

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

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Abstract:- In a previous paper on cross-cultural research design, we had underlined the importance of cross-cultural research design in scientific activity. We had also underlined the importance of obtaining various types of emic and etic perspectives on various kinds of issues, and had also attempted to bucket cultures into various categories. In this paper, we attempt to take those concepts a step forward, and call for a horizontal collaboration among nations. We also define the terms horizontal collaboration and vertical collaboration as being the two types of collaboration involved in cross-cultural research. Thus, this paper adds on meaningfully and significantly to the concepts introduced in our paper on cross-cultural research design, and introduces several new concepts and terms as well. The concepts proposed in this paper hold good for all branches and fields of sciences, though they assume added meaning for various fields of the social sciences where culture-specific data plays a major role in the formulation of hypotheses. Horizontal collaboration must not replace vertical collaboration entirely, but only complement it in places where such collaboration makes eminent sense. Western science has contributed greatly to human welfare, and developing countries must also not be self-centric. They must also contribute to human welfare and human progress in general. This also assumes added importance because the dividing line between developed countries and developing countries will become thin in the times to come as economic performance of various nations also converges.

I. INTRODUCTION

"Alone we can do so little; together we can do so much more."
– Helen Keller

"If you want to lift yourself up, lift up someone else as well."
– Booker T. Washington

In a previous paper on cross-cultural research design, we had underlined the importance of cross-cultural research design in scientific activity. We had also underlined the importance of obtaining various types of emic and etic perspectives on various kinds of issues, and had also attempted to bucket cultures into various categories. In this paper, we attempt to take those concepts a step forward, and call for a horizontal collaboration among nations, or collaboration among peers, and particularly among developing nations. We also define the terms horizontal collaboration and vertical collaboration as being the two types of collaboration involved in cross-cultural research. Horizontal collaboration refers to collaboration among peers or between or among developing nations, while vertical collaboration refers to collaboration between unequal nations where some form of technology transfer is involved.

Thus, this paper adds on meaningfully and significantly to the concepts introduced in our paper on cross-cultural research design, and introduces several new concepts and terms as well. The concepts proposed in this paper hold good for all branches and fields of sciences, though they assume added meaning for various fields of the social sciences where culture-specific data plays a major role in the formulation of hypotheses. Horizontal collaboration must not replace vertical collaboration entirely, but only complement it in places where such collaboration makes eminent sense. Western science has contributed greatly to human welfare, and developing countries must also not be self-centric. They must also contribute to human welfare and human progress in general. This also assumes added importance because the dividing line between developed countries and developing countries will become thin in the times to come as economic performance of various nations also converges, and developing nations up their ante.

Even though scientific endeavour has become much more globalized in the past few decades, with many researchers in India, China and Africa among other nations taking up science and making positive and noteworthy contributions across disciplines, Eurocentric paradigms or paradigms emanating from narrow region-specific data or considerations have not been obliterated completely from various branches of science. Research publications from unexpected parts of the world have been increasing of late, but these pale in comparison with the quantum scientific output still emanating from the West. Colonial bias is also at long last disappearing with the emergence of anti-establishment driven or even reactionary schools of thought, but a lot more may need to be done to make science completely culture-neutral and prejudice-free. Furthermore, while Asians have made major contributions to technology, their contributions to various fields of the social sciences remain abysmally low or non-existent. In these fields, old Eurocentric paradigms still predominate. All these metrics and observations imply that a lot more work needs to be done.

The ‘Globalisation of science’ as we see it, refers to the examination of phenomena and the formulation of strategies from the prism of multiple socio-cultural backgrounds, which is highly desirable in virtually every field of scientific endeavour, but is particularly meaningful and productive in various fields of social science such as Anthropology, Sociology, Linguistics, Historiography and Economics and will lead to what we call ‘true multivocality’, and eventually, a global renaissance and enlightenment in much the same manner as took place in the west a few centuries ago. In this paper, we not only examine why the ‘Globalization of science’ has many positive benefits for science and scientific method as a whole, but also stress and emphasize the need for ‘horizontal collaboration between nations’, particularly developing ones. This paper attempts to cover both theoretical sciences and the practical, commercial applications of science, and the development of socially and culturally apposite economic development paradigms and frameworks as well, even though our scope may prima facie appear to be biased in favour of theoretical and foundational science. Even as we issue a clarion call for the propagation of science around the world, all endeavours must be accompanied by the inculcation of a scientific temper, otherwise dubious constructs will result as exemplified by the Hindutva catastrophe in India.¹

II. “WESTERN” SCIENCE

To western science, the world owes a great deal. In the traditional and the canonical sense, western tradition is contrasted starkly with traditional knowledge systems which are largely based on traditional knowledge, values or belief system. Even though this may sound highly simplistic, this

¹ Research collaboration and team science: A state-of-the-art review and agenda, Barry Bozeman and Craig Boardman, Springer, 2014

may be because western standards of rigorous objectivity and healthy skepticism have not been replicated elsewhere. The term western science as used interchangeably and loosely with modern scientific activity and endeavour as a whole, does not augur and bode well for science in other parts of the world. Alas, this has come to be because modern science, particularly in the social sciences, has yet to come of age or attain maturity in the modern and contemporary non-western world. As such, we loathe the term “western science”, but still use it nonetheless to drive home a point. Truth be told, western science is still highly objective and quantitative as opposed to traditional systems of knowledge, which are relatively highly subjective and qualitative in nature, and do not have rigorous scrutiny as their basis. Western science has as its basis, a formal academic transmission through the mechanism of peer-reviewed journals and dialectical debate and discourse, while traditional knowledge is chiefly passed on orally from one generation to the next. Non-Western scholars can also use the principles and attributes of western science, (such as objectivity and rigour) often falsely touted to be unique to western civilization, for their own objectives, and even as we believe, to provide a strong counter-balancing force to western approaches. Scholars from all over the world can be imbued with the same level of precision if a little bit of training is imparted to them.²

In case of the latter, namely traditional knowledge systems, the elderly are considered to be wise, and are often the chief repositories of traditional knowledge and wisdom. In such a case, there is no constant empirical validation and revalidation, (or even any degree of precision or rigour) and such knowledge systems can include statements about unverifiable facts and supernatural phenomena. On the contrary, western science is based on the systematic and rigorous examination of the structure and functioning of the natural world, often in physical, biological or natural realms. Science in the western sense is also defined as a body of knowledge to which new knowledge is constantly and continuously added, and knowledge that is no longer held to be valid is discarded. Science is also based on the discovery of principles and laws that govern nature. Modern science does not typically investigate supernatural, paranormal or metaphysical phenomena or experiences and other phenomena that cannot be verified through standard techniques of science, though there can be exceptions to this rule. Some others think western science includes inquiry chiefly made in western languages though this assertion may be fallacious and inconclusive. First published in the year 1992, the book “The Beginnings of Western Science” by the American historian David C. Lindberg was the first comprehensive treatise on western scientific endeavour beginning from the ancient

² Structures of Scientific Collaboration (Inside Technology), MIT press, 2007 by Ivan Chompalov (Author), Joel Genuth (Author), Wesley Shrum (Author)

Greeks, and continuing up to the more recent pre-modern times.

The Scientific revolution began in a small circle of European nations particularly in the north and west of Europe, and modern science really began and took off with the systematic investigations of many famous fifteenth, sixteenth and seventeenth century (chiefly European) scientists during the extended renaissance and enlightenment periods, such as the famous Polish astronomer Nicolaus Copernicus, the astronomer Tycho Brahe, Johannes Kepler who gave us the laws of planetary motion, William Gilbert an man who worked on magnetism, Galileo Galilei, an Italian who conducted research on the physics of objects in motion, as well as astronomy, William Harvey, an Englishman who studied the circulation of the blood in the body, Isaac Newton, an Englishman who famously discovered gravity and developed calculus too. Roger Bacon, Thomas Hobbes, John Locke and other philosophers also contributed to the philosophy of science and placed considerable emphasis on logic and reasoning. Western philosophers of science also developed various fields of basic and applied sciences, and some of the thinkers mentioned above, also contributed to social contract theory and other fields which sought to diminish the power of a divine being and also that of the king.

Francis Bacon the famous English philosopher of science, wrote the book *Great Instauration*, which was a grand plan and his worldview for the instauration of science. The modern English writer CP Snow, while being western-centric, spoke about the dichotomy between science and the literary tradition, referring it to the two worlds. The Belgian American chemist and historian George Sarton also attempted to provide a bridge between the sciences and the humanities, calling this “New Humanism”. Much more recently, EO Wilson in his book *Consilience: The Unity of Knowledge* spoke about the synthesis between the natural sciences and the social sciences also. Polymaths like William Whewell wrote authoritatively on various fields of the sciences including social sciences as well, attempting valiantly to bridge worlds. These authors often referred to various chasms that need to be bridged, just like in our view, western-inspired scientific models, and their applicability for the rest of the world, also need to be understood and bridged. Thus Baruch Spinoza’s philosophy of the ‘unity of all that exists’, greatly appeals to us, despite all his other ideas we may not possibly agree with.

Western scientists also developed and laid down the steps and the sequences of the scientific method including techniques for the development of theories, hypotheses and laws which are in use even today. They also developed the science of inductive and deductive logic and reasoning. The Industrial Revolution also began in Great Britain, and then spread to the rest of the western world. The modern scientific age also began in the west, though other counties in the east have sought to play the catch-up game. Many Asian countries have since made enormous strides in applied science and

technology, though very little in pure and foundational science. Great western thinkers however stood on the shoulders of great Greek thinkers and philosophers such as Aristotle (who also provided Aristotlean logic), Plato, Socrates, Archimedes, Eratosthenes, Philolaus, Heracleidus, Anaxagoras, and Ptolemy. Later western scientists included Charles Darwin and Albert Einstein. Western thinkers also contributed to other fields of science such as Economics. Adam Smith and Alfred Marshall were famous economists.

This is not to say that non-western countries and non-western cultures did not contribute to science in any meaningful way ever in their history. No, the hegemony of the west in this regard has been cemented only in the past couple of centuries. Ancient China, Ancient Egypt, Ancient India, the ancient Babylonians, and the Medieval Islamic world have also contributed greatly to science. We have discussed their achievements in our previous papers on multiple occasions. However, these nations and regions (many of which were formerly colonized, suppressed or subjugated ones) must develop their own scientific ideals based on their local realities, but based on the same standards set by western science, given the fact that they have great potential for scientific growth. We have been working towards this singular objective for close to two decades now, and with steadfast determination.

Thus, scientific renaissances and enlightenments must happen wherever necessary in non-western contexts too. It is not to say that the west has no dog in the fight in the rise of science in other parts of the globe; renewed scientific activity in these regions should benefit the west too as were have largely transgressed narrow national or regional boundaries and other parochial considerations in the recent past.. George Basalla and others have proposed models to explain how science might spread from the west to the non-west (Three stage model), but the terms west and non-west must soon become archaic in science as it has become in other fields of technology and economic progress. At the same time, science in newly developing countries must distance itself from the traditional pre-scientific knowledge systems (or revalidate them constantly through modern scientific paradigms) of those societies in much the same way that western science frowned upon pre-scientific enterprise off their respective regions. Blind and dogmatic traditionalism is not antidote to any excesses that may have been attributed to western hegemony in the sciences.

This unfortunate trend however manifests itself from time to time; Some Hindutva proponents propose the Ayurveda and other ancient systems of medicine be considered science without attempting to revalidate or vet them. Even Mahatma Gandhi unfortunately walked into this trap; he erroneously believed all Western education was undesirable and ruined his son Harilal Gandhi’s life; he even opposed the industrialization of India after independence, and had he lived, would have become an obstacle to India’s

development and progress. Rumours abound that the even refused to administer Penicillin to his dying wife Kasturba Gandhi. He was no linguist either and may not have envisioned the factors working in favour of the English language in India when in 1906, he envisioned Hindi (later Hindustani) to be the national language. People all over the world must avoid all such detour, digressions and misinterpretations even if they appeal to a sense of ethnic pride. However, and in spite of all these factors and myopic demonstrations of ill-conceived notions, making developing nations scientific superpowers is no pie in the sky. This can and must be accomplished at any cost, and preferably (and ideally) within our own lifetimes. (Basalla 1967)^{3 4 5}

III. HORIZONTAL COLLABORATION AND BENEFITS OF THIS APPROACH

The following are the benefits of horizontal collaboration

- Science and scientific paradigms that are applicable to different parts of the developing world can be developed using this approach and technique, since local contexts and conditions may vary widely.
- There is a true spirit of camaraderie as this is healthy collaboration between equals carried out for mutual benefit.
- The inquisitiveness and scientific curiosity of people from around the world is kindled and a spirit of scientific enquiry is fostered. Thus, their creative juices flow and this results in new solutions being provided for them.
- Mutual learning: There is mutual learning and upliftment of different parties because all parties are on the same level or boat. Thus, different parties are both willing and able to learn from each other.
- Inductive approaches: Inductive approaches are truly followed as different case studies emanating from local situations from all over the world are taken into consideration, and solutions for local problems sought and accomplished.
- Sociological ninety ten rule: The principle of exceptionism is followed, and exceptions are actively sought for each principle or concept as a wide variety of contexts and situations are assessed and analyzed. Grounds up theorization and research will also emanate from this approach.
- Better theorization will result as more data is collected and analyzed from different parts of the world, or different

social and cultural contexts, and these are aggregated for theorization.

- No ideological imposition by one party on another party will result as this is in essence a collaboration among equals or near equals.
- Subaltern studies are promoted and a voice is given to the unrepresented, oppressed and underprivileged during the research process, as their points of view and considerations are taken into account.
- Challenging established norms: Established norms are challenged, and new norms and power structures are often developed though the approach which can have a ripple and a cascading effect in the long-term.
- Developed countries may not be willing to transfer technologies to other countries. This problem does not arise in case of the horizontal approach if relationships are meaningfully fostered.

Thus, Horizontal collaboration in science, if implemented in true letter and in spirit, can help ricochet and catapult science to an altogether new trajectory. An example of this is the French presence in Francophonie Africa. Rwanda, and more recently Burkina Faso, Mali, Niger and other countries have resisted French dominance in the region, and have sought more balanced and equitable political partnerships with countries like Russia, China and India. However, there may be different types of Vested interests involved in different countries, and these include professional, institutional, cultural, religious and nationalistic interests. There are also some benefits of vertical collaboration, which usually involves transfer of technology from developed nations to developing nations, and these include the following benefits. Thus, a combination of horizontal and vertical approaches must be employed and followed in so far as all parties are willing to collaborate and share information with each other:

- Better technology and better expertise: Developed countries often possess superior technologies than developing ones, and these may often be developed as a result of superior technical skills.
- Time-trusted solutions: Time-trusted and proven technologies are imparted to developing countries.
- Ready-made expertise: Developed countries often have ready-made expertise and technology at their disposal which they at times may be willing to share with less developed nations.
- More financial muscle: Developed countries often have more financial muscle than developing countries, and finance may not be an impediment or an obstacle to research. This may sometimes lead to better solutions being developed.

Vertical collaboration was witnessed in the early years of India's independence when it collaborated multi-dimensionally with the former USSR when the latter was a industrial and scientific superpower. This was the Cold War

³ The Beginnings of Western Science, 600 B.C. to A.D. 1450 (1992) ISBN 978-0-226-48231-6

⁴ Bartlett, Robert (2008) [b2006], The Natural and the Supernatural in the Middle Ages: The Wiles Lecture Given at the Queen's University of Belfast, 2006, Cambridge: Cambridge University Press

⁵ Wilson, E.O. (1999). "The natural sciences". *Consilience: The Unity of Knowledge* (Reprint ed.). New York: Vintage

era, and Nehru and Nikita Khrushchev were at the helm of affairs. The USA and the USSR were antagonistic to each other, and the left-leaning Nehru, though more or less opposed to Communism, leaned heavily on the USSR for technical support. India's five years plans were based on similar Soviet plans, and the focus and emphasis was accorded to heavy industry. The USSR helped India set up several steel plants, (Steel was accorded great primacy in the Socialist worldview) and some multi-purpose dams were built with International expertise too. As such, the two nations were unequal partners, and India leaned on Soviet technology and expertise heavily. However, most of these ventures were not profitable, and this is altogether a different topic of discussion. India failed to advance economically or technologically in the early years of independence. One is reminded of the infamous PL480 days of the 1960's. It was eventually the USA that bailed India out in spite of ideological differences, and helped it breathe easy. Nehru also ensured that India collaborated with other countries in science and technology; many eminent institutions of excellence were set up such as the prestigious Indian Institutes of Technology, which churn out quality graduates even to this day. Other supporting institutes for the development of science were set up both before and after science examples being the Indian Academy of Sciences, Indian National Science academy and the Indian Association for the Cultivation of Science. In spite of his innumerable flaws, Nehru was a great institution builder.

In 2020, the government of India unveiled the "New educational policy for India" titled National Education Policy 2020. The rollout took place on July 29, 2020. The draft committee was chaired by Dr K. Kasturirangan who is an eminent scientist of India, and the former chairman of the Indian Space Research Organization. The draft policy covers aspects such as Higher education, primary and secondary education, adult education, achievement of universal foundational literacy and numeracy, and the promotion and development of Indian languages among other things. The policy also seeks to restructure the school system based on the 5+3+3+4 pattern corresponding to the foundational stage, preparatory stage, middle stage and high stage respectively. It also seeks to establish as far as possible, universal criteria for the assessment and evaluation of student's performance. It also seeks to achieve a Gross Enrollment ratio of hundred percent from preschool to secondary education, including for girls, disadvantaged groups and differently abled students.

The NEP also seeks to promote education in the mother tongue or the regional language as far as possible. At the same time, the three language policy is sought to be continued. Even though the policy does not seek to restrict or demote English in any way, the common criticism is that the importance of English in the Indian and the global context is not adequately emphasized, and resultantly, students may unknowingly ignore the subject until it is too late. English remains well-entrenched in India in the fields of science, technology and higher education and is likely to remain so for a long time to

come. This is the reality, and no amount of jingoism or noisy sloganeering can override this. Education in both Indian languages must be encouraged, and the "transferable skills approach" is another approach worth noting where the student initially learns in the mother tongue, and gradually switches over to English. This approach can indeed be successful as evidenced by the fact that many children enrolled in vernacular schools later went on to become proficient in the English language. Madhya Pradesh and Uttar Pradesh have recently sought to provide medical education in Hindi. This is indeed welcome, but the role played by English in the current context cannot be undermined. Thus, both English and vernacular education must be promoted, and in the early years of a child's education, the parents must be the sole deciding authority,

There is also no policy in place for the lexical development of Indian languages which have greatly lagged behind English. For this, the work done by Malaysia may be adopted as a role-model. There is no need to invent words in Indian languages from scratch as these are not likely to ever be used; terms such as those for Table Tennis and Cricket were coined in the Hindi language in the early years of India's independence by the then Rajbhasha department, but were never used. Instead, English words which may be either technical or non-technical may be borrowed directly with some phonetic adaptation. The concept of lexical development must become an important subject by itself. This has hitherto lagged behind because of Eurocentric concerns and considerations. Experts and representatives of speakers of all major Indian languages must be drawn into this process. A proper policy for this will help students learn their mother tongue, other Indian languages and English easily. Likewise, theories of second language acquisition are all primarily Eurocentric in orientation. Indian scholars and thinkers have barely contributed to this field. This is true of much of scientific activity as well; our papers on the Sociological Ninety ten rule, the certainty uncertainty principle and the inductive approach towards theorization are attempts to set right this fallacy.

The NEP also encourages foreign universities to set up campuses, and Indian universities to set up campuses abroad as well. Indeed many foreign universities have lined up to set up campuses in India, while the Indian Institute of Technology is planning to set up a campus in Tanzania. It seeks to establish a National Research Foundation to facilitate merit-based but equitable peer-reviewed research funding. While all this is indeed welcome, there must be a greater emphasis on scientific output. Rote learning must be discouraged, while scientific method must be taught and encouraged along with the promotion of critical reasoning and thinking skills. Foundational knowledge in all important subjects must be imparted at a young age regardless of the stream the children opt for. We have authored papers on Anthropological Pedagogy and the Sociology of science as well. These were published by us in 2018 and 2021 respectively. The principles,

concepts and tenets of these papers can be incorporated wholesale into pedagogical theory and praxis. As such however, the establishment of a new twenty-first century school of pedagogy is imperative; this must not be Eurocentric, but must be drawn based on the experiences of students, teachers, and the public from all over the world.

This must include virtually all aspects of pedagogy including pedagogical content. This should indeed vary from context to context and from culture to culture, as suggested in our sociology of science paper. Indeed, this would only be possible through horizontal collaboration. We have also published three papers on language dynamics, and these would form a crucial and critical input into the design of education systems. For this, local-specific research is a must, and this could be boosted by relevant expertise from similar nations. Having the right kind of education system in place is also important because it is likely to be closely observed and studied by other developing countries; developing countries can indeed provide each other learnings and expertise on this issue. Thus, developing countries must also act with restraint, responsibility and dignity as their actions will be closely watched by other developing countries.^{6 7 8 9}

Countries like India also rank low on metrics such as the Human development index or HDI, and their creative and entrepreneurial class is small. We have discussed these concepts threadbare and in a great level of detail in our papers on Anthropological Economics and elsewhere. According to the last Human Development Report, which also includes assessment of educational systems, India ranked at 132nd position out of 191 nations, with a score of 0.633. This is pretty low, and the same holds true for most human development indicators. Some African countries are lower still, and we look forward toward a “Horizontal collaboration” among nations primarily in science, but also in economics, and our attempts to formulate a new field of study known as “Anthropological Economics” will bear ample and eloquent testimony to this. India also ranks low on innovation indices,

⁶ Aithal, P. S.; Aithal, Shubhrajyotsna (2019). "Analysis of Higher Education in Indian National Education Policy Proposal 2019 and Its Implementation Challenges". *International Journal of Applied Engineering and Management Letters*.

⁷ Malhotra, Smriti (November 2019), "The Draft National Education Policy: A Distressing Attempt to Redefine India", *Journal of the Gujarat Research Society*,

⁸ Vedhathiri, Thanikachalam (January 2020), "Critical Assessment of Draft Indian National Education Policy 2019 with Respect to National Institutes of Technical Teachers Training and Research", *Journal of Engineering Education*,

⁹ Introducing Anthropological Pedagogy as a Core Component of Twenty-first Century Anthropology: The Role of Anthropological Pedagogy in the Fulfilment of Anthropological and Sociological Objectives Sujay Rao Mandavilli, *IJSRT*, July 2018

and the Indian body NITI Aayog has also put in place the practice of ranking Indian states on the basis of various parameters. Other development and innovation indices are also used, and most of these are not comprehensive or multi-dimensional.

Another interesting concept is that of Jugaad, which seeks to identify solutions in adversity based on improvisation and ingenuity provided at a low cost. This term is Hindi in origin. Examples of innovations attributed to Jugaad include the Mitticool clay refrigerator, invented by Mansukhbhai Prajapati in 2009, and Tata Motor's Nano car, invented in 2008. The latter unfortunately failed. This is one platform on which horizontal collaboration can take place among countries, but we envisage horizontal collaboration as a much bigger scheme of things, spanning from foundational and fundamental science to technology and applied science. India must also institute a much bigger and better rewards and recognition system for its scientists. The Shanti Swarup Bhatnagar prize is an eminent prize, but comes with strings attached. Some prizes have been discontinued, and the Infosys prize for science and the GD Birla prize for science are currently the most sought after prizes.

This will indeed also be a major new string to the bow of most developing nations as they emerge from colonialism, illiteracy, malnutrition and deprivation. Indian Research and development has traditionally been abysmally low due to factors such as the license Raj; Indian car companies did not upgrade their products for decades. Research and development in Indian companies is still low and a fraction of that of competitors such as South Korea, Taiwan, China and Japan. In 2021, India's gross expenditure on research and development (R&D) stood at over 64 billion U.S. dollars, and had actually declined since the previous year. However, there is a glimmer of hope. For example, the Indian Space Research Organization has become a tour de force in the recent past, and has been launching satellites for other countries as well, albeit at a very low cost. Tata Motors and the Mahindra group have since begun to design their own vehicles from scratch, and some are even being sold abroad. In some sectors such as pharma, R&D spend is higher than in other sectors. For example, Dr Reddy's Labs and Lupin have a higher R&D spend than in most Indian companies. Telecom penetration in rural areas has also increased impressively in recent years, and most rural habitations are now electrified. India has accomplished a successful rollout of 5G Networks recently, and is gearing up to launch 6G networks by 2030.

India's contribution to scientific publications is also still low, even though it has greatly increased in the recent past. As of 2022, over five million academic articles are published per year, including full-length articles, short surveys, reviews, and conference proceedings. Around ninety percent of the total output according to one survey is from high income and upper middle income countries such as the USA, Germany and the UK. However, output from countries like China, Russia, and

Brazil is also rising rapidly, and India's scientific publications output is increasing surely but steadily too. According to another survey in 2023, China stood in the first position with respect to academic publications with 744,000 publications, and the USA stood second with 624,000 publications. The UK trailed far behind with 198,000 publications, while India stood not too far behind the UK with 191,000 publications. Most African nations came far behind India, and the scientific and scholarly output of some African nations is abysmally low. China also publishes in Chinese, and this is an example on non-English based scholarship picking up. Journal articles are also published in languages such as French, German and Spanish, though in smaller numbers.

Something needs to be done about India's poor scientific temperament and attitude. In India too, there is scarcely any scientific mindset or a scientific temperament among the youth. Many cannot distinguish science from pseudoscience, or distinguish good science from bad one. This is true even of the educated youth. India's elite does not promote a scientific temper or seek to increase India's output either, and this order of intellectualism is severely and seriously lacking, if not non-existent. Most activity is still largely driven by the need to boost sectarian pride, without any consideration for international concerns. Therefore there is no science-oriented or science-friendly intellectualism yet. There is nether any intellectualism nor internationalism here. We need to build it up brick by brick. However, there is a faint glimmer of hope, and many things can change in a generation or two; the winds of change can blow here too, just as they are blowing in the Islamic world. We need science-based intellectualism not the shrill Hindutva "Arise, awake, O Bharata" clarion calls. (Or fixing Mahabharata dates using pseudoscientific methods, or an obsession with promoting India's real or imagined past scientific glory, much of which can be affirmed through internet sources) "Intellectuals" like to Owaisi also seem to support Quranic literalism, and have supported practices like the Triple Talaq openly and publicly. All these approaches are anathema to intellectualism. We do not know if this because of our "learn by rote" education system or whether there is a wider malaise. Audiences must also bear in mind that our agenda is not an India specific agenda: It is just that we are more familiar with India. We must also pass the baton to other developing countries and encourage them to follow suit by promoting and encouraging science in their own respective countries as well.

Research has also steadily become more global over the past decade; this trend can be measured by studying trends in cross-national co-authorships and citations which have increased steadily over the years. (Luukkonen et al. 1993) Researchers gather scientific expertise beyond their country's borders through meaningful and mutually beneficial cross-cultural collaborations, which may be either direct (pertaining to co-authorship) or indirect (referencing articles from other countries). Relationships may be forged either at a national level or at the level of individual scholars. Therefore,

international collaborations and citations are heavily influenced by the size of the country as well as the educational policies of the country and the level of economic advancement of the country. Interestingly, the USA has begun to collaborate more and more with other countries like India, and American co-authorship with Asian scientists and researchers has increased manifold over the past decade. Horizontal collaboration is severely and seriously lacking between developing nations, or even it exists, is at a fringe level, and does not produce output of the desired and requisite quality. China and India are suspicious of each other's intentions in many domains and spheres and national-level collaboration between these two nations is likely to materialize in the near future; this will severely handicap scholar collaboration at an individual level too.

Another interesting case in point is the Humboldt Foundation. The Alexander von Humboldt Foundation has done excellent work on cross-cultural research. It promotes international academic cooperation between excellent scientists and scholars from Germany and from abroad. It greatly serves the cause of developing countries as well. Every year, the Foundation grants more than seven hundred research fellowships and awards, primarily going to academics from natural sciences and the humanities. It allows scientists and scholars from all over the world to come to Germany to work on research projects as well, and encourages German scholars to go abroad via the Feodor Lynen Fellowships.

The Indian government however tabled in 2023 "The Anusandhan National Research Foundation Bill, 2023" in the Lok Sabha" In a bid to ensure a healthy and a vibrant research ecosystem, and also open up such research activities for the private sector in a more self-sustaining way. It also seeks to address all concerns arising from a low scientific output in India. It seeks to create a National Research Foundation (or NRF), which is positioned as an apex entity to provide high-level strategic direction of scientific research in the nation in accordance with the new National Education Policy (NEP) guidelines of 2020. The NRF Bill will also revoke the Science and Engineering Research Board (SERB) which was established in 2008. The NRF also seeks to promote inter-disciplinary research in India, and increase India's investment in R&D from 0.7% of the GDP to 2% of the GDP by 2030, particularly in the private sector. This is imperative given that the spending on R%D by countries such as the USA, China, South Africa and Israel is much, much higher. The percentage share of scientific publications from India is sought to be enhanced from the present 5% to 7% by 2030, along with the resultant and accompanying quality of output. The number of patent applications from India is also sought to be significantly increased, as it is at present, only a small fraction of that of China. In 2019, the Department of Science and Technology, the Government of India, launched a new channel called "India Science".for promoting science among the Indian public. This channel is complementary to

DD Science. However, social sciences have not matured to a point where they can play a role in cultural transformation.¹⁰

Many conclusions emerge from this data; we see horizontal collaboration manifesting and unfolding itself in five key areas in the immediate future, these being (a) Pure and basic science particularly social science research as it may vary widely based on context to context It can also prove to be an antidote to western ills such as over-theorization and ivory-tower intellectualism, careerism, feuds within a cultural context (as evidenced by the Battle of the Currents and the rivalry between Sigmund Freud and Carl Jung) or western elitism in science. Western intellectuals, scientists and scholars may, in the normal and ordinary course of affairs, may loathe to collaborate with scholars who seek to challenge western hegemony, and hence truly cross-cultural scientific endeavour and enterprise is a must with context-specific strategies conceptualized and implemented. A truly global approach to science can also help ideas gestate faster and gain widespread acceptance faster by reducing the latency time for the acceptance of new ideas (b) Various fields of applied science, particularly those impacting and benefitting society; changes to core scientific activity will have a ripple and cascading effect to applied science as well (c) Technology particularly which has a ripple and a multiplier effect on society, and positively and meaningfully impacts society as a whole (And is also suitably modified to suit the various needs of society such as language translation software and services) (d) Industry and industrial enterprise including cross-industry collaboration (e) The development of economic theory, praxis and economic developmental models, particularly attuned to the needs of emerging economies, all driven by local as well as global interests and considerations as a replacement for, or an addition to classical or neo-classical economic developmental models. These can easily be picked up by other developing economies, and suitably modified, extended, enhanced or localized. India can play a crucial role here, and must not act selfishly by providing its technologies to other developing nations. Social entrepreneurship is another new and interesting trend, and provides a win-win approach, but must spread its tentacles farther and wider, ideally to cover all the areas we had just mentioned.^{11 12}

This approach can be used in a wide variety of contexts and situations too. For example, we proposed and promoted the science of Anthropological Economics in a paper published by us in 2020. We had proposed that this approach should become core and central to the science of economics replacing the neo-classical tradition partly or fully. The study of mind-orientations, cultural orientation, mindspace, thought worlds and worldviews besides cultural remediation would be central to this paper besides other aspects such as the elimination of gender inequality and racism. We had also spoken about trickle up economics here as well as novel concepts such as econoethnography. As such we do now even know how the first world will warm up to these concepts. Besides language dynamics, we had also reviewed theories on the origin of languages, and we had called our new theory “The theory of epochal polygenesis”. This theory must also naturally and understandably be refined further based on data collected from different parts of the world as this is only a hypothesis, and exceptions actively sought either for incorporation into the main body of the hypothesis, or into supplementary hypotheses. The same approach would hold good for understanding the Indo-Europeanization of the world from a Central Asian homeland into outlying regions. Local knowledge in different regions culled through a horizontal collaborative approach would be most useful here, and not any western-inspired or western-derived monolithic models.

We had also proposed the symbiotic approach to socio-cultural change in two of our earlier papers, and these would eminently tackle socio-cultural change in globalized scenarios. However, exception handling is a must, and local expertise is indeed required in any field of social science to speak of; this can only be fruitfully acquired through a horizontal collaborative approach. Emic and etic perspectives of different kinds are also a must. Will men launch a feminist movement? Read our paper on cross-cultural research design (the paper on which the current paper is based) for more details.^{13 14}

We had also revisited the twin issues of racism and scientific racism in our paper on the Certainty Uncertainty principle. While adherence to the truth is of paramount importance and must override or supersede any other consideration, there are many factors that could explain the so called Race IQ divide, apart from the fact that IQ tests may

¹⁰ Popper, K., *The Logic of Scientific Discovery*, Basic Books, New York, 1959

¹¹ Introducing Anthropological Economics: The quest for an Anthropological basis for Economic theory, growth models and policy development for wealth and human welfare maximization Sujay Rao Mandavilli ELK Asia Pacific Journal of Social Sciences Volume 6, Issue 3 (April –June 2020)

¹² Unleashing the potential of the ‘Sociology of Science’: Capitalizing on the power of science to usher in social, cultural and intellectual revolutions across the world, and lay the foundations of twenty-first century pedagogy, Sujay Rao Mandavilli, ELK Asia Pacific Journal of Social Science, 2021

¹³ Articulating comprehensive frameworks on socio-cultural change: Perceptions of social and cultural change in contemporary Twenty-first century Anthropology from a ‘Neo-centrist’ perspective Published in ELK Asia Pacific Journal of Social Sciences Volume 3, Number 4 (July 2017 – September 2017) Sujay Rao Mandavilli

¹⁴ The relevance of Culture and Personality Studies, National Character Studies, Cultural Determinism and Cultural Diffusion in Twenty-first Century Anthropology: An assessment of their compatibility with Symbiotic models of Socio-cultural change ELK Asia Pacific Journal of Social Science Volume 4, Issue 2, 2018 Sujay Rao Mandavilli

themselves be somewhat misleading and may not isolate all factors. These factors could include factors such as mind-orientation, parenting, enculturation or acculturation, and cultural orientation besides, empirically-acquired knowledge, linguistic ability, and a reflex action acquired due to socio-cultural discrimination. People may not simply strive if they believe they have no chance of succeeding. We could even call the latter the “Comprehensive socio-cultural persecution complex”. This could also lead to an extended downward spiral and impact factors such as nutrition. We give this a name because this issue deserves to be studied a lot more deeply than it currently has been. Amy Wax and others have harped on the race IQ divide either directly or indirectly while there have indeed been amazing black success stories. Examples include Barack Obama, Malcolm X, Trevor Noah, Oprah Winfrey, Neil DeGrasse Tyson, Martin Luther King and others. We also request readers to read our paper on the Certainty uncertainty principle in its entirety because it explain our entire philosophy very succinctly. Can we draw Bell curves for “IQ” for “Blacks” and “Whites” (These terms work only in an American context), and see if they can be made to converge?

Latency time is often an inordinate time span from the time a new idea is gestated till it is more or less widely accepted. This elapsed time may be referred to as the ‘latency period’ for the acceptance (or even a structured and a justified rejection of ideas. This is found in most societies around the world, unfortunately sometimes even in more advanced ones. Reducing this latency period will lead to faster scientific progress, or “Scientific progress at the speed of light” as we call it. There are many ways to do this. The first would be to improve the education system on the principles we had specified in our paper on “Anthropological Pedagogy” and the “Sociology of science”. The second would be to build a robust twenty-first century intellectualism which should greatly serve to set the house in order. We had dedicated an entire paper to the idea of twenty-first century intellectualism. The latency time can be academic purely (i.e. Academics can take a long time to accept a new idea as it has often been observed). At other times, it can be non-academic; the public may take time to warm up to a new idea, and there may be wide variations across cultures. For example, people in developing countries may accept new scientific ideas a lot more slowly. Again, there may be a time gap between early acceptance of ideas, and more widespread acceptance of ideas.¹⁵

Academic activity in general could often lag behind practical applications of technology, and progress in social sciences can lag behind progress in the physical sciences due to a smaller number of scholars (and culture-specific scholars being involved) as well as the absence of an industry-

academia collaboration. We had also discussed the idea of ‘inside out approach’ and ‘outside in approach’ whereby new ideas gain traction. In case of the former, specialists and academicians accept an idea first, and then spread it to the general public, while in the case of the latter, the establishment effectively implodes because it is left behind. Examples of the latter include the fate of the Nineteenth century school of Indology in the Twenty-first century. These would be akin to other types of lag like Robert Odgen’s theory of cultural lag. This latency period we believe, can be greatly reduced if science becomes a more global activity, and the ideas and ideals of the “Globalization of science” movement that we have been championing all along with multi-cultural perspectives, are accomplished. Horizontal collaboration among nations would be of great value here. Thus, we would be effectively be killing two birds with one stone. Thus, ‘Globalisation of science’ is necessary to achieve the objectives of ‘Isopedology’. This name means to equalize, or to put on an equal footing in Greek, and this term refers to the science of making things equal.

Rethinking Journal classification is also in the interests of a higher quantum of scientific output and more globalized scientific activity of a higher quality. Several years ago, a librarian at the University of Colorado by the name of Jeffrey Beall has published a list of “predatory journals”. This endeavour began in a small way in 2008, but had snowballed into a much bigger movement by the mid-2010’s, and was widely followed in many parts of the world. Not everyone was pleased with this idea, and this list led to several defamation lawsuits as well. There are several valid criticisms of Beall’s approach. For example, two librarians from the City University of New York by name Monica Berger and Jill Cirasella wrote that Beall’s views were biased against open-access journals from less economically-developed countries. Others such as Rick Anderson of the University of Utah also question the use of the term predatory. Also lamentable is that the quality of English used is often a criteria for classification, and this puts people from non-English speaking countries at a disadvantage. If the objective behind such endeavours is to promote high-quality science, they must be supported. If their objective is to stymie scientific progress in developing countries, or to promote and maintain the stranglehold and hegemony of science in developed countries, it must be criticized and vehemently and vociferously opposed, by all parties that are adversely affected or offended by it.

The problems with an over-simplified evaluation system are that they are highly misleading to the public, that they deter researchers from various walks of life from publishing and contributing to science, and that they may reduce the quantum of scientific and scholarly output; Thus, good research may go unpublished and papers in languages other than English may go unpublished too. No approach or classification system must be proposed and followed that is detrimental to the healthy growth of science anywhere in the world. What must also be understood is that many well-

¹⁵ Redefining Intellectualism for a post-globalized world: Why present-day intellectualism is obsolete and why a comprehensive reassessment of intellectualism is required
Sujay Rao Mandavilli IJSRT, August 2023

meaning and well-intentioned scholars have problems in publishing in top-end journals. This is due to factors such as the high volume of papers received, low acceptance rate, bias towards scholars with academic affiliation, Bias towards scholars with higher academic qualifications, racism and ideology; western researchers may be preferred, anti-establishment scholars and scholars promoting new points of view (or novel ideas) may not be preferred as there is careerism. In addition, many high-end journals charge hefty publication fees too. Thus, we propose that a comprehensive assessment mechanism be enforced and put in place. Factors to be assessed would include factors such as the financial backing of journal, academic backing including the editorial board and advisors, the quality of the review process, indexation, target audience, citation index, plagiarism check, generation of DOI's etc. Journals can be ranked from 1 to 10. There should be concept of predatory journals. Journals must be encouraged to increase and improve their ranking based on a carrot and stick approach. Thus, any journal can become a high-end journal in a matter of a couple of years, if it follows the proper editorial policies, and adheres to quality control.

A truly cross-cultural design can benefit many other fields of scientific inquiry too. For example, the Out of Africa theory may have been based on an anti-racist tenor and rhetoric, but other researchers may be quick to point out that this approach is over-simplistic. India owes a lot to the west in Indology and Indus archaeology. These countries promoted a scientific study of the history of India's past when local expertise in this regard was lacking. However, many western researchers often naively superimposed over-simplified models of understanding of Indian history, triggering a mini-rebellion of sorts there. Gregory Possehl, though a competent and well-meaning Indus archaeologist, does not appear to have collaborated with the locals and exhibited a patronizing streak. He does not appear to have understood the working of India culture in its entirety either.

Another interesting observation is that most primates and apes such as Orangutans, Chimpanzees, Gorillas, Rhesus Monkeys, Gibbons, and many Lemurs are predominantly herbivores, frugivores, or foliovores. The only notable exceptions are Lorises, Tarsiers, some other species of Lemurs and some other primates. While most pre-primates may have been carnivores, it is likely that Neanderthal Man, Homo Erectus and Homo Sapiens began to eat a predominantly carnivorous diet in order to gain more strength to hunt. They used their power of discretion to eat meat, but more interestingly many people in the last couple of decades even in the west are becoming vegetarians. Would people from different cultures have different perspectives on this? Can each and every paradigm in science be revisited from a multi-cultural perspectives to see if different perspectives exist?

Horizontal collaboration can have other benefits to in areas such as automotive safety and product design, as accident data specific to a region is built to automotive design

thus enhancing automotive safety. The fundamental premise behind this is that accident patterns vary from region to region. Human anatomical measurements may vary from region to region too, and region specific data must be built into product design. This would impact other fields such as ergonomics too. Eurocentrism presents an epistemological problem too. For examples, many theories such as Cournot's Oligopoly theory and Chamberlain's Oligopoly theory may have been based only on limited observations, and some laws as proposed in Economics may not be universal laws at all, as may also be other postulated laws such as the Zipf's law. Thus, every law and theory on earth (many of them extremely old ones) needs to be revisited based on the concept of exceptionalism. Every theory or law proposed this far also needs to be constantly evaluated and reevaluated to verify if there is any bias, prejudice or vested interest involved, or whether they make sense from a universal and a global perspective. Cross-cultural perspectives on a wide variety of issues both scientific and non-scientific must also be obtained for the record, and a comprehensive database of sorts built up. These could provide meaningful inputs into policy making and exercise including pedagogical development. To achieve and accomplish all this, horizontal collaboration can be a vital tool.^{16 17 18}

IV. CONCLUSION

In a previously published paper on cross-cultural research design, we had emphasized the importance of cross-cultural research design in various fields of scientific activity. We had also underlined the importance of obtaining various types of emic and etic perspectives on various kinds of issues, and had also attempted to bucket cultures into various categories. In this paper, we have attempted to build on those concepts, and have called for a horizontal collaboration among nations as well, particularly among developing nations. The concepts proposed in this paper would hold good for virtually any branch and field of scientific activity, though they assume added meaning and importance for various fields of the social sciences where culture-specific data plays a major role in analysis. Horizontal collaboration must never replace vertical collaboration entirely, but only complement it in places where such collaboration makes sense or is meaningful. There is no

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

¹⁷ Making the use of Inductive approaches, Nomothetic theorybuilding and the application of Grounded theory widespread in the social sciences: A guide to better research and theorization in the social sciences Sujay Rao Mandavilli IJISRT May 2023

¹⁸ Addendum to "The Indo-Europeanization of the world from a Central Asian homeland: New approaches, paradigms and insights from our research publications on Ancient India" which was published in Journal of Social Science Studies, Macrothink Institute, Volume 3, Number 1 in 2015

denying that western science has contributed greatly, and very often selflessly to human welfare, and developing countries must not be self-centric either. They must also bear in mind human welfare and human progress at all times, and must contribute to scientific activity in general. This also assumes added importance because the dividing line between developed countries and developing countries will become thinner and thinner as the years roll by, as economic performance of various nations also converges, and academic publications from all parts of the world increase rapidly.