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Building Upon "Foundationalism" to Achieve the Objectives of Contemporary Science: How this can Lead to Faster Scientific Progress and Inclusive Science

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Abstract:- This paper is one of our most important ones in the core philosophy of science, and one that we expect to stand science in extremely good stead as well. We believe this can move the needle and push the envelope as well, and lead us to what we have always called "scientific progress at the speed of light". We naturally commence this paper by tracing the history of the term "foundationalism" itself, right from the time of the Ancient Greeks, renaissance and enlightenment thinkers, and finally to the modern and contemporary ones. Types of foundationalism such as strong and weak foundationalism, modest foundationalism, and then finally anti-foundationalism, internalism and externalism are also discussed and dissected threadbare along with allied and related concepts such as circular logic and reasoning, regress and infinite regress, all of which form a part of epistemology. The core concepts forming a part of this paper such as forward linkages, backward linkages, and traceability matrices are also discussed. We follow this up with the core principles of this paper, and discuss the ideal and recommended direction of research, including the ideal nature of research, primary research, secondary research, basic and applied research, and cross-cultural collaboration including vertical and horizontal collaboration as well. This paper is also much more importantly linked to our papers on sociocultural change, pedagogy, scientific methods, and other papers in the social sciences for maximum impact and efficacy. It is therefore an important part and parcel of our globalization of science movement, and one that will help realize our overall goals and mission greatly.

I. INTRODUCTION

You can't build a great building on a weak foundation. You must have a solid foundation if you're going to have a strong superstructure - Gordon B. Hinckley.

The loftier the building, the deeper must the foundation be laid- Thomas a Kempis.

This paper is one of our most important ones in the core philosophy of science, and one that we expect to stand science in extremely good stead as well. We believe this can move the needle and push the envelope as well, and lead us to what we have always called "scientific progress at the speed of light". We naturally commence this paper by tracing the history of the term "foundationalism" itself, right from the time of the Ancient Greeks, renaissance and enlightenment thinkers, and finally to the modern and contemporary ones. Types of foundationalism such as strong and weak foundationalism, modest foundationalism, and then finally anti-foundationalism, internalism and externalism are also discussed and dissected threadbare along with allied and related concepts such as circular logic and reasoning, regress and infinite regress, all of which form a part of epistemology. The core concepts forming a part of this paper such as forward linkages, backward linkages, and traceability matrices are also discussed. We follow this up with the core principles of this paper, and discuss the ideal and recommended direction of research, including the ideal nature of research, primary research, secondary research, basic and applied research, and cross-cultural collaboration including dialectical approaches, vertical and horizontal collaboration as well. We also discuss some other concepts such as coherentism, reliabilism, aeternitism, omnimodism, and ontology as well, to the extent they ratify and validate the ideals of this paper. This paper is also much more importantly linked to our papers on sociocultural change, pedagogy, scientific methods, and other papers in the social sciences for maximum impact and efficacy. It is therefore an important part and parcel of our globalization of science movement, and one that will help realize our overall goals and mission greatly.

- *Introduction to Foundationalism*

Foundationalism as described in this paper, and as generally understood by the scientist and the researcher, is an important concept in the philosophy of science that posits that all forms of knowledge and justified beliefs are built on a basic foundation of non-inferential knowledge or justified true belief. Justified true belief as we may state here is also the foundation of epistemology or the science of knowledge. Non-inferential knowledge here refers to a type of knowledge that can be justified without depending on any other set of beliefs usually foundational ones. According to the core philosophy advocated by foundationalists, some beliefs may be inherently justified and may not require support from other beliefs. Foundationalists also emphasize

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clearly, lucidly, and in unequivocal terms, that foundational beliefs are the starting point for all other knowledge and beliefs, and all other forms of superimposed knowledge are built upon foundational knowledge. They also emphasize that beliefs be supported by a finite and a continuous chain (or tree) of supporting beliefs that logically emanate from each other and flow linearly, rather than by loops or circles of inference. Many thinkers and philosophers of science from across the ages have accepted the general doctrine of foundationalism, and some of the more notable among them are Rene Descartes, John Locke, Gottfried Wilhelm Leibniz, David Hume, George Berkeley, and Thomas Reid. Rene Descartes is however considered by most to be the progenitor of this belief in modern times, building upon the work carried on by earlier Greek thinkers such as Plato and Aristotle. Immanuel Kant and J. G. Fichte in were foundationalists as well, albeit in a slightly different interpretation of the term, and so were Edmund Husserl, Bertrand Russell and John McDowell in more recent and contemporary times. Some of these philosophers emphasized common sense, rationality, and the application of the mind too, as being important and critical components and essential prerequisites of foundationalism.

Foundationalism must always be contrasted with the idea of coherentism, which alternatively argues that justification has to do with the mutual support that beliefs give one another. Coherentists therefore generally reject the idea that justification logically proceeds in a logical fashion from one belief to the next, and emphasize mutual interdependence instead. We must therefore also differentiate between a priori knowledge and a posteriori knowledge here. A priori knowledge refers to knowledge that emanates from theoretical deduction and not experiential knowledge. A posteriori knowledge refers to knowledge that is based on observation and experience alone. The latter is corroborated by empiricism which holds that knowledge emanates from sensory experience alone. Therefore, both empiricists and rationalists are foundationalists, but with a small difference. Empiricists consider the breadth of experience to be the foundation while rationalists ascribe it to some form of logical reasoning based on innate ideas. Circular reasoning must also be distinguished at the very outset from regress (including epistemic regress) and infinite regress. Circular reasoning is a logical fallacy where premises are also in need of justification. In case of regress one form of knowledge depends on each other in a continuous chain often infinitely. Only the latter of course corresponds to infinite regress.

After a long hibernation, debate over foundationalism revived considerably in the 1930's. The famous German philosopher of science and the founding father of both logical positivism and the Vienna circle, Moritz Schlick viewed scientific knowledge like a pyramid with different classes of beliefs, while Otto Neurath contrarily stated that scientific knowledge generally lacked an ultimate foundation. Willard Van Orman Quine, Richard Rorty and Wilfrid Sellars stated that there was some amount of subjectivity involved, and absolute certainty of knowledge was impossible. This "ontological relativity" allowed for cultural biases and cultural interpretations as well. This is also sometimes referred to as a web of beliefs. These positions themselves are determined by mere opinions, with some degree of ego clashes or personality clashes entering the mix. We must argue for, and proceed towards a higher degree of reliability, and better science at all times, and look for some form of underlying evidence or epistemology always. Foundational research is also extremely important, and must be carried out always. We must also emphasize and reiterate pragmatism, practicalism, and social responsibility of scientists and intellectuals at all times. There are also strong and weak forms of foundationalism, and these positions became particularly well entrenched in the 1970's; the former argues for infallibility of basic beliefs, while the latter does not. Likewise, we have had classical foundationalism and modest foundational. In case of the former, foundational beliefs are postulated to be infallible, while in case of the latter, positions are generally held to be true unless proven otherwise. Anti-foundationalism which was also supported by Richard Rorty, also likewise sometimes rigidly and dogmatically holds that foundational beliefs do not exist. This concept must also be meshed with internalism and externalism. The thesis of internalism holds that it is pretty much uncommon to act or behave independently of desires and beliefs, while externalism holds exactly the opposite position. There have been critics of foundationalism too; among the more important ones are Donald Davidson and Jacques Derrida. Some important critics of foundationalism are also post-modernists, and post-structuralists. We also need non-abstraction and non-dogma in the philosophy of science. This is the crying need of the hour and day. This is also the underlying philosophy behind this paper. [1] [2] [3] [4]

II. CORE CONCEPTS OF THIS PAPER

The following are therefore the core concepts of this paper; while these are based on the general doctrine of foundationalism, we have extended them in new and meaningful directions so as to satisfy the principles of pragmatism and practicalism espoused and advocated by us all along which means that researchers, scientists, intellectuals or scholars are actively engaged or involved in solving real world problems and making the world a better place for its denizens, citizens and inhabitants. Read this

[1] *Audi, Robert (2003). Epistemology: A Contemporary Introduction to the Theory of Knowledge. Routledge. ISBN 978-0-415-28109-6.*

[2] *Coelho, Ivo (2010). "Foundationalism". In Puthenpurackal, Johnson J. (ed.). ACPI Encyclopaedia of Philosophy. Asian Trading Corporation. ISBN 978-8-17086-574-2.*

[3] Franke, John R.; Grenz, Stanley James (2001). Beyond Foundationalism: Shaping Theology in a Postmodern Context. Westminster John Knox Press. ISBN 9780664257699

[4] *Lemos, Noah Mercelino (2007). An Introduction to the Theory of Knowledge. Cambridge University Press. ISBN 978-1-13946-185-6.*

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statement as an approach enhancing the general utility of science to the general public as well, not just in one part of the world, but everywhere, and at all times. [5] [6] [7] [8] [9]

➢ *Envisaging Forward Linkages*

The term "Forward linkages" which is also known as downstream linkages, is commonly used in many walks and spheres of life, and both in scientific and non-scientific domains. The term generally refers to the connections between an object, entity or paradigms and other objects, entities or paradigms that use its outputs as their own inputs. We may mention here in passing, that forward integration as a strategy is also adopted by companies to take control of its distribution chain, even though this examples is not related to science. Therefore, from our perspective, and from the perspective of this paper, the following will hold good at all times.

- Potential downstream research must be identified consciously and conscientiously at all times, by all researchers, so that one's own research is molded accordingly. While potential downstream research may not always be identified immediately, it may at least be conceptualized and envisaged. Many industries and business firms adopt this strategy. Then, why not academicians, researchers, scientists, and intellectuals?
- Potential downstream consequences (and potential downstream interlinkages, if any) must be identified consciously and conscientiously at all times so that one's own research and research design can be tweaked, molded or modified accordingly, and new research elements added. (or some research elements emphasized more than the others)
- Potential scenarios must be identified consciously and conscientiously at all times, and the scope of the research expanded as necessary. Research designs must also offer bullet proof reliability to the extent existing data or evidence will allow it.
- In such a case, paradigms, frameworks, concepts and hypotheses upon which future paradigms, frameworks, concepts and hypotheses will be based or built must themselves be stable as far as practically possible. Researchers must be particularly careful and cautious if downstream usage is large and diversified. In such as case they must tread with utmost caution and take external help as and when necessary.
- There is of course a scope for margin of tolerance or margin of error (and an error of judgment, at times). This is why revisions will always become necessary as and when more interdisciplinary equations become apparent.

➢ *Envisaging Backward Linkages*

In stark and in direct contrast, backward linkages, also known as upstream linkages, are the connections between an entity, concept, or a paradigm and its predecessor entities, concepts, or a paradigms. There term is also widely used in industry with many industries widely using or adopting this strategy in order to gain control of the supply chain and raw material supply. For example, Henry Ford, whose iconic Ford Model T revolutionized the automotive landscape between the years 1908 and 1927, set up a glass factory as obtaining large quantities of glass from suppliers became evidently very difficult. In 1928, after the Ford Model T was discontinued and the Ford Model A was introduced, he also set up a rubber plantation in Brazil called Fordlandia. The plant is mostly deserted now, and the strategy construed to be a colossal failure of epic and of monumental proportionss. This strategy is also sometimes referred to as vertical integration, and even the American electric car giant Tesla has adopted it in the recent past, albeit for raw material sourcing.

- Therefore all concepts, entities and paradigms must be traced backward to predecessor concepts, entities and paradigms, and multiple linkages established wherever necessary, both direct and indirect.
- Predecessor concepts, entities and paradigms may also be modified as necessary, and adequate feedback provided to the researchers and specialists. Collaboration may also be initiated with other researchers as necessary, to the benefit of science and the scientific community as a whole. Therefore traceability matrices may be prepared to reduce risks and accomplish a workable and a viable action plan. Traceability itself is classified and categorized into forward traceability, backward or reverse traceability, and bidirectional traceability as will be evident from our reasoning.
- In case of paradigms, frameworks, concepts and hypotheses, the paradigms, frameworks, concepts and hypotheses upon which the current paradigms, frameworks, concepts and hypotheses must be in good working order and good shape, and must be flexible and amenable as far as possible.

[5] Hypothesis, paradigm, framework and concept evaluation and testing across space and time: A revalidation of our concepts of "aeternitism" and "omnimodism" Sujay Rao Mandavilli

[6] Operationalizing cross-cultural research design: Practical, cost-effective, and a minimalistic application of cross-cultural research design to minimize cultural bias in research and reconcile diverse viewpoints IJISRT, April 2023 Sujay Rao Mandavilli

[7] 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

[8] Taking the benefits of science to underrepresented regions of the world: Promoting Horizontal collaboration in social science research as a meaningful extension of cross-cultural research design Sujay Rao Mandavilli IJISRT, August 2023

[9] Popularizing auto-dialectics in scientific endeavour: A potentially productive tool in the interests of better and higher-quality science Sujay Rao Mandavilli IJISRT, June 2024

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➢ *Distinguishing between Foundational Knowledge and Non-Foundational Knowledge*

Researchers must also be able to demarcate between foundational knowledge and non-foundational knowledge at all times; and the direction, tempo, and pace of research must be suitably and adequately researched and emphasized. Experts in foundational streams of knowledge must be thorough, meticulous and professional, and must possess the adequate knowledge and expertise in order to share it with others and impart it to others. Sadly, this is often not the case, and this principle is seldom realized or followed in practice. For example, if we take the field of historiography, Marxist historiography has seldom (if at all) provided any interdisciplinary frameworks, and Hindutva approaches to history are fundamentally flawed too. Marxist historians have seldom (if at all) spoken about objectivity, contributions to science, and social responsibility either. We must also master the art and the knack of building upon foundations. We must have the ability to identify paradigms, frameworks and concepts that not foundations, the ability to identify paradigms, frameworks and concepts that lie at the heart of an issue, the ability to identify paradigms, frameworks and concepts that are not foundations, and the ability to identify paradigms, frameworks and concepts that do not lie at the heart of an issue.

➢ *Sound Concepts*

A concept may be defined is a highly abstract idea provides a robust foundation for more much complex frameworks, concepts and paradigms. These are often associated with mental representations or visualizations of something, though it would be very obvious to most that they are often codified appropriately and consigned to writing. Concepts may also vary widely in their content, and may range from being highly exact to inexact, highly precise to highly imprecise and very certain and reliable to highly uncertain and unreliable. Concepts are constantly or regularly envisaged, created, and formalized in diverse fields of study such as mathematics, physics, chemistry, zoology, and computer science. Needless to say, they would be as important in many different fields of the social sciences as they are in many other fields of the non-social sciences. It is only that they are often given the short-shrift in the social sciences, which are mostly less precise and more Eurocentric in orientation than their non- social sciences counterparts. As these concepts constitute the core and the heart of any system of knowledge or field of inquiry, (if sum, they are the basics) they must be full proof and must offer bullet proof reliability. Therefore, researchers must devote and dedicate a great deal of time, energy and attention to make this happen. [10]

[10] Armstrong, S. L., Gleitman, L. R., & Gleitman, H. (1999). what some concepts might not be. In E. Margolis, & S. Lawrence, Concepts (pp. 225–261). Massachusetts: MIT press.

➢ *Sound Frameworks*

Concepts may be aggregated into frameworks, often multitudinally and multidimensionally, and in myriad overlapping ways. Frameworks in science must therefore be solid, robust, and provide an overarching, supporting structure that allows more things to be built on top of them. A good scientific framework also provides rich clues, on how to interpret newer observations as and when they occur or arise, and construct more complex hypotheses, or paradigms. (It equates to a system of rules, ideas, observations, or general beliefs that is used to anchor, formulate, plan or build upon something) Frameworks must also be tested against space and time, and this is an important component of this paper. Researchers must devote a great deal of time and energy to develop robust and overarching frameworks, but alas, this is not always done. We need to step up our game here, and get our act together. Theories are often rushed through without an adequate supporting structure. Over-theorization is a malady we have discussed and debated many times in the past. Hypotheses are not clearly demarcated and distinguished from theories, and theories are not always demarcated and distinguished from laws. These terms are used carelessly, and interchangeably, and it is indeed time to stem the rot. [11] [12] [13]

➢ *Sound Paradigms*

In science and also in the philosophy of science, a paradigm is referred to as a distinct set of concepts or patterns of thought, which encapsulate theories, research methods or methodologies, postulates, frameworks and standards for what constitute legitimate contributions to a field. The origin of the English word *"*paradigm*"* is attributed to the Greek word and the Greek term "paradeigma", which means a "pattern", or "model" for something else to follow as described, and defined by Plato and Anaximenes, both of whom were eminent Greek scholars of yore. The Merriam-Webster dictionary defines the term paradigm to be "any theoretical or philosophical framework of a scientific school or discipline within which theories, laws, and generalizations and the experiments performed in support of them are formulated". This is a general definition, but more specialized definitions prevail and pervade in other fields of enquiry. Paradigms must carefully and methodologically answer who, when, why, what, how or where questions, but these are usually ignored, leave alone adequately tested. This has been our general observation from a study of anthropology, sociology, economics, and linguistics over the past couple of years, and this perception has been tragically unshakably reinforced.

[11] Eysenck. M. W., (2012) Fundamentals of Cognition (2nd) Psychology Taylor & Francis

[12] Murphy, G., & Medin, D. (1999). the role of theories in conceptual coherence. In E. Margolis, & S. Lawrence, concepts: core readings (pp. 425–459). Massachusetts: MIT press.

[13] Rey, G. (1999). Concepts and Stereotypes. In E. Margolis, & S. Laurence (Eds.), Concepts: Core Readings (pp. 279–301). Cambridge, Massachusetts: MIT Press.

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➢ *Axioms or Postulates*

An axiom, or a postulate refers to a statement that is taken or accepted to be true, in order that it may serve as a premise, foundation or a starting point for further logical reasoning and argumentation. The word is said or thought to have been derived from the Ancient Greek word "axioma"; this equates and translates to anything "which is considered or thought to be worthy or fit" or "anything which commends itself as evident". Axioms and postulates must be adequately rationalized and justified; in addition, they must also be sound, and may be kept to the barest minimum as necessary.

➢ *Minimum Number of Assumptions*

Researchers must also make the minimum or the least number of assumption possible in a scientific endeavour or an undertaking in their chosen specialized area, or field of study. Assumptions must also be properly ratified, and adequately justified. Simply put, an assumption is something that that a researcher simply accepts as true without further or elaborate questioning or proof. Given that assumptions most often equate to a critically unexamined belief, a large number of unexamined or unevaluated assumptions may equate with poor scholarship. In a few cases, it may even equate with intellectual arrogance. The dictum that the paradigm with the least number of assumptions may be the most reliable is provided by Occam's razor which is also sometimes alternatively spelt as Ockham's razor. This is named after a pre-medieval English friar namely William of Ockham who lived several centuries ago, and in the very early part of the preceding millenium. The Occam's razor also states that the simplest solution is usually and typically the most elegant, and therefore the most efficacious.

➢ *Sound Logic and Sound Logical Reasoning*

Logic is the formal science and the formal study of reasoning. It has been studied since ancient times by the Greeks and the Indians. The Greeks used Aristotelian logic, while in ancient India, the Nyaya school of thought was popular. Some other scientific fields of study were also instituted in ancient India, and we have already dwelt upon them briefly in our previous papers. In more recent times, a formal study of logic was reintroduced by Gottlob Frege and others. Sound logic forms the basis of sound logical reasoning which is an intense mental activity, and seeks to arrive at conclusions in a methodological and in an error-free fashion. We also then have logical positivism, logical empiricism and neopositivism which are based on the verification principle, and demand critical inquiry. We had discussed the essentials of all these previously, and in another related paper on the methods used and employed in scientific study. Sound logic and sound logical reasoning must be vigorously and rigorously pursued at all times, and logical non-sequitors, leaps of logic, and unrelated masses of logic must be eschewed at all costs, and under any circumstances. This includes propositional logic, or a study of relations between propositions. This is the cornerstone of our philosophy. These is extremely important because sound and methodological reasoning often form the basis of frameworks and paradigms, and these are in turn used by many researchers under the sun.

We also emphasize a common sense-based, and a common-sense-derived interpretations of the issue as formal studies of logic may sometimes prove to be elusive in the real-world. This is as elusive and non-forthcoming as objectivity itself, and authors of the caliber of Joseph Salem Lelyveld (A biographer of Gandhi) are few and far in-between. Marxist historians in India themselves did not produce any robust historical models to speak of; yet they imposed all their ideologies irresponsibly on an unsuspecting public. Likewise, Steve Farmer misleads people on the Indus script even though only a small portion of the Indus Valley has been excavated. Hindutva proponents like NS Rajaram and Dravidian nationalists did likewise by force reading their interpretations onto the Indus script. This is a classic case of fools rushing in where angels fear to tread. We may also invoke the hasty generalization fallacy here; all this may come to nought if deep-rooted cogitation and foundationalism are systematically and meticulously applied. Iravatham Mahadevan did some good work with his concordance on the Indus script, but was unfortunately swayed by his ideology. In the case of Indological research, the foundation was not properly set, and a direction was lacking. This observation is probably sadly true of many other fields as well. Coming back to the topic of Gandhi, shaky and shoddy scholarship misleads and misinforms; it amplifies and magnifies chaos and confusion. The same observation holds good of any field of scientific inquiry. But what is the source of the malaise and the rot, the chaos and the confusion. We believe that scientific method and research methodology are not properly imparted to children from a school-going age. Our motto always is, and always has been, "Sound upstream research leads to sound downstream research". Likewise, the philosophy of science is also extremely important from the point of view of foundationalism, and must be accorded a great deal of importance. Eventually, and as and when knowledge of scientific method becomes more widespread among diverse groups of researchers from across the world, we believe that the concepts espoused in this paper will become essential preconditions for good research. [14]

III. RATIONALITY

Rationality is a very important concept and philosophy in scientific research; it refers to the quality and attribute of being rational in thoughts, deeds and actions, and is also a cornerstone of any progressive society. Rationality therefore encompasses both theoretical and practical forms. A rational individual is always guided by reason and strong evidence as opposed to ideology, faith, belief, or dogma. The latter is sometimes referred to as arationality. Rationality forms the bedrock of scientific temper and is necessary to solve problems effectively and efficiently. Scientific temper refers to a way of thinking, behaving and acting that uses a structured scientific method to analyze and understand issues as opposed to allowing personal biases and prejudices to influence decisions. An essential prerequisite of a

[14] Berman, Harold J. (1 July 2009). *Law and Revolution, the Formation of the Western Legal Tradition*. Harvard University Press

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scientific temper is an open-minded attitude and a willingness to question, observe, test, hypothesize, analyze, and communicate. The very fact that Euro centrism and western elitism persist shows that we have a long way to go yet before open-mindedness and pragmatism prevail, leave alone an earnest desire to serve society through the medium and mechanism of science. [15] [16]

➢ *Critical Thinking Skills*

Critical thinking skills are also extremely important before the basis of sound and methodological science can be laid. Critical thinking is an extremely important concept particularly in today's world, and refers to the ability to analyze information, evidence, and arguments to form critical and well-informed judgments. These are also reflections of a person's talents, intellectual abilities, and problem solving abilities. This technique involves applying rational thought, skeptical positions, and unbiased forms of analytical techniques and evaluation besides a thorough questioning, application of judgmental techniques, elimination and isolation of all forms of biases and prejudices, whether cultural or not, and consistency of approach. These are necessary to displace dogma and appeals to authority. Critical thinking can also be fostered and inculcated over time, often through elaborate and systematic training. There are many critical thinking methods, tools, and techniques, and we have been discussing these off and on in our previous papers. [17] [18]

➢ *Awareness of other Research*

Researchers must be aware of other research carried out in the field regardless of source and origin. Researchers must not also play down other researchers based on their country of origin, or ethnicity. This would be necessary to build a strong foundation of foundationalism. We had noted that the American researcher Dr Gregory Possehl was not even aware of research carried out in the field of Indological studies by other American researchers; he was sadly and regrettably very pompously naïve to boot. The Author had a deeply unfortunate experience with him. This may have even been due to his ideological dispositions and predilections. A literature review must also therefore be performed and carried out at all times. A literature review is nothing but a summary and analysis of published works on a specific topic, but must be accompanied by a thoughtful and a critical analysis. This approach and technique can also help other scholars and researchers in the field by highlighting what is not and what is not known. The latter are also sometimes referred to gaps in knowledge. The crucial and critical step of literature survey is however, tragically and unfortunately ignored by many researchers in diverse fields, leading to subpar of substandard research, that also additionally misleads others. Research may also be categorized into primary and secondary literature. Primary literature is defined as original and often groundbreaking or path breaking research, while secondary literature is only a summary or interpretation of primary literature. Sometimes, the term tertiary literature is also used, but this is much less common. [19] [20]

➢ *Prioritization of Research*

Research must also be suitably and meaningfully prioritized at all times so that efficiency and efficacy is prioritized and maximized. Prioritization may be defined as an activity that suitably arranges and rearranges items, components or activities in order of their urgency. Often a prioritization matrix is drawn up, and activities are linked up in a continuous chain in order to examine their real-world relevance or significance. Prioritization techniques are widely used on some more modern and contemporary fields such as computer sciences, but, as we believe and infer, are not emphasized adequately enough in more traditional and Eurocentric fields such as sociology, anthropology, economics, political science, and philosophy. This is a fundamental anomaly that we must set right and correct. Therefore, as far as practically possible, core issues must be analyzed and taken up first, fundamental issues must be analyzed or taken up first, foundational issues must be analyzed or taken up first, central issues must be analyzed and scrutinized first. As far as practically possible, more financial and non-financial resources must be dedicated towards foundational research while peripheral and less important issues can be analyzed and later as and when resources have the time, the energy, the resources, or the bandwidth for it.

Of course, this is only a crude rule of thumb, and not a hard and a fast rule. One must also always get his or her basics right. He must attach a great deal of importance to identifying concepts, demarcating and distinguishing concepts between core and peripheral concepts, put concepts above frameworks and paradigms, put concepts over hypotheses and theories. Issues that are central to society or important to its success must be explored first as far as practically possible, and primary causes of a problem must be identified before secondary causes are explored. Exceptions to this rule may also be documented and justified. Pressing issues can be solved quickly, but core issues must also be tackled in parallel as far as time and resources constraints will allow also knowledge and other aspects and factors. The principle of maximum benefit to society and to science can also be applied, but underlying

[15] Leary, Christopher C.; Kristiansen, Lars (2015). *A Friendly Introduction to Mathematical Logic*. Suny. p. 195

[16] Bimbo, Katalin (2 April 2016). *J. Michael Dunn on Information Based Logics*. Springer. pp. 8–9

[17] Kompf, M., & Bond, R. (2001). Critical reflection in adult education. In T. Barer-Stein & M. Kompf(Eds.), *The craft of teaching adults* (pp. 21–38). Toronto, ON: Irwin

[18] McPeck, J. (1992). Thoughts on subject specificity. In S. Norris (Ed.), *The generalizability of critical thinking* (pp. 198–205). New York: Teachers College Press.

[19] Cooper, Harris M. (1998). *Synthesizing Research: A Guide for Literature Reviews*. Applied Social Research Methods (3rd ed.). Thousand Oaks, California

[20] Creswell, John W. (2013). "Review of the Literature". *Research Design. Qualitative, Quantitative, and Mixed Method Approaches* (4th ed.). Thousand Oaks, California: SAGE Publications

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issues must be solved first. Research may also be categorized and subdivided into primary and secondary research for this purpose. We must also bear in mind the fact that robust upstream research leads us to more robust downstream research. Robustness of solutions must be also borne in mind, and downstream implications of research must be understood.

We can provide and furnish many examples here; for example the underlying basis behind the out of Africa theory and multiregional hypothesis must be adequately explored before theories themselves are formulated. Race and IQ studies must not also be deviously misused and often with evil or less than ideal intentions before the basics themselves are grasped and thoroughly understood. We can draw and identify many different parallels- for example, boosting education systems has a positive overall value for society and must be prioritized first. As another example, refining scientific method is important before scientific paradigms can be improved. This approach will help us determine and set the direction and tempo of research too.

- *Comprehensive Third-Party Evaluation and Review*

We also need comprehensive third-party evaluation and review of frameworks, paradigms, and concepts at all times. This is of extreme and of paramount importance because such frameworks, paradigms, and concepts tend to be crucial and critical to scientific inquiry, scientific activity and scientific endeavour. There is a domino effect and a ripple effect, and errors tend to be amplified and magnified downstream. This has however, and rather sadly and unfortunately so, not been institutionalized in a systemic and in a systematic fashion. These must be reviewed more deeply and consistently that mere research outputs based on frameworks, paradigms, and concepts are. There must be no peer-review bias, and no ad hominem attacks involved. One probable and possible reason for this is a lack of expertise, which may also lead to an unwillingness to review- in order to remediate this, we may need to identify many direct and indirect causes including an overhaul of the education system in many countries.

- *Cross-Cultural Research Design*

Cross-cultural research along with sharing of perspectives, techniques and best practices must also become widespread and much more widely practiced and commonplace in many, most, or if possible virtually all facets of scientific activity, and this must occur through the medium and mechanism of debate, discussion, mutual consensus and the setting up of cross-cultural research teams. It goes without saying that this is a crucial cog in the wheel, and we believe this is so important that we have dedicated an entire paper to it. This kind of a research design must be used in many different types of sociological research, but may readily be extended to other fields of research too, including physical sciences and the natural sciences, where cross-cultural perspectives become somewhat less important. Cross-cultural research design naturally involves the participation of many different types of researchers, scholars, or subjects of study from many different cultural backgrounds with a careful and a methodological selection process. This process was also dealt with in the aforesaid paper, and it is pointless and meaningless to repeat it so many times ad nauseum, and in a parrot like fashion. While conceptualizing, designing and implementing such tie-ups, the intellectual and scientific maturity and abilities of other researchers must be borne in mind too.

- *Horizontal Collaboration and Vertical Collaboration*

We had, in a previous paper, classified research collaboration into vertical and horizontal collaboration. Horizontal collaboration can be carried out between different groups or sets of developing countries. Horizontal collaboration in science, if properly and systematically will help catapult and ricochet science to an altogether new level of ability and performance. An example of this from another realm, domain, and sphere, is the French presence in different African countries that have resisted continuing French presence and dominance in the region, and have sought more diversified political partnerships with countries like China and India. This kind of a strategy must be replicated, reflected, and must manifest itself in various domains of science and technology too so that any one form of ism is not allowed to dominate. There are also some benefits of collaboration with more developed countries, as this may involve a transfer of expertise or technology from developed nations to developing nations. Thus, a combination of horizontal and vertical approaches must be employed and implemented so that better research frameworks and paradigms will fruitfully result.

- *Dialectical Approaches*

"Dialectics" which is also sometimes referred to as the dialectical method, connotes the dialogue between different categories or classes of people who hold different points of view about a subject but and desire to reconcile their differences though debate, dialogue, mutual understanding and debate, so as to arrive at the truth. Debates must be carried out on a strictly factual basis, and emotion, rhetoric, and appeals to authority (for example), left out. This technique often is traced back to the time of Plato, Socrates, and Aristotle, (It is believed that Zeno of Elea originally invented it) but was refined further in more recent times by GWF Hegel. It was used in a strictly materialist sense by Karl Marx and Friedrich Engels too. There have been some criticisms of traditional forms of dialectics most notably by scholars such as Karl Popper and Mario Bunge. This approach, and this techniques can be applied to quite virtually and quite literally to anything under the sun, but we believe this can be used for refine concepts, paradigms, and frameworks too, and hone them to perfection. We had also proposed auto-dialectics in a previous paper, and we believe this can be used too. [21] [22] [23]

[21] Ayer, A. J.; O'Grady, J. (1992). *A Dictionary of Philosophical Quotations*. Oxford, UK: Blackwell Publishers

[22] McTaggart, J. M. E. (1964). *A commentary on Hegel's logic*. New York: Russell & Russell

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➢ *Sound and Fundamentally Strong Subject Matter Knowledge*

Subject matter knowledge in a particular domain or area of expertise is considered to be absolutely essential and necessary in order to facilitate and allow for competency in research. A sound level of subject matter will include in its fold, a thorough and a detailed understanding of what the field or area of study encompasses and includes, and what is does not. It also requires a grasp of the latest advances in the field, including those made by researchers in other geographies. Understanding the direction of research in the field, limitations of current research, and possible future vistas or directions is also extremely important. The researcher must have a thorough knowledge, grasp and a sound understanding of the concepts, frameworks and paradigms in the field as well, and must be able to elaborate on the main ideas. He must be aware of all the other researchers participating in research in the field including subject matter experts, and must also endeavour to collaborate with them as and when necessary. This will automatically take research to a higher level and trajectory.

➢ *Interdisciplinary Research*

Interdisciplinarity or interdisciplinary research involves the combination (or integration) of methods, and data drawn multiple or many different academic disciplines into one activity. It heavily draws upon, and synthesizes knowledge from several fields like anthropology, sociology, political science, historiography, physiology, psychology, economics, etc. It is an approach to study that crosses or transcends traditional boundaries between academic disciplines or schools of thought, and often leads to the birth or gestation of new professions or fields of study and inquiry. Interdisciplinary research is often dynamic, need-based, or solutions-based and solutions-driven. Therefore, there is no dogma or rigidity, and new paradigms emerge all the time. Such research is also often extremely complex, and focused on, or directed towards the real-world. An extension of interdisciplinary research is transdisciplinary research which often involves integration of large interdisciplinary studies, or a synthesis of data drawn from extremely diverse fields.

➢ *Identifying Bottlenecks in Research*

A bottleneck as it is understood by the common many in everyday parlance, is the narrow portion or neck of a bottle close to its opening, which limits the rate of outflow from the bottle. A bottleneck is also loosely and not very accurately referred to as a constraint, and the theory of constraints was very famously developed by the Israeli researcher Eliyahu S. Goldratt. According to the core paradigm of his theory, removing bottlenecks leads the process to a higher level of efficiency. Bottlenecks must be suitably and also be systematically analyzed and scrutinized in order to identify potential causes of delays or underperformance. This must also be carried out proactively. This process is commonly applied in manufacturing, and in industry, but less commonly so, in theoretical science. This technique is also of course mostly combined with a root cause analysis which helps us identify underlying root causes. As a part of this exercise and this technique, the basic and main sequence of steps in a process needs to be identified, and mapped to internal or external entities. Data must also be collected and analyzed as necessary before solutions are developed and implemented. We must also of course always continuously improve, and benchmark with other entities as well.

➢ *Root cause Analysis*

A root cause analysis must also be systemically performed to identify causes for potential problems in research, and also to close gaps in understanding. Root cause analysis (also abbreviated as RCA) may be likened to a highly structured, systematic and methodological process that can help identify the root causes of a problem and develop solutions to prevent it from recurring or happening again. The underlying core philosophy of this is that it is much more effective to address the underlying causes of a problem than just treat the symptoms because it prevents the problem from recurring again and again. As good as this seems, this is not as commonly applied in theoretical sciences as it perhaps should be, and therefore, we must step in to address the issues. RCA involves collecting data and mapping events, identifying and determining potential root causes, analyzing, comparing and evaluating each potential root cause, and confirming the validity, soundness and legitimacy of the root causes. Some common ways of performing a root cause analysis is by means of fishbone diagrams also known as Ishikawa diagrams, the five whys method, and cause and effect diagrams. Many of these tools and techniques are widely applied and employed in industry, but less commonly in theoretical science. Hence, theoretical sciences, and scientific method need a leg up now. There is a huge opportunity waiting to be tapped.

➢ *Social Responsibility of Researchers to Science and to other Researchers*

Academic freedom as most people see and view it, refers to the fundamental and the implicit right of teachers, researchers, students, academicians, and academic institutions to pursue knowledge in their own chosen areas or fields of study without any outside or external interference. This also includes in its purview, the freedom to teach, impart their ideas and discuss issues freely and without fear, conduct any types of research, publish research findings in peer-reviewed and other journals, express opinions about the institution in general without fear of adverse consequences or unfair criticism, and engage in any form of social and political criticism. Academic freedom is of course, is not always without its limits. There is also careerism and academic rivalry in academic institutions and in universities, both of which may sometimes be necessary, but are obviously not always healthy. We believe that social responsibilities of researchers to society are extremely important, but not always adequately emphasized. Even industries often do better; for example, researchers

[23] Popularizing auto-dialectics in scientific endeavour: A potentially productive tool in the interests of better and higher-quality science Sujay Rao Mandavilli IJISRT, June 2024

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developing new battery technologies have a strong consumer of a customer focus, and attempt to reduce the environmental footprint too. In many fields of the social sciences, social responsibility of researchers is seldom exhibited and manifested. Marxist historians for example, have no social responsibility, only a commitment to their ideology. This even inhibits the healthy growth and evolution of these sciences, as careerism and imagination are often allowed to run riot and amock and go berserk and haywire. We must stem the rot before it is too late; that is why we had authored a paper on the issue, and several other upstream ones as well. [24] [25]

- *Social Sciences as a Foundational Basis for Research*

Social science is one of the important branches and main subdivisions of science, besides the natural sciences, and is mostly devoted to the formal study of different types societies both highly complex, and less complex and the relationships among individuals within those societies. The term was formerly used to refer to the field of sociology, which was the oldest and the original "science of society", having been established as early as in the eighteenth century. In addition to sociology, it now encompasses a wide array of diverse academic disciplines, including many different and diverse fields such as anthropology, economics, geography, linguistics, mythology, communication studies, archaeology, management, philosophy. psychology, social studies, and political science. However, interdisciplinary and cross cultural studies and not typically adequately emphasized, and many fields of study typically retain a colonial flavor. For example, anthropology is still sometimes seen as a study of primitive or savage people, and not of advanced industrial societies. This is in spite of the fact that social science research methods and social science research techniques typically have a lot to offer to the study and analysis of advanced industrial societies as well.

- *Emphasis on Scientific Method and the Philosophy of Science*

There must also of course, always be an adequate emphasis on scientific method in all fields of scientific inquiry, and all fields of scientific study at all times. Scientific method is not necessarily rigid; it can be flexible and freeform too, as advocated and aptly demonstrated by the famous philosophers of science Paul Feyerabend and Karl Popper. This must not however come at the cost of rigour and objectivity, and there must be controlled processes and demonstrability of results at all times. In other words, there must be no epistemological anarchism. To reiterate and emphasize, a scientific method is an empirical method for acquiring knowledge that has characterized the development of science since at least the seventeenth century, if not earlier. The foundation for scientific method was laid down since the times of the Ancient Greeks, with major contributions by Plato, Aristotle and Socrates. The scientific method involves careful observation along with rigorous skepticism, though not skeptopathy, to minimize the errors caused by cognitive biases and cognitive assumptions Hypotheses are also created through inductive reasoning, and testing and experimentation are performed through experiments and statistical analysis, in order to validate or reject results. At the very same time, the philosophy of science must also be given utmost importance, and this is something that has been neglected by most researchers. This is because the philosophy of science is the entire edifice upon which much of scientific endavour is built; the philosophy of science is still mostly too abstract to be of much value. This is something we have been trying to remediate for many years now. [26]

- *Theoretical Science as a Basis for Applied Science*

Theoretical science must form a robust basis for applied science, though this has not always happened this far. Applied science broadly speaking, may be defined as the application of the scientific method and scientific knowledge to attain practical and real-world objectives and goals. Applied science is applicable to a broad and a wide range of disciplines or fields of study, such as engineering, computer and medicine. Applied science must be contrasted with basic sciences at all times, which focuses on propose and advocating general scientific hypothesis, theories and laws to explain and predict different real-world phenomena. There is some times a lack of collaboration between theorists and non-theorists, and there is often a dearth or an absence of sound and robust theoretical frameworks; in spite of all this science advances. Theoretical sciences can and must set the direction and the tempo for practical application, though this is not always systematically done, and applied science sometimes advances even without a robust theoretical basis. There is of course some opportunity loss here, and this indeed begs to be rectified urgently.

- *Theoretical Science as a Basis for Technology*

The term “technology” is a term dating back to the early seventeenth century that meant “systematic treatment”. It later came to be known as a way of doing things, particularly in the French and in the German languages. The term technology means the application of theoretical and conceptual knowledge in order to achieve practical goals that benefit humanity directly and serve the cause of society as well. The word technology also often refers to products resulting from such efforts, including both

[24] Propounding “Structured innovative thinking techniques for Social Sciences Research”: Why this can be a game changer in social sciences research Sujay Rao Mandavili IJISRT, July 2024

[25] Social Responsibility over Academic freedom: Emphasizing Ethics and Codes of Conduct geared for a Scholar’s duties towards science, society and the education system in Twenty-First Century Science Sujay Rao Mandavilli IJISRT September 2022

[26] Smith, A. Mark (2001a). "Alhacen's Theory of Visual Perception: A Critical Edition, with English Translation and Commentary, of the First Three Books of Alhacen's "De aspectibus", the Medieval Latin Version of Ibn al-Haytham's "Kitāb al-Manāẓir": Volume One: Introduction and Latin text". *Transactions of the American Philosophical Society*. **91** (4): 1–337

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tangible and intangible goods. Technology is also often associated with patents, trademarks and copyrights, and has the ability and the potential to change society in a way that theoretical science cannot. Technology can also contribute to economic development greatly, though the nexus between the two has not yet been properly formally studied or investigated. As important a technology may be to all walks or all facets or human life, there is not always a theoretical basis for practical and workable technology. In fact the nexus and correlation between the two can often be hazy and nebulous. This is something that we must seek to remediate.

- *Pedagogy as a Foundational Basis for Research*

Pedagogy, is the science and the methodology of both teaching and learning at all levels, and includes and encompasses the theory and practice of learning, and how this process influences, and is influenced by, the social, cultural, political, religious and psychological development of learners. Pedagogy, is construed to be an academic discipline, in the formal sense of the terms, and is also the study of how knowledge and skills must be imparted to maximize social, cultural and economic performance. Education systems often foundationally and fundamentally distinguish successful societies from less successful ones. Successful education systems must not only foster rote learning, but must also impart and teach critical learning and thinking skills, scientific method, the ability to distinguish between science and pseudo science, and time and space encapsulation. Pedagogy has however yet to mature, change and evolve with the times, and a proper theoretical foundation for the science of pedagogy is sorely lacking. In India, there is mostly rote learning emphasized. There is also a dearth of high quality teachers, and there is absence of good school infrastructure, and high quality teaching material. We have also written extensively on pedagogy, and have formulated theories of pedagogical content as well. We beseech and implore the authorities that these be implemented. Only a proper pedagogical foundation will help us achieve and accomplish the goals of foundationalism, because it will help us lay the foundation of better science. [27] [28]

- *Pragmatism and Practicalism*

Pragmatism is a philosophical movement that is attributed to ideas that originated in the United States in the 1870s by Charles Sanders Peirce, William James, and John Dewey though the term can be traced back to the Greek word "pragma". According to doctrine of pragmatism, all ideas and ideals must be evaluated solely on the basis of their practical application, and their practical utility. There must also always be a relationship to practice and praxis. This would dictate the direction of research and eschew impractical and non-pragmatic ideas too. We had proposed the ideals of practicalism too, in another paper published by us in the past. While this is not a core doctrine or a core and chief of this paper, this paper itself is based on the ideas and ideals of pragmatism and practicalism, as abstract interpretations of the term foundationalism are avoided. [29]

- *Aeternitism and Omnimodism*

In a previous paper, we had evaluated concept of "eternalism", (this is seen as a metaphysical position and a point of view regarding the existence of time, but may have several additional meanings to boot) and had found it to be grossly inadequate from our point of view. We found it not to be entirely in harmony and in concordance with our general and specific requirements too. We had therefore proposed (and suitably and beneficially employed as well) the term "aeternitism" which is derived from a Latin term "aeternitas" meaning permanence. "Aeternitism", according to the definition advocated and attributed in our previous papers may refer to the application, implementation, interpretation, or enforcement of a certain principle (or a set of allied and interrelated principles) across the boundaries and vagaries of time. Aeternitism is also extremely important because we are living in a (highly) multispeed civilization, and different often contradictory trends may manifest themselves at different points in time; different trends and different scenarios may also ultimately prevail, and some others may be relegated to the background or quickly bite the dust. As per the doctrine and principle of aeternitism, all concepts and principles satisfying this requirement must naturally and always get the upper hand – this is because they have been from our perspective and point of view, have been adequately self-tested. There must also be a conscious and conscientious hunt for paradigms, frameworks, concepts and hypotheses with universal applicability, as this will provide a case for foundationalism, and boost it in many different ways. Likewise, all concepts satisfying this principle must also get the upper hand, as this is a much broader term than existing concepts in the market.

There must also therefore be a conscious and conscientious hunt for paradigms, frameworks, concepts, and hypotheses with universal applicability across both space and time – as least as far as existing data or knowledge will allow us to know or to discern. Such principles may also be happily used as a basis for future research, unless there is a reason to believe otherwise. For example, Karl Marx's ideas may not have necessarily satisfied or fulfilled both these principles. They may have been limitedly based on the experiences of mid-nineteenth century Europe. This may not have been fully true, and some of Marx's ideas may indeed have had universal applicability. Marx also came up with alternative ideas such as the Asiatic modes of production, though this may have been done somewhat or rather half-heartedly, or without full knowledge. Marxist historiography is also rather limited and flawed as we have eminently demonstrated all along in our previous papers, but Marxist historians say all schools of thought have been encouraged. This reasoning and line of

[27] Bruner, J. S. (1966). *Toward a Theory of Instruction*. Cambridge, Massachusetts: Belkapp Press.

[28] Bruner, J. S. (1971). *The Relevance of Education*. New York, NY: Norton

[29] Embedding "practicalism" as an intrinsic constituent of the philosophy of science: Positioning "practicalism" as an essential prerequisite for rapid scientific progress Sujay Rao Mandavilli IJISRT, June 2024

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thought itself is misleading and also highly flawed. They are essentially saying they can have their own ideology, and therefore, so can we! Such arguments cannot form a logical basis for foundationalism.

➢ *Absence of Ideology*

An ideology is a set of beliefs, ideas or doctrines held by a person or group of persons, especially those which lack universal validity or applicability. Common ideologies that are known to us today are Marxism, socialism, capitalism, communism, to the account they don't gel with, or take into account and consideration other ideas particularly those derived from hard experience or raw data. To such an extent, ideologies may be grossly inadequate or highly misleading. They may also damage science or society to that extent and may prevent them from realizing their full potential. The term ideology is traced to the French word "ideologie", though the word itself was coined by a French Enlightenment aristocrat and philosopher Antoine Destutt de Tracy, and subsequently elaborated upon by Terry Eagleton and others. The idea of a scientific ideology was coined and championed by the historian Georges Canguilhem, and as such constitutes as epistemological obstacle and may lead to totalitarianism or what may be called a "silence culture". Science must be free from ideologies in order to satisfy the tenets of foundationalism. Other belief systems such as Euro centrism, Indocentrism, Afrocentrism and Sinocentrism also fuel scientific ideologies and must be eschewed and avoided at all costs.

➢ *Coherentism*

Coherentism is a theory in epistemology that states that a belief can be justified only if it is part of a larger and a wider coherent system of beliefs. This position is sometimes seen to be in conflict with foundationalism, though from our perspective, this is not naturally necessarily the case. The two are almost always mutually interrelated, mutually interdependent, and also almost always go hand in hand with one another or each other. A coherent system of ideas and beliefs are much more likely to satisfy the principles of foundationalism, and provide the foundation other downstream ideas and scientific activity can depend upon. Coherentism from our perspective can be achieved though interdisciplinary research and through cross-cultural research design alone. Concepts must also therefore complex and comprehensive enough; they must not be oversimplified, and must take into account and consideration, all possible factors, and all possible scenarios. We also then have the concept of confirmation holism or epistemological holism which states that statements can only be refuted holistically and not in isolation. This concept was developed by the American philosopher Willard Van Orman Quine by extending Pierre Duhem's ideas. [30] [31]

[30] Duhem, Pierre. *The Aim and Structure of Physical Theory*. Princeton, New Jersey, Princeton University Press, 1954.

[31] Curd, M. and Cover, J.A. (Eds.) (1998). Philosophy of Science, Section 3, The Duhem-Quine Thesis and Underdetermination, W.W. Norton & Company

➢ *Validity and Consistency*

Validity (the origin of this term is attributed to the Latin term "validus" meaning strong, robust and invincible) is a characteristic or an attribute which measure the extent to which a concept, premise, conclusion, or measurement corresponds accurately to other data obtained from the real world though multiple sources. We also have the concepts of internal and external validity, and these determine the extent to which the concept, premise, conclusion, or measurement is consistent within itself, or across entities. Therefore, the term validity is related to the concept of consistency, and we have the allied concepts of internal and external consistency as well. Validity and consistency are also commonly measured and evaluated over time, and paradigms and frameworks must satisfy the test of repeatability as well. Reliabilism is another important philosophical theory that explains knowledge and justification in terms of the underlying reliability of the processes that are used to form such beliefs. Leading proponents of reliabilist theories of knowledge and justification have included Alvin Goldman, Marshall Swain, Frank Ramsey, Kent Bach and Alvin Plantinga. Concepts that do not satisfy such tests, and correspond more to researchers' whims must be tested more thoroughly. For example, we have the relatively more robust Flynn effect as contrasted and opposed to more unreliable "race" and IQ claims. The latter deserve to be tested much more thoroughly before they have the potential to spread misinformation.

➢ *Entities and Ontology*

Entities are studied through the science of ontology which refers to, and corresponds to a scientific study of being. Entities may also be categorized on the basis of their robustness and universal validity and universal applicability. Entities may also be ordered in a continuous chain, primarily based on the interdependencies. These interrelationships may also be represented and depicted diagrammatically so that they may be easily grasped and understood by other researchers. Relationships between entities may also be categorized into the following types as we had discussed previously (a) Fully nested entities (b) Overlapping entities (c) Related (i.e. "Temporally-related") entities (d) Related (i.e. "Spatially related" entities (e) Related (i.e. "functionally-related" entities, etc. core entities may be accorded more importance in research. An entity for this purpose is a logically self-contained unit that completely exists as "itself". We had reviewed "entities" comprehensively before. [32] [33] [34] [35]

[32] Presenting the art and the science of Qualified Historiography: Anchoring history-writing in the event of uncertainty and unreliability of narratives Sujay Rao Mandavilli IJISRT Volume 7, Issue 7, July 2022

[33] Propositioning Investigative Historiography as a niche subfield within Twenty-first Century Historiography: Making a case for Investigative historiography in Twenty-first Century Social Sciences Sujay Rao Mandavillli IJISRT, August 2023

[34] Historiography by Objectives: A new approach for the study of history within the framework of the proposed

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A 'Universality Scale' or a scale for ranking of concepts and principles may also be suitably prepared by assessing principles on the basis of the following factors, namely (a) Their universality, their applicability and their relevance on a time scale (b) their geographical applicability on the basis of a spatial spread (c) Their overall long-term positive implications for science and benefit for society or for humanity as a whole. (d) Their conformity with natural laws (e) Their conformity with human nature. (f) Their conformity with principles across many associated disciplines. Research may be prioritized accordingly, and on the basis of these principles. We have we believe, therefore provided highly practical and pragmatics approaches to foundationalism, and not just highly abstract, or practically less useful ones. These are only rules of thumb, not hard and fast rules. A combination of approaches may be meaningfully adopted at all times, and there must be no dogma or rigidity at any times. This approach can lend itself to a diversity of uses, and among them, the root causes of an issue can be systematically identified, and this approach will help solve problems more systemically, and foundationally.

- *Benefits of this Approach*

There are many benefits of this approach, therefore, and as a matter of fact, a plethora and a diversified set of benefits are available. For one, it would lead to faster progress in science, as foundational solutions are proposed. Solutions therefore become more reliable and error-free. They will also have a greater and a wider applicability both across space and time. It would lead to more foundational and fundamental progress to begin with, and would also benefit a wider section of humanity. Much more importantly, foundationally, and critically it can counter ideology-driven or ideology-based science, counter what we may call a "public relations –driven approach to science"; this is extremely damaging and harmful to the cause of science, as long as the laity believes in faulty or in non-robust paradigms and frameworks. It will counter, and at least indirectly so, excessive careerism in science, and lead to lead to reliabilism as well as consistency of scientific activity with scientific method. It can of course boost the quality of the education system and can improve scientific method as well. It can even lead to multiple ripple effects in a continuous chain; for example, improved historical models can boost scientific temper and take people away from religious-driven and religious-inspired ideologies. This is true at least in an Indian context, but probably not so much so, elsewhere.

IV. CONCLUSION

This paper may well have been proven to be one of our most important ones in the core philosophy of science, and one that we expect to stand science in extremely good stead as well. We believe this can move the needle and push the envelope as well, and lead us to what we have always called "scientific progress at the speed of light". We had therefore aptly begun this paper by tracing the history of the term "foundationalism" itself, right from the time of the Ancient Greeks such as Plato, Socrates and Aristotle, to important later renaissance and enlightenment thinkers, and finally to the modern and contemporary ones. Types of foundationalism such as strong and weak foundationalism, modest foundationalism, and then finally anti-foundationalism, internalism and externalism were also discussed, probed and dissected threadbare along with other important allied and related concepts such as circular logic and reasoning, regress and infinite regress, all of which naturally form an intrinsic part of epistemology. The core concepts forming a part of this paper such as forward linkages, backward linkages, and traceability matrices were also discussed with the attention they deserved and merited. We also then followed this up with an examination of the core principles of this paper, and went on to discuss the ideal and recommended direction of research, including the ideal nature of research, primary research, secondary research, basic and applied research, and cross-cultural collaboration including vertical and horizontal collaboration as well. This paper was also much more importantly linked to our papers on sociocultural change, pedagogy, scientific methods, and other papers in the social sciences for maximum impact and efficacy. We therefore believe that it will become an important part and parcel of our globalization of science movement, and one that will help fulfill and realize our overall goals and mission considerably, if not greatly.

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[35] Introducing Anthropological Historiography as an integral component of Twenty-first Century Historiography: The role played by Anthropological Historiography in the attainment of long-term Anthropological goals and objectives International Journal of Innovative Science and Research Technology, February 2018, Volume 3, Issue 2 Sujay Rao Mandavilli