# Imre Lakatos's Scientific Research Programme: A Critical Evaluation

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## ABSTRACT

This paper is an evaluation of Imre Lakatos's scientific research programme. The paper critically queries the submission of Lakatos in the history of science, against standard logic and the reality of scientific practice. Lakatos's work is a constructive survey of the history of science. Hence this study assumes deconstructivist historiography as its theoretical framework for the analysis. To achieve its aim and specific objectives, the study adopts content analysis as its research method. It was discovered in the course of the study that Lakatos assumes without reference to scientific practice the irrefutability of the hardcore. Lakatos believes that his method proffers a much better explanation than Popperian's falsificationism and the Kuhnian paradigmatic shift in the history of science. The paper argues that while Lakatos's views could be seen to be original and compelling, nevertheless, it stands fallible and fraught with too many inconsistencies. This paper concludes with an attempt at a critical evaluation of Lakatos's thoughts on the scientific method and its progress.

**Keywords:** Critical Evaluation, Research Programme, Scientific, Imre Lakatos

## INTRODUCTION

Throughout the annals of history, a captivating rivalry has been adequately recorded, pitting various explanations, theories, and experiments against each other, spanning from ancient civilizations to the present day. Howbeit, it was during the Renaissance through the modern era that an extraordinary surge of knowledge took place, with iconic figures like Nicolaus Copernicus and Francis Bacon challenging theological doctrines and reshaping our comprehension of the universe through their groundbreaking cosmological theories. As time progressed, the 20th and 21st centuries witnessed an unparalleled ascendancy of scientific prestige, outshining other forms of knowledge. In contemporary society, scientists are highly esteemed for their ability to collect facts, provide evidence, and draw scientifically proven conclusions. Science, without a doubt has become the very cornerstone of humanity, touching almost every aspect of our lives. (Sarton, 1916. 521) Through science, humanity has achieved groundbreaking technological inventions and innovations, serving as powerful tools for our well-being and our quest for a comprehensive understanding of the universe. (Sarkar and Pteifer, 2006. XI) The rise of natural philosophy in the 19th century, particularly in Britain, owes much to philosophical thinkers like Mill, Whewell, Pearson, and others. In Austria and various parts of Europe, philosophers like Mach and Bolzano also played significant roles in shaping philosophical inquiries in science. This Eurocentric tradition lays the foundation for what is now known as the philosophy of science.

In light of this, the philosophy of science can aptly be defined as a branch of philosophy dedicated to exploring the underpinnings, methods, and significance of science. Sarton's perspective on the history of science underscores the study of science's own development as an integral part of its narrative. Historically, historians and philosophers have observed how science tackles fundamental questions about the universe.

From ancient philosophers like Thales, Anaximander, and Anaximenes initiating debates about the universe's origins to the Renaissance period's transformative work of Copernicus, Brahe, and Kepler in revolutionizing astronomical views, the pursuit of knowledge has been an ongoing journey. Notable scholars from this transformative era include Gerolemo Cardano, Francis Bacon, and Rene Descartes. Subsequent centuries further emphasized these debates, with continental rationalists like Descartes advocating the power of reasoning and distinguishing between the realms of matter and mind. British empiricists, such as David Hume, championed a scientific approach based on experience, challenging the credibility of metaphysical works.

The debates on scientific theory and methodology continued into the 19th and 20th centuries, persisting as significant discussions in the scientific realism debates of the 21st century. With each passing epoch, science continues to captivate humanity's curiosity and propel us further toward understanding the mysteries of the universe. (Larry, 2023. 293-294)

## The 20th Century Major Contributors on Methods in the History of Science

It is widely recognized that theories once held in the past are now considered obsolete, inadequate, and incompatible with modern realities. This evolution of scientific thought can be exemplified by the transition from Newtonian to Einsteinian scientific positions, indicating how theories change over time. During the early 20th century, the British empiricist tradition experienced a resurgence through the logical positivist movement led by Moritz Schlick and others. The logical positivists advocated for the verification principle as the appropriate method for science, aiming to remove all metaphysical elements from scientific processes by emphasizing empirical verifiability as the criterion for meaningful statements. However, the debate on the best scientific method evolved with the introduction of the "critical rationalist" perspective.

Karl Popper challenged the prevailing notion that scientific knowledge is acquired and confirmed through inductive generalizations. He asserted that theories cannot be empirically verified, but they can be subject to falsification. Popper emphasized that scientific systems should be tested through rigorous experiences, and scientists should discard theories that are falsified and propose new hypotheses (conjectures) to undergo further testing. (Popper, 1959. 19)

Thomas Kuhn, in contrast, proposed the concept of "paradigm shift" as a model for scientific progress. According to Kuhn, science advances through stages such as pre-paradigmatic, paradigmatic, crisis, and revolutionary stages. Paradigms represent dominant scientific frameworks that attract adherents while leaving room for problem-solving. Kuhn argued against the linear accumulation model of scientific development proposed by the logical positivists and emphasized that scientific revolutions involve a shift to new and superior paradigms based on beliefs rather than strict proof.

Kuhn further exemplified his ideas by examining the historical development of light theories or optical science, showing that scientific revolutions involve a transition from one paradigm to another. He highlighted that these successive transitions should not be seen as failures in methodology but as incommensurable ways of seeing the world and practicing science. (Kuhn, 1970. 10-12)

Nwigwe, reporting on Ian Hacking's ideas, presented the concept of "normal science," where paradigms succeed one another indefinitely, each offering different views of truth. These paradigm shifts occur as new and superior knowledge emerges, often influenced by anthropological and sociological factors. (2004, 24&25)

While the scientific development model proposed by Lakatos may appear innovative, a closer examination reveals that it shares similarities with the ideas of predecessors such as Descartes, Popper, and Kuhn. The paper suggests that Lakatos's research programme method for understanding the history of science and theory change is not entirely distinct and raises several convergent points with earlier philosophical perspectives.

This paper discusses the evolution of scientific theories and methods, exploring the viewpoints of logical positivism, critical rationalism, and paradigm shifts. It highlights the contributions and convergences of various thinkers and encourages critical analysis of scientific progress and theory development. (Larry, 2023. 294-295)

**Some Reactions to Imre Lakatos's Scientific Research Programme.**

Many great scholastic works are known to receive different reactions, interpretations, and reviews, as also as the *Scientific Research Programme* (1978) with Imre Lakatos as the author which has attracted the attention of lots of scholars who have expressed various interpretations of it. Lakatos's philosophy of scientific thought as seen in his work gain a reputation, as it offers to make up for the limitations of the existing scientific methods as prescribed by the inductionist, conventionalist, and later the Popperian's falsificationism and Kuhnian paradigmatic criteria.

In their contribution, Alan Musgrave and Charles Pigden (2016) gave their succinct report on the history of science as ably presented by Lakatos's *Methodology of Scientific Research Programme*; *Proof and refutation* , and also with a glimpse of Lakatos's life and career. The Duo asserts that Lakatos's influence especially in the philosophy of science is enormous. Also referring to 'Google Scholar', they explain that by January 25$^{th}$ , 2015 which was about 25 days at the beginning of a new year, 33 papers were in print referencing Lakatos's works within that month, resulting in a quotation pace of a paper per day which is super amazing. W.W. Bartley (1976) referred to Lakatos as a very focused man and someone he had close acquaintance with. Bartley state that Lakatos contributes numerous priceless thoughts which were relevant in England and Hungary. He adds:

> Lakatos had the good sense to see that the word metaphysic presented an insuperable public-relations obstacle to the professional philosophers of science but who lacked his sense of humor. So, he calmly changed the word metaphysical to the word scientific and won the acclaim that he had intended for the notion. (38)

William Berkson in his part presented in his article titled *"Lakatos One and Lakatos Two"* (1977) a somewhat hilarious scene, of which he (Berkson) professes he dreamt. In his dream, Lakatos was engaged with an angel in an interesting dialogue at a pearly gate. Berkson by 'Lakatos one' referred to the Lakatos of Proof and Refutation: which is a work that represents a fundamental significance as it concerns the mathematical history and the "teaching of mathematics and perhaps even directly to mathematics itself". (p. 45) While 'Lakatos two', Berkson refers to the Lakatos of "Criticism and the Methodology of Scientific Research Programme". Berkson added; "briefly my view of this later work of Lakatos is that it has one good idea, that of a heuristically degenerating research program, and the rest of the work is a degenerating research program". (pp. 49-50)

Feyerabend in his *"The Rationality of Science*" (1976) as contained in the compendium of *"Can theories be refuted?*" gave an insightful critique against Lakatos's stance. The Lakatos's claim that generating problem shifts could only be terminated after it must have failed over some time, could make a bounce back to relevance. Feyerabend criticizes this view by stating that for Lakatos's standard to hold water or show any practical force, it must be mutual within a specific period. Feyerabend continues:

> What looks like a degenerating problem shift may be the beginning of a much longer period of advance, so how long are we supposed to wait? But if the limit is introduced, then the argumentagainst the more conservative point of view, against naive falsificationism", reappears with only a minor modification. (pp. 296-297).

Also, Feyerabend whose proffered method as seen in his work *Against method*, with his famous caption"Anything goes", further scrutinizes Lakatos's stance that " if you can wait, why not wait longer" be

inapplicable. Lakatos tries to defend this position by citing examples of the heliocentric theory which supersedes the geocentric theory, and also the atomic theory of Einstein which supersedes the mechanical theory of Newton all after a somewhat period. Feyerabend disagrees that Lakatos's standards of defense are either "vacuous" or as he put it- "one does not know when and how to apply them- or else can be criticized on grounds very similar to those which lead to them in the first place." (p. 297) Joseph Agassi, (2014) also a prominent philosopher of science refers to Lakatos as a top-notch Philosopher of Mathematics, who is also identified for his philosophy of science. (p. 77) In his view, Larry Lauden (1978) asserts that Lakatos develops his substitute theory concerning the part of contending "Super theories" in scientific development as a reaction to the Kuhnian attack on mostly the respected supposition of conventional philosophies in science. The general theories, Lauden ascribes Lakatos to have referred to a "Research Programme". (p. 76) He explains despite the seeming improvement of Lakatos's model of a research programme, it shares many flaws of Kuhn's paradigm as well as newly observed flaws. From the account of John Losee (2001), in the 1960s there was much debate concerning the rational reconstruction of scientific progress. To this end, Popper and Kuhn supply the basic books for the discus that follows an era of brainstorming by scholars. Lakatos proffered viewpoint was considered the most important to emerge from the discussions of the time. Losee affirms that Lakatos agrees with Kuhn on the possibility of continuity in science, and also that scientists at times persist to utilize theories in the face of refutable evidence. Christian C. Emedolu (2013), in his account of theory change, expounds that no given criteria within the 20$^{th}$-century science by its devotees are enough for the formulation and evaluation of true and accurate theories, since theories are forever perturbed by the turbulence of scientific change". (21) In his view, the true nature and form of scientific explanations have not been adequately grasped. Furthermore, he posits that the devotees to theory change such as the neo-positivist (Rudolf Carnap, Ernest Nagel Han Reichenbach et al), the conventionalist (Henri Poincare, Pierre Duhem), and the falsificationist Popperian are some groups that explore the facticity of the scientific revolution. However, Emedolu comments that most of the views presented are lopsided by the tendency to universalize their doctrine as exhaustive principles of a scientific revolution. (p. 21) Emedolu still believes that perhaps the given individual statement concerning the character of science and its revolutions contains some elements of truth. To this effect, Emedolu asserts; his convictions:

> Ineluctably, I invoked Kuhn mainly to support my conviction that scientific experiment deals with many test combinations or test situations that cannot be said to be exhaustive at any given moment. Popper himself is invoked to advance my view that science is evolutionary and keeps penetrating deeper realms of reality and keeps making new findings. And ultimately, I deployed Lakatos mainly to state my belief that sometimes theories are abandoned owing to a shift of interest, or to the fact that other aspects of some given phenomena have arrested the interest of experimentalists or theoreticians within a given field. (22)

Jude A. Onuoha (2013), on his part, raises well-articulated and critical questions such as; can Lakatos's scientific methodology proffer a better and suitable criterion for progress in science? To what extent can we have progress in science? Can there be any reliable methodology for scientific progress? Onuoha posits further that even though theories cannot be proven, it is possible to falsify them, as a single result or observation can falsity a universal statement or hypothesis Onuoha remarks:

> This argument is based upon the analyses of the scientific method by lmre Lakatos, a well-known philosopher of science, and the further application of his analysis beyond natural science. Lakatos's account, while not perfect, accurately describes the practices of science and reveals that there is no firm demarcation between science and non-science. The judgment, rather, must be between good and bad science and between progressive and degenerative research programmes. (163)

A.F. Udoigwomen (2015), comments that Lakatos came under the influence of Popper in the London School of Economics. Also, Udoigwomen maintains that like Popper, Lakatos is also a rationalist, as he believes that the fundamental difficulty in the philosophy of science is stating the general circumstances

With in which a theory can be considered as being scientific and when to possibly decide to accept the theory if it is rational or not. Udoigwomen considered the Lakatos model as a remarkable improvement to Popper's falsification criterion. In his conclusion, Udoigwomen posited that Lakatos and Popper had shares of similarities, such as they agreed that the goal of science should be to amplify verisimilitude (truth content) and corroboration… John Kadvany (2001) also shares the same thought line. W.H. Newton-Smith in his 1981 masterpieces, states that Lakatos in his development of a science model, considers his methodology as correcting the inconsistencies in the building and understanding of Popper's ideas. Still on, Newton-Smith's captions the subheading as *'Lakatos; the Revisionary Popperian'*. Newton-Smith further observes that Lakatos's primary objection to Popper is that he favors or prefers to represent or show the scientific undertake as a two-cornered fight between a theory and sagacity such as:

> A test is –or must be made –a two-cornered fight between theory and experiment so that in the final confrontation only two faces each other; and (2) the only interesting outcome of such a confrontation is (conclusive) falsification of the only genuine discoveries are refutations of scientific hypotheses; However, history of science suggests that (1) tests are –at least- three-cornered fights between rival theories and experiments and (2) Some of the most interesting experiments result, *prima facie*, in confirmation rather than falsification. (78)

Ian Hacking a die-hard exponent for the autonomy of scientific experiments set out crucial steps in his attempt to use the experiment as proof which as a matter of necessity deals with real entities in the central theme of scientific realism. Hackings in his review article on "*Imre Lakatos's Philosophy of Science"* (1979) gave a supportive and critical representation of Lakatos's papers in view. Hacking who is a specialist in experimental philosophy, gave his succinct exposition of the works edited by John Worrall and Gregory Curries. It is Hacking belief that Lakatos's method is normative in that it, say, several precedent events in science, that it ought not to have vanished away. However, he criticizes that Lakatos's philosophy offers no futuristic evaluation of current contending theories in science, especially economists that fancy Lakatos's method, and other numbers of disciples this work will cite. Ronald C. Curtis (1986), began his inquiry from Lakatos's conviction with the following questions such as: "Are methodologies theories of scientific rationality? Should we treat them as such?" Curtis elucidates that Lakatos believes the rational side of scientific development can be wholly accounted for by the personal methodologies of the historian. Still, "Lakatos use this idea to argue for the testing of methodologies against history, but it has been accepted by friends and critics of his program alike". From the account of John Darwin (2010), he examines in his paper the alleged war between Kuhn and Popper and the subsequent incorporated two (Lakatos and Feyerabend) who extend the discussion, but importantly as protagonists. On the part of Feyerabend, Darwin explains that for Feyerabend, 'anything goes'. Deborshi Brahmachari (2016), Mark Blaug, and Wenceslas I. Gonzalez (2014) are seen in their works to have adopted the Lakatosian Scientific method in their effort to proffer explanation in the field of economics. On Lakatos's Mathematical Ideas, we have contributors such as; Bharath Sriraman (2006), and of course, Joseph Agassi (1976). Also, among other notable authors in the multifaceted works of works of literature on Imre Lakatos is Henry Frankel (1979) who applies Lakatos's method of the growth of science to the rising case of drift theory in geology. Frankel affirms that the theory of continental drift was initially developed by Alfred Wegener during the early 1900s. Frankel reported Wegener to have identified two research program and their hardcore which he announced in his theory (Drift theory). The other theories Wegener considered were "Contractionism" and "Permanentism" (31) Frankel state that Wegener's Drift theory 'hardcore' could be seen as the continent have dispel themselves horizontally with reverence to one another. Frankel continues, "Certain continents, nowseparated by vast oceans were once combined." (31) Frankel further submits that this research program was considered radical as it is a new theory, while the others may trace their root to 'living or dead pedigree'. However, Frankel opines thus: "Following Lakatos's, DRIFT Superseded 'PERM' and 'CON' with corroboration of Vine-Matthews and Wilson". (54) Kevin Harris (1979) from an educational and ideological viewpoint applied Lakatos's method in the crucial aspect of his book. As opined by David N. Aspin:

> Harris approaches this problem by adopting Lakatos' refinement of Popper's falsificationism showing how theoretical adjudications between and critical preferences of competing theories occur based on attempted refutations and conjectures that turn out to be progressive in their explanatory power are greater than previous or competing ones and their discovery of new facts lead to a move onwards… (1980. 172)

Harris approaching Lakatos's method from an ideological perspective assert that if ideology is considered as a set from a theoretic stance, or as a total belief system, it might be construed as loosely analogous to Lakatos's research programme in several important ways. (1979. 48) At the end of his postulations, Harris instead, proposed the adoption of "a radically different account of knowledge and knowledge-getting– the Marxist's notion of knowledge of production". (172) Richard S. Briggs (2009), on his part, introduces Lakatos to the biblical studies community by applying the Method of hermeneutics research programmes in biblical studies to Lakatos's programme (LRP). Briggs reporting Nancy Murphy opines that Lakatos's model might be useful to the task of doctrines in religious studies as appended in the article "*Theology in the age of Scientific Reasoning*" (1990), which seeks in protecting position with the aim of "doctrinal theology is a form of empirical science" that is vulnerable to Lakatos's analysis. (2009, p. 111) On his part, Briggs proposed what he referred to as the 'JEDP hypothesis' which he likened to Lakatos's programme. Swinburne (1975) reports Popper's response to his critics especially Imre Lakatos, when he claimed that the policy of acting on the finest tested theory could itself be challenged, and the rationality of acting on this policy would be shown by its ephemeral tests. Swinburne adds more from Poppers' reply that even though there is an infinite regress in his method of rationality, notwithstanding "it is transparently harmless". (Swinburne, 1975, p.367) Elkana as reported in Tomas Kulka (1977) also share is view on Lakatos's model.

**Imre Lakatos's Methodology of Scientific Research Programme**

Although this paper's primary material source is the jointly edited work of G. Currie and J. Worrall of Imre Lakatos's *Methodology of Scientific Research Programme* (1978). Nonetheless, it has been observed from some philosophical sources that the MSRP began in 1967 and came to an end in 1974 with the abrupt and unexpected demise of Lakatos at age 51 (Agassi, 2014. 81). There are also related views of the editors of the MSRP when they gave their disclaimer in the following statements that: "none of the paper published here for the first time was regarded by Lakatos as entirely satisfactory. Some are early drafts, while others seem not to have been intended for publication…" (1978. V)

The research programme in a much more general implication could be referred to as a professional network of scientists responsible for the conduct of research. From Lakatos's perspective, it has a very meticulous meaning in the philosophical image of how the knowledge of science grows. To do justice to the rest of Lakatos's method, the following sub-heading which are the core theses of his position will be considered below.

**Hardcore and the Protective Belt of a Research Programme**

For Lakatos, a research programme has two main constituents which are; "hardcore" and "protective belt". He explains that a programme hardcore is a series of assumptions that are necessary to the programmes. Lakatos continues that these sets of assumptions or ideas cannot be surrendered without giving them out altogether. It is born recalcitrant, therefore cannot be rendered falsified, as it is immune to refutation by the methodological decisions of its proponents. (48) Lakatos to further buttress his point, gave a classic example of the Newtonian research programme which he considered to be the most successful research programme ever. For him, the Newtonian triad laws of motion and his gravitational rule could be considered the hard core of the programme. (Godfrey-Smith, 2013.104) Lakatos states more that:

> When it was first produced, it was submerged in an ocean of anomalies (or if you wish, counter-examples), and opposed by the observational theories supporting these anomalies. But Newtonians

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> turned, with brilliant tenacity and ingenuity, one counter-instance after another into corroborating instances, primarily by overthrowing the original observational theories in the light of which this 'contrary evidence' was established. In the process, they produced new counter-examples which they again resolved. They turned each new difficulty into a new victory of their programme. (Lakatos, 1978. 48)

Further confirming Lakatos's stance, Godfrey-Smith also identifies the nineteen-century Darwinian research programme in biology as hardcore which insinuates that diverse biological species are connected by descent which in turn forms a family tree. (2013, p. 105)

The second constituent that makes up the research programme according to Lakatos is the 'protective belt' which could be qualified as a class of lower essential ideas that are used or applied to the hardcore of tangible phenomena. These sets of assumptions make claims which surround the hardcore and function as an auxiliary hypothesis. Furthermore, Lakatos informs that what is most necessary in the research programme is the fact that the protective belt comprises the clear supporting hypotheses which augment the hardcore, and best guesses that underlie the explanation of the essential circumstances and observational statements. Thus, individual or group of scientists is free to adjust or enhance the protective belt every way they choose, in as much as this move will open up the opportunity for tests and the likelihood for original breakthroughs. (Chalmers 2013. 126).

Lakatos further stresses that a research programme is a formation that makes available direction for futuristic researchers in both positive and negative applications. These applications Lakatos referred to as heuristics.

**Positive Heuristics**

Imre Lakatos explains that other than the "hardcore and the protective belt of a research programme", there is even more importance within the programme that he tags as heuristics. For him, heuristics is that "powerful problem-solving machinery, which with the help of sophisticated mathematical techniques, digest anomalies and even turns them into positive evidence." (1978.4). With an example, Lakatos states that when a planet fails to move precisely as it is supposed to, the Newtonian scientist would inspect "his conjectures concerning atmospheric refraction, concerning the propagation of light in magnetic storms, hundreds of other conjectures which are all part". (1978, 4) The scientist he explains might also probably have to devise an unidentified world, and then compute its "position, mass, and velocity" to clarify a given anomaly which is the feature of heuristic. Lakatos identifies two workable guidelines that work within a research programme. These guidelines he divided into 'negative' and 'positive' heuristics.

**Negative Heuristics**

The negative heuristics as Lakatos put forward is laden with the responsibility to ensure that the programme hardcore is always protected. In other words, the "negative heuristics specifies what the scientist is advised not to do. As already seen, scientists are advised not to tinker with the hard core of the programme in which they work". (Chalmers, 2013, p. 123) Lakatos in his own words says the negative heuristics:

> of a programme forbids us to direct modus tollens at this 'hardcore'. Instead, we must use ouringenuity to articulate or even invent 'auxiliary hypotheses', which form a protective belt around this core, and we must redirect the modus tollens to these. It is these protective belts of auxiliary hypotheses which has to bear the brunt of testing and get adjusted and re-adjusted, are even completely replaced, to defend the hardcore. (1978. 48)

Lakatos from his statement above without mincing words implies that the programme hardcore should always maintain its position, as such, sacrosanct at all times. But where a scientist for any reason tries to tinker, mend or modify the hardcore, then that scientist as a matter of cogent necessity has withdrawn from

the programme. For instance, "Tycho Brahe opted out of the Copernican programme when he suggested that only the planets, but not the earth, orbit the sun and that the sun orbits the earth". (Chalmers, 2013, p. 123) Furthermore, Lakatos maintains that where 'theoretical progress' can be verified immediately, we cannot say the same regarding 'empirical progress', as the programme for research might be perturbed with an elongated cycle of 'refutations' before "creative and lucky content- increasing auxiliary hypotheses" which turn a chain of defeats- with 'hindsight'- in a reasonable success story. Lakatos also emphasizes the intermittent progressive shift which he implies to be a "rational scope for dogmatic adherence to a programme in face of prima facie 'refutation'." (49) In the closing remarks of this section, Lakatos opines that his approach is different from Poincare's justification of conventionalism as the research programme when it desists to predict novel facts, its hardcore may be disposed of. In this view, Lakatos claims he sided with Duhem who thought of the possibility of such an outcome to be allowed.

**Positive Heuristics**

Lakatos postulates here that just as a research programme entails negative heuristics that indicate the "hardcore" which by its nature is "irrefutable by the methodological decision of its proponents". This research programmes Lakatos says also has its positive heuristics that consist of an existing research parameter that foresees these refutations. Also, positive heuristics can be said to specify what scientists ought to do rather than what they ought to not do within a research programme. Lakatos also asserts the positive heuristics comprise in part articulated sets of suggestions on how to modify, and enlarge the refutation strains of a research programme, and how to adjust and sophisticate the "refutable protective belt". (1978, 50). Still on, Lakatos states that the programme positive heuristics goal should be to salvage scientific practitioners from getting perplexed by the oceans of anomalies. The positive heuristics take off as a programme whose listings are chains of ever-intricate prototypes stimulating reality. Therefore, practitioners of science have to concentrate their attention on intricate models that follow the established instruction in the positive aspect of the programme. The positive heuristics of a programme also serve to fortify the programme by the breakthrough of novel facts that further give relevance to the hardcore. In a nutshell, "the positive heuristics gives guidance on how the hardcore is to be supplemented and how the resulting protective belt is to be modified for the programme to yield explanations and predictions of observable phenomena". (Chalmers 2013, 124) Lakatos still from Chalmers's views, states that the development of a programme involves both the appropriation of auxiliary hypotheses and the development of sufficient experiments and mathematics techniques. Giving an instance, Chalmers comments further:

> From the very inception of the Copernican program, it was clear that mathematical techniques for combining and manipulating epicycles and improved techniques for observing planetary positions were necessary. Lakatos illustrated the notion of positive heuristics with the story of Newton's early development of his gravitational theory. Here, the positive heuristics involves the idea that one should start with simple, idealistic cases and then, having mastered them, should proceed to more complicated and more realistic, cases… (124)

The idealistic cases Lakatos refers to as 'metaphysical principles' are times ignored as the basis of foundation in the inception of a programme. For Lakatos, the positive heuristics are generally more flexible than the negative heuristics. However, when a research programme enters the phase of degenerating, Lakatos proposes that a little revolution which he also termed a "creative shift" within the positive heuristics could drive it ahead. Hence, no matter the streams of anomalies spotted in a programme, the positive heuristics keeps going without any regard for refutations. (1978. 51)

**Progressive and Degenerating Research Programme**

Lakatos here contends that the crux of the matter lies not in evaluating whether a research programme is

Lakatos here contends that the crux of the matter lies not in evaluating whether a research programme is inherently good or bad, but rather in determining whether it is progressive or degenerating. In Lakatos's understanding, a progressive research programme leads to the discovery of entirely new and previously unknown facts, while a degenerating one merely concocts theories to accommodate existing facts. (1978. 5)

To illustrate this point, Lakatos presents a historical case that aligns with his argument. Contrary to Popper's view, Lakatos argues that the distinction between programmes cannot be based on whether some theories are still unrefuted while others are refuted. He refers to the example of Isaac Newton's groundbreaking work "Principia," which, despite its revolutionary status, faced a known challenge concerning its inability to provide accurate explanations for the motion of the moon due to its refutation by lunar motion. In addition, Lakatos highlights how a renowned physicist named Kaufman managed to challenge Einstein's theory of relativity in the same year it was published, emphasizing that the strength of a research programme lies in its ability to predict novel facts that were previously inconceivable or contradicted by rival programmes.

Lakatos further strengthens his position by citing examples from the history of science. For instance, he discusses Newton's gravitational theory of 1680, an improvement upon Kepler's theory of comets. While Kepler believed comets were extraterrestrial bodies moving in a straight line, Newton proposed that some comets moved in parabolas or hyperbolas without ever returning, while others moved in ordinary ellipses. Halley, having thoroughly studied Newton's programme, made precise calculations based on observations and accurately predicted the reappearance of a comet after seventy years, a prediction that Lakatos refers to as "Halley's Comet." Moreover, Lakatos presents the case of Einstein's programme, where Einstein remarkably predicted that measuring the distance between two stars at night and during an eclipse of the sun would yield different results, an observation that had not been previously considered.

In essence, Lakatos emphasizes that the success of a research programme lies in its ability to produce novel predictions that were previously inconceivable and unimagined by competing theories, solidifying the notion that a programme's progressiveness is crucial to its scientific significance. (5)

**Problem Shift**

Problem Shift from Lakatos's position implies a series of theories within the sphere of scientific investigation whereby each success theory is detained as a mark of advancement over its predecessor. Hence, the process of moving from one theory to another which has greater predictive prowess within a research programme is known as problem shift.

Lakatos in his research programme evaluates the terms to which a theory is said to be progressive and degenerating problem shift. He emphasizes that "A research programme is successful if all this led to a progressive problem shift; unsuccessful if it leads to degenerating problem shift." Thus, following the progression of theories $T_1$, $T_2$, $T_3$… could be said to be progressing as far as the following compulsory conditions are met; Tn attributes for the earlier success of $Tn\text{-}_1$; Tn is seen to have superior observable content than $Tn\text{-}_1$. Most surplus content of Tn has been corroborated. If not, the problem shift is simply on the path of degenerating problem shift. (Lakatos, 1978. 48)

**A Critical Evaluation of Imre Lakatos's Scientific Research Programme**

From the ongoing discussion so far, it has been observed that scientific theory, methodology, or the logic of scientific discovery (in the words of Popper), lays certain claim to the most appropriate criteria for determining the supposed nature and operation of our scientific endeavors. As a consequence, the credibility of any proffered scientific method is arbitrated following its intended applicability to scientific methodological realities. The early part of this work made a conscientious elaboration of some major philosophers of science into some discrepancies and inconsistencies as contained in Lakatos's model. Nevertheless, there are still some critical points to be considered. These criticisms of Lakatos's method

become necessary in the paper. Thus, as a matter of cogent necessity, it becomes imperative for these views to be added to the collection of criticisms Firstly, Lakatos's decision to proffer two componential explanations within a single method tends to pose some level of inconsistencies. These components Lakatos refers to as 'hard core' and the 'protective belt'.gives two separate explanations that are inter alia parallel to themselves. Where one
component is defended, rigid, and unfalsifiable. On the other hand, the other component stands as the defender is flexible, and could be falsified. Now, the Methodology of a scientific research programme sure cannot offer one single definition or objective, thus, it grapples with too many explanations to arrive at its points which are still dented with inconsistencies.

Still on, inconsistency in Lakatos's model, the fallacy of *non-Sequitur* is identified. This is because one cannot claim that a thing 'is' and 'is not' at the same time 'It simply does not follow'. Now Lakatos's method first makes a claim that superseded theories should be shelved and not falsified like Popper would want us to believe. Moving forward, another claim is made by Lakatos that if the research programme of which it is a part is no longer generating novel predictions, which are corroborated, it should be dropped or falsified. The above argument presents a double standard position in just one programme, which consists, for example, of a repentant drunkard going back to embrace his old bottle of alcohol. The question one would want to ask is, did the drunkard ever give up on alcohol? Therefore, as a 'sophisticated Popperian', Lakatos is simply in the chain with his master's methodological model.

Secondly, to a large extent, it would somewhat seem appropriate to restructure the title of Lakatos's model to something like "Magico-Methodology," of research programmes. This caption I believe will perfectly portray Lakatos's picture of science and its developments.

The study assumes this position as Lakatos's model somehow portrays that '0=2' a famous equation put forward by Aleister Crowley (1989). According to Morgue in his online video, he states that Crowley argues that to unravel the riddles of the universe, the 0=2 formula becomes the necessary solution. Morgue states more that for Crowley, we will have to treat numbers not as an abstraction but by their ontology, which means to treat numbers as existence, and existence equals zero. Now, since numbers exist, the equation 0=2 can be rewritten as 0=1+(-1). On the right side of the equation, there are two separates '1'. Therefore, as Morgue explains, we can think of '0' as the combination of two opposites which are '1' and '-1' which in turn equals '0'. What attracts my attention to Crowley's equations is their likely resemblance with Lakatos's model. In application to MSRP, where '0' could be seen to represent the 'hard core' of the research programme, it, therefore, equals to positive '1' which could be seen as progressive problem shifts. On the other hand, negative 1 or (-1) could then be seen to represent degenerating problem shifts. Nonetheless, together, 0=1+(-1) this equation could be considered as a research programme to unravel necessarysolutions to the riddles of the universe. From our ongoing explanation in this session, it becomes distinctlyclear that Lakatos's model as well bears some semblance to Crowley's chapter five conviction of zeroequals two (0=2). This comparison therefore suggests that Lakatos's model might lack empirical foundation, theoretically making it more akin to metaphysical speculation than a rigorous scientific framework. Finally, Lakatos's method as defined by its componential presentations in his bid to explain, by logical standard the history of science, tends to be laden with too much rigid dogmatism and hyper infinite regress. Still, in Lakatos component of the hardcore in a research programme by his standard is unchangeable, sacrosanct, and unfalsifiable. This position Lakatos chooses to chain tenaciously to the locks and keys of dogmatism, even when as pointed out by Popper, and Kuhn (although through different spectacles of methodological appraisals) that given a period, either the dominant theory gets falsified, or there will be a shift of emphasis after a revolution from one paradigm to another. It is still noteworthy that the history of science from the 14th and 15th centuries which witness the era of enlightenment, renaissance to the 20th century, the geocentric and heliocentric examples, as well as the Newtonian and Einsteinian examples provide a better and workable criterion for the understanding of the scientific event in history, as well as its most appropriate methodology. On the other hand, the component of the protective belt could be seen to be ladened in a perpetual infinite regress. This is because Lakatos could not specify in clear terms the number of theories or auxiliary hypotheses that should be permissible within his protective belt. Neither could he

determine the time frame a degenerating research programme should be tolerated or pardoned. Thus, the door to his proposals is *ad infinitum* which seems implausible. Instead, failed research programme should be given a certain amount of time to regain its relevance and become progressive. Feyerabend, in a swif response, criticized Lakatos's stance that in all practicality it did not provide any methodological rules to follow (Feyerabend, 1978).

## CONCLUSION

This paper's position clearly has shown a critical evaluation of Lakatos's sentiments as it went against standard logic and the reality of scientific practice. Imre Lakatos's Scientific Research Programme (SRP) presents a motivating and complicated model for comprehending the development and assessment of scientific theories. Nonetheless, this paper upon careful examination, certain weaknesses and contradictions arise which cast doubt on the model's validity and usefulness. Among noteworthy issues with Lakatos's SRP as explained in this paper are the presence of dual componential explanations, namely the 'hardcore' and the 'protective belt.' These components we see offer separate, sometimes parallel, explanations, leading to inherent inconsistencies. Another problem identified in this paper, arises from Lakatos's seemingly contradictory claims when he suggests that superseded theories should be shelved instead of falsified, he also argues that research programs lacking novel predictions and corroboration should be abandoned or falsified. This double standard undermines the consistency and credibility of the SRP. The paper alsoobserves that, Lakatos's model bears resemblance to a form of "Magico-Methodology," comparable to Aleister Crowley's equation of 0=2. This comparison suggests that Lakatos's model might lack empirical grounding, potentially making it more akin to metaphysical speculation than a rigorous scientific framework. Additionally, Lakatos's insistence on rigid dogmatism regarding the hardcore and his failure to specify clear criteria for the protective belt leads to problems of hyper-infinite regress. This lack of methodological clarity and perpetual openness to auxiliary hypotheses weaken the practicality and applicability of his approach.

However, as identified in this paper, Lakatos's model is undoubtedly one of the finest ideas of the 20th century, it is not without its flaws and limitations when subjected to critical scrutiny.

## REFERENCES

1. Agassi, J. (2014). Popper and his famous critics: Thomas Kuhn, Paul Feyerabend, and Imre Lakatos. New York: Springer. DOI:10.1007/978-3-319-06578-8
2. Agassi, J. (1976). The Lakatos's revolution. *An essay in memory of Imre Lakatos.* In Cohen R. S., Feyerabend P.K., and Wartofsky M.N. Boston: D. reidel publishers.
3. Aspen, N. D. (1980). Revolutionary practices 'versus philosophy of education? A comparative education. DOI: 10.1080/0305006800160208.
4. Bartley W.W. (1976). On Imre Lakatos. *An essay in memory of Imre Lakatos.* In Cohen R. S., Feyerabend P.K., and Wartofsky M.N. Boston: D. reidel publishers.
5. Black, S. (2003). Imre Lakatos and literal tradition. *Philosophy and literature.* 27 (2): John's Hopkins University. DOI: 10.1353/phl.2003.0039.
6. Blaug, M. (1975). Kuhn versus Lakatos, or paradigm versus research programme in the history of economics. 7 (4). DOI:10.1215/00182702-7-4-399
7. Brahmachari, D. (2016). Neoclassical economics as a method of scientific research programme: *A review of existing literatures"*. Https://mpra.ub.-unimuenchen.de/75341/
8. Briggs, R.S. (2009). The methodology of hermeneutical research programmes in biblical studies: some insight from the work of Imre Lakatos *the heythrop journal.* 50 (1). DOI: 10.1111/j.1468-2265.2009. 00440.x
9. Buchdahl, G. (1965). A revolution in historiography of science. *History of science.* 4 (3) Iss.1 Chalmers, A. (2013). What is this thing called science? 4th (Ed). Queensland: University of

Queensland press. Ebook
10. Curtis, R. C (1986). Are methodology theories of scientific rationality? *The journal of philosophy of science:* Oxford university press. http://www.jstor.org/stable/687007
11. Darwin, J. (2010). Kuhn vs. Popper vs. Lakatos vs. Feyerabend: Contested terrain or fruitful collaboration? *Philosophy of management.* 9 (1). DOI: 10.5840/pom20109117
12. Dreyer, J. L. E (2014). History of the planetary systems: from Thales to Kepler. Cambridge University press.
13. Emedolu, C. C. (2013). Ramification of theory change in experimental science. *Scientific revolution, truth and technology. Turning the philosophical telescope.* Aba: Rex press.
14. Emedolu, C. C. (2017). "Ian Hacking on primacy and autonomy of scientific experiment: Perspectives in the history and philosophy of science". *Explorer: African journal of philosophy, arts and social sciences.* 1 (1): University of Port Harcourt press.Feyerabend, P. K. (1975). Imre Lakatos. *The British Journal for the philosophy of science*. 26 (3. Iss.1. DOI: 10.2307/686328
15. Feyerabend, P. K (1976). The rationality of scientific (from 'against method'). *In can theories be refuted?* Essays on Duhem-Quine thesis. Harding S. G. (Ed.). Boston: D. Reidel Publishers Company. DOI: 10.1007/978-94-010-1863-0
16. Frankel, H. (1979). The career of continent drift theory: An application of Imre Lakatos analyses of scientific growth to the rise of drift theory. *Studies in history and philosophy of science part 'A'.* 10 (1). DOI: 10-1016/0039-3681(79)90003-7
17. Gellner, E. (1974). "*Professor Imre Lakatos*". The times, February 8.Godfrey-Smith, P. (2003). An introduction to the philosophy of science: Theory and reality". Chicago: University of Chicago press.
18. Gonzalez, W. (2014). The evolution of Lakatos repercussion on the methodology of economics. *The journal of the international society for the history of philosophy.* 1 (1). URL: https:// www.jstor/ stable/ 10.1086/ 675401
19. Hacking, I. (1979). Imre Lakatos philosophy of science. *British journal for the philosophy of science.* http://www.jstor.org/stable/687547
20. Hacking, I. (1983). Representing and intervening: Topics in the philosophy of natural sciences". Cambridge: Cambridge University press.
21. Harris, K. (1979). Education and Knowledge: The structured misinterpretation of reality. London: Routledge and Megan Paul.
22. Hersh, R. (1978). Introducing Imre *The mathematical influencer.* 1 (3)
23. Immanuel, V. (1950). Worlds in Collison. New York: Dell publishing co., Inc
24. Kadvany, J. (2001). Imre Lakatos and the guise of reason. London: Duke University Press.
25. Kau, A. (2001). Deconstruction and science: How post structuralist literary theory applies to scientific understanding. http:/sites. science. oregonstate. edu/- stetza/ ph407H/ Deconstruction.pdf
26. Kosso, P. (2009). Philosophy of historiography. *A companion to the philosophy of history and historiography.* Aviezer Tucker (ed): Blackwell publishers.
27. Kothari, C.R. (2004). Research methodology: Method and techniques. New Delhi: New age international
28. Kuhn, T. (1970). The structure of scientific revolution. Chicago: university of Chicago press.
29. Kuhn, T. (1970). Notes on Lakatos. *PSA: Proceedings of the Biennial meeting of philosophy of science association:* http://www.jstor.org/stable/495758
30. Kuhn, T. (1970). Reflections on my critics. *Criticisms and the growth of knowledge.* London: Cambridge university press.
31. Kulka, T. (1977). "Some problems concerning the rationality reconstruction: Comments on Elkana and Lakatos". *British journal for the philosophy of science.* 24 (4): Oxford University press. http://www.jstor.org/stable/686877
32. Lakatos, I. (1969). Criticism and the methodology of scientific research programme. *Proceedings of the Aristotelian society.* Blackwell publishers. http:// www jstor.org/ stable/4544774
33. Lakatos, I. (1978). The methodology of scientific research programme. Worrall J. and Currie G. (eds). Cambridge: Cambridge university press.

34. Lakatos, Imre- New world encyclopedia. www.newworldencyclopedia.org
35. Larvor, B. (1998). Lakatos: An introduction. London: Routledge
36. Lauden, L. (1978). Progress and its problems: toward a theory of scientific growth. Los Angeles: University of California press.
37. Losee, J. (2001). A historical introduction to the philosophy of science. Oxford: Oxford university press.
38. Michel, M. Didier, Q. (2012). The discovery of exoplanets. In Annual review of astronomy. https://doi.org/10.1146/annurev-astro-081811-125447
39. Musgrave, A. and Pigden, C. (2016). Imre Lakatos. *The Stanford encyclopedia of philosophy.* Https://plato.stanford.edu/achieve/win2016/entries/Lakatos
40. Musgrave, A. (1976). Method or madness. *An essay in memory of Imre Lakatos.* Cohen R. S., Feyerabend P.K., and Wartofsky M.N. Boston. D. reidel publishers.
41. Newton-Smith W.H. (2008). The rationality of reason. London: Routledge.
42. Nwigwe, B. E. (2004). Philosophy of science movement- a quest for more adequate interpretation of scientific knowledge. *A compendium on the history and philosophy of science.* Udoidem S. I., and Inoka D. B. (eds). Lagos: Africa heritage research.
43. Onuoha, J.A. (2013). Imre Lakatos on the cross-road of scientific enquiry. In scientific revolution, truth and technology. *Turning the philosophical telescope.* Aba: Rex press.
44. Popper, K. (1959). The logic of scientific reasoning. London: Routledge.
45. Popper, K. (1962). Conjectures and refutations: The growth of scientific Knowledge. New York: Basic book publishers.
46. Uduigwomen A. F. (2015). A textbook of the history and philosophy of science.4 (eds). Ava: Vitalis book company.
47. Sarkar, S. and Pteifer, J. (2006). The philosophy of science: An encyclopedia. New York: Routledge.
48. Swinburne, R. G., Schlipp, P. A. (1975). The Philosophy of Karl Popper. *Philosophical quarterly.* 25 (101). Series: Library of living philosophers XIV: Open court publishers.
49. Sriraman, B. (2006). An Ode to Imre Lakatos: Quasi thought experiments to bridge the ideal and actual mathematical classroom. 37 (4). DOI: 10.1007/s10780-8405-1
50. Wartofsky, M.W. (1996). The relation between philosophy of science and the history of science. *An essay in memory of Imre Lakatos.* Cohen R. S., Feyerabend P.K., and Wartofsky M.N. Boston. D. reidel publishers.