2007), "Validity theory", in Salkind, Neil J. (ed.), Encyclopedia of Measurement and Statistics, SAGE Publishing*

[14] The Demise of the Dravidian, Vedic and Paramunda Indus Hypotheses: A brief explanation as to why these three Hypotheses are no longer tenable, Sujay Rao Mandavilli, 2013

[15] Unveiling the Sociological Ninety-ten rules for Social Sciences research: Towards better hypothesis formulation in the Social Sciences in the interests of higher quality research and intellectual multi-polarity Sujay Rao Mandavilli Published in IJISRT, February 2023

[16] Elucidating the Certainty uncertainty principle for the Social Sciences: Guidelines for hypothesis formulation in the Social Sciences for enhanced objectivity and intellectual multi-polarity Sujay Rao Mandavilli IJISRT, March 2023

validated with existing research in all other allied and related disciplines as well.

- Literature review required: As a part of this approach, all review of existing literature must be consciously and systematically performed at periodic or irregular intervals.
- To refute a theory holistically if it is superseded: This is by far the most important tenet of our approach; this canon states that if a theory, hypothesis or a paradigm is sought to be superseded or replaced, it must be comprehensively and convincingly refuted. It must clearly be demonstrated why it is false or grossly inadequate if it is grossly inadequate and also logically false.
- New work must not contradict existing work unless it is refuted: As a corollary and extension of the above, if any new works seeks to contradict a well-established or a widely held principle, it must be adequately and sufficiently refuted, before the new research begins or is satisfactorily concluded.
- All theories and hypotheses in the field must be holistically evaluated and refuted however egregious they may be, if the researcher believes they are false, and does not wish to incorporate them into his work. Therefore, If lacunae are found in existing work, they must be exposed and laid bare. Refutations or validations must be holistic and comprehensive in all respects. The refutation must follow an established scientific methodology and must be devoid of digressions such as ad hominem attacks, or peripheral attacks carried out using hackneyed, dubious or irrelevant methods.
- This approach can be carried out as a systematic effort by concerned third parties to reduce biases, prejudices and careerism in science: This would be a highly beneficial and instructive approach indeed and only goes a long way to demonstrate that science has not matured or evolved fully.
- Use of appealing catchphrases like "Latest research" , "New work" , "New research has shown that.." "Scientific" must be avoided to the extent it misleads and misinforms the general public to any degree.
- This approach we believe, will avoid unhealthy tendencies in science and rein in researcher whims and fantasies as well. It will ensure that every scientific activity under the sun is meaningful, significant and productive.
- Benefits of old and other relevant, applicable or appropriate approaches must be listed, and be incorporated into the new approach if necessary
- This approach must be used across space and time with both contemporaneous and archaic frameworks and paradigms.
- This approach we believe, will reduce the negative impact of careerism on science. Careerism is an approach of seeking self-promoting over everything else. It often carries an unhealthy connotation. A person or an individual who practices careerism is generally referred to as a careerist.
- To facilitate better peer review processes, peer-reviewers need to bear in mind this process as well, and follow it consistently.
- To reduce confirmation bias: This approach, we also hope and believe, would reduce confirmation bias as well. This may be defined as an approach which seeks to consciously, subconsciously or unconsciously interpret events in the light of the individual's own past experiences or deeply cherished beliefs.
- Raising red flags: Thus, the scholar or the reviewer can raise red flags or red alerts, and can even convincingly show or demonstrate either the old or the new research to be wrong, either partly or fully.
- Defining legacy research or legacy science: This approach we would hope and anticipate (and at this point in time assume, even if audaciously so, with some amount of temerity and gumption) would distinguish (all our previously published papers on scientific method over the past couple of years must also be taken into account and consideration). We will however reserve this judgement for other scholars and researchers to make.
- This approach must be followed in letter and in spirit, and not half-heartedly, spiritlessly or lackadaisically. Otherwise, it would be doomed to fail.

➢ *Examples of bad science*

There are several examples of bad science, and we present a few of them below. All these do not, of course, adhere to or confirm to our principle of institutional coherentism. [17]

- It is a well-known fact that Michael Witzel of Harvard University refuted the "Dravidian" Harappa hypothesis (rather unconvincingly) and by skimming on the surface to promote his own Para Munda Indus myth. Thus, different groups subscribing to different ideologies and wishing to promote different vested interests have variously promoted the Dravidian, Vedic and Paramunda Indus myths. From our perspective and point of view the Dravidian Indus theory is unsupportable with evidence old or new because the Harappan region lies to the north-west of the Indian subcontinent, and migrations could have only been small in number; thus, the notion of "Aryans" displacing "Dravidians" appears highly ludicrous at best. Likewise, Paramunda Indus supporters who are a peripheral few, are mostly ageing German Indologists. The term "Paramunda" itself was perhaps invented by those with vested ideological interests, and as such may have little to no epistemological currency. We had analyzed threadbare, the different and the differing motivations of British and German Indological scholars in a paper published by us in 2013. As argued by Douglas T. Mc Getchin and Kaushik Bagchi German, some British scholars of Ancient India and missionaries of the likes of ,John Muir and J Wilson had wanted (mostly owing to their ideological beliefs, stands and allegiances) wanted to show "Aryans" as being superior to the natives and the "aborigines" of Ancient India who were projected as being lazy, indolent and slothful. German Indologists in

[17] Alcock, J. (2001). Science vs. Pseudoscience, Nonscience, and Nonsense. *The Skeptical Inquirer*, **25**(3), 50–54.

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particular, wanted to project immigrants as being aloof from the natives with no miscegenation purported to have taken place. Anyone who proposed any acculturation model was branded as being politically motivated, etc., and half-baked methods such as the substratum methods were followed. This exercise may now be one in futility now, as the mind-nineteenth century school of Indology lies irrecoverably on its deathbed. Asko Parpola and Michael Witzel (Steve Farmer, and to a small and a lesser extent) pursued different trajectories, and seldom saw eye to eye. We hope all these digressions and misadventures can be buried in the years and decades to come, and a healthier camaraderie forged. Likewise, Steve Farmer had told the Author (In the year 2005), that the Dravidian hypothesis was obsolete, and that latest research had now shown that the Indus valley civilization was non-Dravidian. While this assertion may be coincidentally true, the methodology followed is unsatisfactory and non-convincing.

- Likewise, the highly competent and well-establish scholar of Indus studies, the late Gregory Possehl stated (in 2007, in a review of the Author's article) that Thomas Burrow's ideas (on the "Aryans" attacking the "Dravidians") were naturally largely outdated, but did not say why; he was only trying to protect the cherished mid-Nineteenth century school of Indology from oblivion and extinction, by dragging all forms of Indological scholarship in the direction of the mid-nineteenth century; this was obviously done to pre-empt it from vanishing into total oblivion.
- In another unrelated assertion. Gregory Possehl stated that FE Pargiter's ideas were plain wrong without furnishing a justification, evidence or proof; this is plainly bad science, and was plainly and clearly done in the interests of careerism. FE Pargiter, though not an Anthropologist, was a bonafide orientalist; his magnum opus on Ancient India was published in 1922, after decades or hard work. Why did all his hard work go in vain? Why was a reconciliation of ideas never attempted or done?
- New drugs or new cures for ailments promoted by mainstream scientists and researchers, often state that old solutions are flawed, and yet do not convincingly state why. This is a common misadventure in many fields of science including those with which we are not highly familiar, but this unhealthy and nefarious tendency (Many western scientists, researchers and scholars also unfortunately are guilty and must stand accused) must be wholly nipped in the bud.
- Heavy bodies versus light bodies for automobiles: Paradigm shifts in automotive design have taken place; old-schoolers subscribe to the idea and notion that heavy bodies are inherently safer and stronger. However, modern "science" has apparently "refuted" this. We also believe in substance over form, and automobile safety must be convincingly demonstrated under real-world conditions. Likewise, if new crash and safety tests are to replace old crash and safety tests, (or even if one tests claims to be better than another as there are different tests such as the global NCAP) the superiority of new safety and crash tests over old safety and crash tests must be convincing and consistently proved and demonstrated under real-world conditions, and the lacunae and drawbacks of the old tests also exposed. This is a parallel and an example from practical engineering, but there are probably many other parallels from theoretical and applied science.
- It must also be noted and observed that science is often a directionless activity resembling a merry-go-round or a carrousel with multiple and myriad twists and turns, and no long-term direction. New trends emerge, supplementing old trends or relegating them to the background. Fuel efficiency is sometimes the momentary trend, and dominates automotive discourse; this is then relegated to the background as conditions and situations change, and automotive safety or sustainability is the new hot topic for discussion; a long-term direction and a benchmark for progress which is arrived at through comprehensive reasoning, needs to be maintained at all times in many spheres of human activity, though the trajectory may itself be revisited at times. While we do agree that individual scholars may (and reserve the prerogative to) set the direction and tempo for scientific research, research must by no means become an unchanneled and a directionless activity. Other scholars and researchers must initiate course corrections, if and whenever required.

II. CONCLUSION

The justification of this paper has been that while coherentism and internal and external validity are often rigorously pursued in the real-world by many eminent scientists of repute, the idea and the concept of "institutional coherentism" the way we define and understand it, rarely is followed in a structured and a coherent fashion. We have also provided examples to show how this approach is more comprehensive than existing approaches in the market, and will naturally, inevitably, and invariably lead us to much better, more consistent and higher-quality science. We had begun this paper by defining what an institution is with respect to science, and have also provided real-world examples of such institutions. We have also revisited different aspects of epistemology like coherentism, holism, internal and external validity, confirmation holism, and methodological holism. Needless to say, this paper constitutes a proper justification of the concept of "Institutional coherentism" as espoused and propounded in this paper, and we hope this will propel science to an altogether higher trajectory, reduce gaps in a multispeed civilization, and lead to scientific progress at the speed of light. This will also lead to immense cascading benefits for society as a whole, we believe.