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SOME THOUGHTS ON CURRENT KNOWLEDGE PARADIGMS AND THEIR IMPLICATIONS FOR RESEARCH ETHICS

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Abstract: This is the first of two papers in which the authors seek to explain and problematise the current moral and ethical deviations from ideal research ethics by examining the predominant humanist philosophical knowledge system that underpins the postmodern era and modern scientific research practices. Additionally, a causal relationship between knowledge paradigms, culture and societal behaviour along with societal products and societal instruments is proposed. The notion is that knowledge paradigms have the potential to influence the cultures of the people who adopt them. The culture which knowledge paradigms produce within a society in turn influences the instruments that said society generates, such as economic systems, power structures and policies pertaining to human co-existence/behaviour. This paper in two parts examines and compares the formulae for (ethical) knowledge generation that were used during the medieval, modern and current postmodern eras and the performative effects of the respective knowledge paradigms within those societies in terms of morality, ethics, geopolitics, scientific and existential inquiry.

Keywords: *linear economic growth, epistemic justice, epistemic authority, ethical knowledge generation*

1. INTRODUCTION

Various human civilizations have recorded significant milestones throughout history. In recent centuries, The Age of Reason and Science (also known as The Age of Enlightenment) saw growth in the intellectual movement during the 18th and 19th centuries following two centuries of intense colonial practices in the world – the hallmark of which was the Industrial Revolution – particularly in Europe and North America (Piper, 2018). This movement was a retaliation to the dogmatic interpretations of societal ethics, aesthetics, and knowledge that was widely enforced by fundamentalist religious authorities (Encyclopedia Britannica, 2019). The 20th and 21st century ushered in The Age of Globalization and the Digital Revolution which saw humanity transcend physical boundaries and immerse itself in a networking culture and economic co-dependence, a shift that has exponentially accelerated our development of humanity as a species. This development is evidenced in the scope of demand for resources and their related consumption, and the corresponding geo-political links between the countries where resources are located and those where resources are consumed. These links are influenced by supply-and-demand principles and/or historical ties, as well as potential colonial relationships of the past. In addition, the exchange of resources has been complemented with the exchange of experiences, thoughts and environmental management practices, to name a few examples.

Historians have dubbed this movement and the inter-linked character of the human existence and reality ‘Contemporary Humanism’, ‘The Humanist Movement’ or ‘The Humanist Revolution’ (Kristeller, 1978; Sharp, 2012, Harari, 2016) – a contemporary cultural and philosophical movement that gives new meaning to the human condition, which was previously provided by religious institutions of the time (Ehrenfeld, 1981). On this previous period of theism, Harari states that “traditionally, the great cosmic plan gave meaning to the life of humans”. (Harari, 2016, p. 221). This suggests that higher cosmic powers, such as a deity, or God if you will, was the moral authority that dictated what was desirable, moral and just for humanity and did/does so through ordained individuals and institutions.

By contrast, Humanism emphasizes and almost deifies humanity in the sense that humanity is expected to play the role of God and “[humanity] must draw from within their inner experiences, not only the meaning of their own lives but also the meaning of the entire universe”

(Harari, 2016 p.221). Authority empowers us to give meaning and ascribe purpose to things, ourselves and other phenomena, or as Harari puts it “Whoever determines the meaning of our actions – whether they are good or evil, right or wrong, beautiful or ugly – also gains the authority to tell us what to think and how to behave” (p.222). With this in mind, Humanism seeks to navigate the human condition by using other human beings, their experiences and practices as the nexus of meaning and authority on moral, philosophical or aesthetic uncertainties (IHEU, undated). This will have or even has implications for knowledge generation and research ethics where humans, namely researchers, interact with other humans, i.e. the research participants. Uncertainties and realities of individual experiences of human participants, as well as the researchers, will have an influence on power relationships in the research space, as well as the related ethical implications.

Jeffries-Martin (2015) illustrates an example of a situation where previously, a moral and ethical transgression such as theft was primarily addressed by religious clerics such as a priest during a confession and subsequently atoned for by performing rites or rituals stipulated in religious texts. However, during this Humanist era, meaning is derived from extensive examination of one’s feelings given an individual’s capacity to self-reflect or utilize another person’s experiences, wisdom and advice to navigate their situation and find personalized answers to their internal questions (IHEU, undated). This is essentially the role of today’s psychiatrist in that the goal is to provide their patients with intellectual tools and a guided line of questioning that enables them to examine their feelings and convictions with more clarity. Thus, meaning is derived intrinsically from the self rather than from some extrinsic divine force. The sense of individuality and the ability to self-reflect on one’s surroundings will play a key role in one’s own perception of the world, one’s own surroundings and the relationship between a particular human being and other members of a society. These relationships will be of critical importance in the generation of knowledge, as it is seen as the driving force behind pushing the boundaries of human endeavour and knowledge itself. This pushing of boundaries will be linked to the ethics of right and wrong, right and wrong conduct and the right and wrong interpretation of knowledge, its origins and ownership, as well as the epistemic authorities in relation to the knowledge around one’s self (see below).

Further to the above, what can be said for the Humanist movement is that it restored faith in humanity in the sense that human agency and

autonomy are now seen as the foundation of the human experience (Keeling and Lehman, 2018). Similar changes can be observed in the way the education system has changed over the same period. Before the Age of Enlightenment, meaning and authority were externally derived, and education was aimed at developing persons that were well adjusted to the times. This involved participating in religious ceremonies (Sunday Mass for instance), memorizing religious scripture, undergoing a rite of passage such as baptism and obeying various other norms. The Humanist movement pushes for an education system that teaches people to think for themselves, that is, to develop critical thinking skills along with value and sensitivity for what it means to be human (Sharp, 2012). Before the Age of Enlightenment, belief in God and the involvement of a divine entity in human life was seen as a necessity for a complete human experience and was non-negotiable. Belief in and devotion to a supernatural entity such as God was necessary to experience the good and positive aspects of existence and deviation or transgression came with clear consequences, both divine and societal. This system of checks and balances meant that people were not willing/able to denounce their faith in religious institutions due to the heavy price of losing the source of meaning and authority in their lives (Lamont, 1997). This is an example of a deontological set of values and deontological ethics. In comparison to the Humanist paradigm of ethics, the boundaries and ethical impacts of knowledge derived from a deontological paradigm are more likely to be clearly defined in terms of values, beliefs and actions taken by “researchers”.

From the Age of Enlightenment came the so-called ‘discovery of ignorance’, which is a phrase that has been used by the scientific community since the beginning of the Scientific Revolution and describes the period in history when scientific inquiry had overtaken religious ideology as the foremost socio-cultural paradigm (Taylor, 2019). Scientific inquiry into the various facets of our social existence as well as the inquiry into the natural world, has led to several discoveries that have helped accelerate human development over the last four centuries, most notably by addressing the issues that plagued human civilization prior to the 18th century such as disease, war and famine (Taylor, 2019). For example, the discovery of antibiotics and the subsequent strides in biomedical science were the result of an inquiry into the etiology of infectious disease and human pathology (Aminov, 2010). Similarly, the development of the automated industrial process was largely as a result of the inquiry into computer sciences and engineering. Taylor (2019) asserts that admitting

ignorance inspires scientists to look for new/unknown knowledge. This knowledge-generating system was based on collecting empirical observations about the human condition and the phenomenal natural world, and then interpreting them using mathematics or other such cognitive tools (Taylor, 2019) – an approach to knowledge generation that will be discussed in the sections below. Said approach encompasses the generation of knowledge in a wider context, not just in a “limited space of scripture” and by a wider community of epistemic authorities, “ethical knowledge-generators”, such as scientists and not just religious authorities.

The evident social, political and economic benefits that humanity has experienced as a direct result of the scientific approach of inquiry (into both the human condition and the natural world we live in) meant that adopting Humanist ideology came with none of the same consequences for atheism or the arguably blasphemous belief in humanity as a moral authority, i.e. those consequences being the exclusion and isolation of the individual from the religious community/society. Humanism holds that human beings are capable of experiencing emotional, moral, political and aesthetic fulfilment that makes for a complete human experience without the belief in or need for divine intervention (American Humanist Association, 2003). However, the question that then arises is how Humanism justifies its epistemic and socio-political authority to provide meaning to our lives? Ethically speaking, this constant pushing of the boundaries of knowledge is what enriches a human being and the society s/he is part of; it is an individual and collective process made of permanent exchanges which, in turn, generates knowledge by itself, thus enriching the human experience beyond the scope of what religion and any deontological space (grounded on extrahuman entities) would ever provide.

2. HUMANISM'S EPISTEMIC AUTHORITY

Contemporary epistemology attempts to distinguish between two main types of authority, namely, epistemic authority (also called theoretical authority) and practical authority (Spaić, 2018). The former is said to give reasons for a belief while the latter provides reasons for actions (Spaić, 2018). For the sake of explaining the belief in Humanism as a philosophical ontology, the focus here will be placed on its epistemic authority. Humans, by nature, are social creatures, and as such, there is a proclivity for us to form our beliefs and belief systems through social interaction and

societal influence. However, the societal aspects of belief/knowledge formation cannot inform us whether our doxastic practices (the practice of forming our beliefs) are reliable or justifiable (Spaić, 2018). Reliable doxastic practices are those that produce evidence – evidence which in turn is used to justify reasons for belief(s) (Spaić, 2018). This is to say that another individual or group of individuals with a shared opinion on a matter cannot be substituted for a belief or knowledge-forming practice/system that has an inherent ‘verific propensity’ or natural inclination to verify said knowledge/belief. Thus, the question becomes, does Humanism have the verific propensity to justify its doxastic practices? In the context of research ethics more specifically, does the humanistic position allow for the knowledge to be generated as a social compact or are individual members of society holders/generators of the knowledge in their own right only?

The socially influenced (or ‘people-reliant’) nature of an individual’s knowledge/belief system means that authority can be understood in two forms, illustrated by the following example;

*“Knowledge about a matter, ‘M’, that person ‘Y’ gains from the utterance of another person ‘X’, is said to be second-hand knowledge and so person X is said to have **fundamental** epistemic authority over person Y if person Y believes that ‘M’ is true from sheer utterance by person X. However, if person Y believes that ‘M’ is true because of some characteristic or distinctive trait of person X which makes person Y believe that person X is reliable, then person X is said to have **derivative** epistemic authority over person Y” (Foley, 1994).*

To simplify the concept, an epistemic authority can be understood as a form of expertise on the matter. In matters relating to traditional medicine, it is justifiable to say that a traditional doctor has this ‘expertise’ and therefore has a claim to being considered an epistemic authority. Conversely, as a patient (or individual with relatively less knowledge on illnesses and traditional medicine) it is “logical to confer derivative epistemic authority” to the indigenous expert (based on the text by Spaić, 2018). A similar example of this derivative epistemic authority is from the news. News reports about incidents we have not witnessed lead us, the viewers, to form a trust in the information which originated from the reporter, however, this knowledge about the incident/report is to be considered second-hand and “it is thus rational to give *prima facie* derivative epistemic authority to the news reporter” (Spaić, 2018). However, in the instance that eye-witness accounts contradict the information

given by the reporter, it is justified to change our opinion on the incident in question since the eye-witness testimony is likely more reliable and, as such, we defer epistemic authority to the eye-witness (Spaić, 2018). Spaić (2018) asserts “if we have good reasons to believe that another person is more knowledgeable about the issue than the first person we trusted, we can justifiably defer to the other person’s opinion” – the “other person” in the above example being the eye-witness. He goes on to state that “this is in line with our intuitions and our practices of forming beliefs” (p. 149). As a result, epistemic authority will have a significant role to play in research ethics. This will be linked to the knowledge dynamics in societies that are dealing with the aftermath of colonialism, historical injustices and lack of transparency and justice in knowledge generation. More particular aspects of epistemic authority are discussed below.

An important feature of epistemic authority is that it exists only if a person, Y, explicitly acknowledges the authority of person X. Furthermore, that said acknowledgment is not and cannot be forcefully taken by person X, rather it is voluntarily given by person Y (De George, 1970). However, the definition of epistemic authority might be fluid in the research process and during knowledge generation, based on particular settings. This brings us to the understanding of how epistemic authority is “formalized or institutionalized” in modern society. De George asserts that: “an epistemic authority is formally produced in society as being certified as such by peers where s/he acts as an epistemic authority for subjects of epistemic authority only if accepted by them” (p. 202). However, as seen in the example of the news reporter and the viewer, the relationship does not necessarily have to be at the peer-to-peer level for the viewer to defer epistemic authority to the reporter (Fricker, 2006). However, the statement by De George shows that the derivation of epistemic authority is perpetual in that authority is derived from the same source that it subjects its authority upon, that is other less knowledgeable/skilled human beings. Therefore, it can be inferred that Humanism derives epistemic authority from and subsequently subjects it to, the human subject itself.

3. A FORMULA FOR KNOWLEDGE (GENERATION)

Several knowledge-generating systems have existed over the millennia to provide the societies of their time with information to best navigate

their lives and environments. In medieval Europe, knowledge about human existence and the natural world was highly influenced by the authority of religious institutions. During this period, “writing was [in the form of] scripture” (Jeffries-Martins, 2015). Medieval society was such that a religious text was viewed as a source of truth; but at the same time this knowledge was accessible to only a small group of educated/literate people within the aristocracy. This meant that these institutions could place themselves at the heart of the knowledge-power structure by claiming to possess fundamental truths about the human experience – a truth which was located in scripture, and scripture only few could access. Additionally, by enabling only select individuals such as clerics and scholars to become epistemic authorities, knowledge was centralized and hierarchical – most notably in the way that the illiterate laity was subordinate to the literate clergy, therefore, the epistemic authority on matters about the human condition was naturally conferred to predominant religious bodies. Therefore in the research ethics it is important to maintain cognisance of the “knowledge community”, i.e. the owners and generators of knowledge, the knowledge users and the consumers of the outcomes of the knowledge application. Access to knowledge will depend on the context and the generation paradigm.

Harari (2016) describes a formula for how knowledge was derived during the medieval period and is as follows in Equation (1):

$$\text{Knowledge} = \text{Scripture} \times \text{Logic} \quad (1)$$

In Equation (1), *Knowledge* (in each formula) is understood to be the consolidation of true information about the phenomenal world (Bolisani and Bratianu, 2018). *Scripture* refers to the religious text or canon in question (such as the Bible or the Torah) and *Logic* is the ability to use methods of reasoning (such as the process of elimination for example) in order to come to a valid conclusion based on the examination of the available data (Collins dictionary, 2019).

Going by this formula, knowledge is obtained from religious scripture and logical deduction of the canon. The formula is structured as a multiplication due to the co-dependency of the parameters. If one’s logical value is zero, then no amount of reading scripture will provide knowledge that is truly understood; while if one has no knowledge of scripture, then no amount of logical deduction can lead to knowing what is unknown (Harari, 2016). An example of this is how Christian academics of the

time attempted to understand the shape of the earth from anecdotes in the Bible. One such instance is seen in Job (38:13) where it is said that God can “take hold of the earth’s edges and the wicked as shaken out of it” (Bible Hub, 2004-2020a), leading scholars to deduce that the earth is flat and square similar to a dish-cloth. Similarly, Daniel (4:10-11) states that, “the king saw a tree of great height at the centre of the earth, reaching with its top to the sky and visible to the earth’s farthest bounds” - “a notion that scholars at the time used to make inferences about the shape of the Earth in that for visibility to reach *earth’s farthest bounds* a sufficiently tall tree would require a flat earth and not a spherical one” (Bible Hub, 2004-2020b).

From an ethical point of view, Equation (1) indicates that access to the deontological texts such as the scripture was critical to the generation of knowledge. Exclusion of a large part of the population, i.e. non-clergy, resulted in the knowledge not being distributed in accordance with the principles of justice. In addition, the limited nature of the deontological source, i.e. the scripture, resulted in the limited ability of the scripture, as well as other deontological and religious texts, and the derived knowledge system to ethically deal with the reality of the world, as the humanity started to push the boundaries of knowledge.

The Age of Science and Discovery proposed a different method for developing knowledge about the phenomenal world. The ‘scientific method’ as it has come to be known, is based on the empirico-analytical paradigm (Higgs and Titchen, 1995 p.522). Based on logical empiricism philosophy, the scientific method of inquiry relies on observation and experimentation to acquire data which is turned into information. This information is used to help make deductions/come to conclusions about events in the world we live in (Creath, 2011). Higgs and Titchen (1995) assert that according to empiricism philosophy, “knowledge is discovered and justified on the basis of the empirical process, which is reductionist, value-neutral, quantifiable, objective and operationalizable” (p.523). Knowledge is developed by collecting data from observed events and making sense of data using our cognitive faculties (Clark, 2012). Similarly, Harari (2016) asserts that empiricism was the guiding philosophy through the 18th- and 19th-century industrialization period and conceptualizes this knowledge-generating system using the following formula:

$$Knowledge = Empirical Data \times Mathematics \quad (2)$$

In Equation (2), *Empirical Data* is defined as the data acquired from observations and measurements rather than theory or belief (Guides.libraries.psu.edu, 2019). *Mathematics* is broadly defined as the combined science of deductive reasoning (inferences from a hypothesis) and inductive reasoning (inferences from experimental observations) that examines the relationships of measurements, quantities and shapes using numbers and symbols (Khan, 2015; AHD, 2019).

Equation (2) introduces a comparative justice and democracy into the process of knowledge generation and distribution. The collection of empirical data became more accessible to a wider community, i.e. naturalists and scientists were able to explore the natural world using the scientific method. As a result, the deontological paradigm of scripture was largely abandoned as a corner stone of knowledge generation, and the epistemic authority was expanded beyond the clergy and its related societal structures. Wealth of the knowledge base was also expanded, as empirical evidence provided a wider source material for knowledge creation and for solutions to problems previously unknown. Knowledge boundaries were pushed beyond the scope of the divine, the scripture and the power base of clerical deontology. The now opened linear path to knowledge generation had several ethical implications, which are discussed later in this paper.

In addition, the knowledge-generating formula in Equation (2) suggests that to gain truthful knowledge, one needs to collect empirical data on the subject and then assess the information with mathematical tools. Using the above example of the shape of the earth, if scholars in the Age of Enlightenment wished to elucidate the shape of the Earth they would need to observe celestial bodies like the sun, moon and other planets from various places on earth and then use trigonometry (a mathematical tool) to elucidate the shape of our planet and how it is organized in the solar system (Johns, 1959). The centuries to follow saw rapid development in the fields of biomedical science, bioethics, pharmaceutical research and evidence-based healthcare as a direct result of the widespread adoption of the empirical method of inquiry (Borry, Schotsmans and Dierickx, 2005; Garthwaite and Duggan, 2010; Salloch et al., 2015; Webb, 2018). As suggested by Higgs and Titchen (1995, p.523): “this paradigm provides the basis for the medical model”.

The medieval formula was less concerned with the ability to account for accuracy and verification about the universe and more concerned with navigating situations based on value judgements because the “predominant

religious authority of that era deemed that the most valued facets of the human experience were located in spirituality and its link to an afterlife and less so in an empirical understanding of the physical world” (Harari, 2016). During this period, religious institutions were the source of epistemic, moral and ethical authority (Herlihy, 1987). It is not to say that accuracy and verification did not exist during this period, but rather that the medieval knowledge systems ultimately relied on medieval axiomatics (in the form of scriptures and orthodox interpretations of the cannon) as opposed to using mathematical axiomatics to elucidate or interpret facets of reality.

In comparing Equations (1) and (2), a statement should be made here that both knowledge-generating paradigms have had their place in human history and pushing the boundaries of humanity’s understanding of the reality within which it existed. Ethical values/implications or impacts which can be derived or result from both paradigms of knowledge generation have often been in conflict with each other in the practical dimension of human life, as the understanding of the human experience and dimensions of knowledge have evolved. Ethical implications of these developments are important in the historical and current context of knowledge generation and the related power dynamics, as humanity is still defined through a combination of science, knowledge and spirituality. This combination is ethically important from a research point of view, and more on this will be discussed through the rest of the article.

At the beginning of modernity, the middle-class and the bourgeoisie sought to replace the prevailing religious power structure of the era by developing and establishing the scientific paradigm and the modern form of research inquiry, that is, the dualistic and ontologically detached approach to knowledge generation where the subjective inquirer is the sole epistemic authority of the inquiry and the objects of inquiry (resources or indigenous knowledge) are a utility that can be justly exploited to serve and develop humanity. It is also crucial to note that, whether intentionally or not, the scientific paradigm has discounted and prevented many, if not all, other forms of knowledge generation and ways of thought from becoming mainstream within the global society. It is so deeply entrenched in the fabric of modern society that any form of knowledge that is developed from or is a result of other systems of knowledge, such as African metaphysics, is discounted and dismissed as being inaccurate and unreliable, as is the case in today’s world with indigenous/traditional medicine systems. This exclusivity has established a knowledge hegemony where

the modern scientific paradigm, which was/is typically a Western dominant knowledge system, is revered for being the more progressive system of inquiry at a global level. Additionally, this hegemony implicitly associates knowledge, authority, social progress, development, morality and ethicality with Eurocentricity – a dangerous notion that runs the risk of placing moral and epistemic authority within the hands of previously colonial countries and their linear/exploitative system of research inquiry.

This dominant association to Eurocentricity has the potential to marginalise voices outside of the Western-based scientific and academic institutions in knowledge generation. This arguably means that a shift from a Eurocentric driven knowledge-generation system to one more inclusive of alternative theories of knowledge generation is unlikely, which in turn stagnates the development of knowledge generation (and research ethics) and compromises epistemic justice (in potentially the same way that the lack of distribution and democracy in knowledge generation in the clergy did during medieval times). In the same way that Humanism was developed as an antithetical ideology to remedy this injustice, a wider scope of authority needs to be consulted or acknowledged, to produce a changed process of knowledge generation which benefits a more collective, and less hegemonic, conceptualisation of society.

That said, the scientific formula for knowledge (generation) from Equation (2) was and still is ideal for accurately quantifying unknown phenomena in our reality and continues to guide our civilization to new heights in terms of improving quality of life. However, it cannot make decisions on value judgments based on mathematical reasoning. For example, empirical data and mathematics cannot give one a reason for why the acts of biopiracy or appropriation of traditional knowledge and patent monopoly are morally and ethically wrong but can produce and support evidence as to the efficacy of a medication that is a product of the act of biopiracy. However, as mentioned above, authority, but more specifically epistemic authority, empowers us to give meaning and ascribe purpose to things, ourselves and other aspects of our reality. This authority also gives meaning, purpose and most importantly *value*, to natural resources such as indigenous medicinal plants and traditional knowledge and can simultaneously justify the ascription of meaning and value to the aforementioned entities by virtue of our epistemic authority being self-derived.

The value we as a society ascribe to things and people alike, and the judgments we as people (in our individual and collective capacities) make of their value (i.e., valuable or not valuable, good or bad, ugly or beauti-

ful) is based on our perceptions of these entities. These perceptions, in turn, are formed both by personal experiences and societal influences. Additionally, given that in this contemporary postmodern era the perceptions of the world are grounded largely on the Humanist-based Western paradigm of thought and knowledge generation, it is no surprise that we as human beings consider valuable those resources, materials and other humans that are able to serve personal interests or obtain some sort of self-serving/capitalist goal (Mohanty, 2007; Freudenberg, 2000). Therefore, and from an ethical point of view, the knowledge-generation formula in Equation (2) provides the researcher with a basis to collect empirical data and interpret it, but does not cater for the value placed on said knowledge (i.e. the morality of said knowledge generation, and the ethics of the process in which it was captured and interpreted).

As the modern era evolved, there was a growing consensus on how human values could/should not originate in nor be based merely on empirical/quantitative data. The prevailing empiricist/positivist approach to technological development in modernity saw that many of the advancements that humanity achieved in sectors such as agriculture, medicine, communication, energy, and transportation, almost always come with major drawbacks, and sometimes major disasters. The scientific formula for knowledge generation is yet to invent a method, technique or device that can detect and quantify qualitative data such as suffering, hunger/anger, cultural appropriation, sexism or racism, let alone propose definite solutions to solve them. Thus, there are limitations to the quantitative/empiricist approach to knowledge generation, in that the qualitative aspects of human existence cannot be obtained using the same mathematical axioms. Value judgments in the modern era (those actions we judge and deem as valuable/not valuable or moral/immoral) are not formed or governed by the same instruments, authorities, rules or laws that govern the empirical sciences such as the universal forces (gravitational forces, electromagnetic forces and weak and strong nuclear forces), but rather, value judgments, according to the Western paradigm, are formed from anthropocentric, Humanist positions that make use of a subjectivist, self-justifying epistemic authority – an authority that enables us to ascribe value and gives meaning to our own lives, resources and other entities. Nilsson and Strupp-Levitsky (2016, p. 86) assert that “Humanism is associated with an anthropocentric metaphysics, a subjectivist epistemology, and moral intuitions, values, and aspirations pertaining to intrinsic preferences and the pursuit of human well-being.”

The modern scientific paradigm first emerged within Europe and is thus thought to be predominantly Western in its genealogy. Ethnocentrism has been defined by Baylor (2012) as “a cultural or ethnic bias – whether conscious or unconscious – in which an individual views the world from the perspective of his or her own group, establishing the in-group as archetypal and rating all other groups with reference to this ideal” – “which had been observed as a strategy often used in the colonial conquests by (white) imperialists in their interactions with indigenous “civilizations, cultures and societies” (Baylor, 2012). These colonial powers did not seek to integrate with local societies and their ways of life but rather sought to establish a hegemonic system of knowledge generation, morality and ethicality based on the premise that civilization and development was situated within the Western paradigm and the colonized African/Asian population was uncivilized, ignorant and in need of guidance, effectively making any non-white ethnicity inferior.

Baylor (2012) portrays a very neutral definition of ethnocentrism, making the premise about personal or cultural bias as opposed to highlighting the power asymmetry within the geopolitics of the colonial era. Being black/non-white during this period meant that one formed part of the ‘human capital’ that the colonial economy so heavily depended on, in the form of slave labour. Conversely, being white/European meant that one was part of the colonial system that benefited from the ownership of other human beings. Colonialism was aimed at establishing an ethnocentric system within the occupied territories, where the literal value of human beings was hierarchically centred. As a result, the state of affairs during the colonial era was essentially racially/ethnically binary where the white European imperialists were superior to the non-white, indigenous populations they colonized. However, contemporaneity and the Humanist era offer a different ‘centrism’, namely anthropocentrism, which instead of being centered around fascist ideology about race or ethnicity (colonialism since 1500) and the interpretation of human existence through the Western imperial paradigm, it is focused on interpreting the human condition and the experiential/phenomenal world in terms of subjective (human) experiences and exclusively from that perspective.

Within modernity, we saw the emergence of Humanist forms of philosophy and ideology: initially, a form of Humanism against medieval forms of domination and supremacy, but subsequently, Humanist notions and concepts were implemented in society to justify linear and hierarchical forms of exploitations (men on men, men on women, men on children,

men on nature, etc.; Grey, 1998). After centuries of colonization, the subsequent independence of these now-sovereign nations (from 1950 until today, obtained through anti-colonial political activism and/or active rebellion and establishment of local governments) has, to an extent, prevented the perpetuation of the same violent, systemic racism and ethnocentrism of the contemporary global context; however, this is seen to have transformed to a less 'violent', but equally if not more harmful, neocolonial model that is observed and practiced in today's world. In other words, value and meaning, according to Humanist philosophy, is found and constructed within human subjectivity as opposed to nonhuman objects, whether natural or transcendent (atoms, gods or heaven, for example).

A similar binary relationship, as the one mentioned above, is observed within Humanism, as described by the Cartesian ontological separation of man and nature, where man is superior and subjective and nature is subservient and objective (Haila, 2000). Descartes was also famously cited as having captured the essence of the metaphysics of the modern Humanist era with his declaration '*Cogito, ergo sum*' or '*I think, therefore I am*' – a system of metaphysics that has shaped the modern world as we know it by declaring that the interests, aspirations and endeavours of humanity are a priority (including prioritizing human-human relationships) and are of more importance than any of the other relationships we have with different entities in our reality (Treanor, 2006). Over time, this anthropocentric system of thought and knowledge generation has formalized itself within global society as capitalism, linear economics and consumer culture. Additionally, the malpractices that are a result of abusing our self-derived epistemic authority have materialized within formal institutions such as Big Pharma and commercial academia where the widespread adoption of the scientific method of inquiry has situated the flagship of knowledge generation with scholars and academics and therefore the institutions that control or influence them – in other words, universities and corporate interest groups have become the arbitrators of knowledge and are simultaneously responsible for the malpractices that have resulted from this method of research inquiry such as biopiracy, bio-prospecting and traditional knowledge appropriation.

Humanism in the modern era accepts the scientific approach to acquiring knowledge relating to phenomena about the natural world but suggests a different approach, particularly for obtaining knowledge about the ethical/existential facets of human existence (Lyotard, 1999). Based on what Higgs and Titchen (1995) refer to as "*interpretive paradigms*,"

(p.523) the Humanist method of inquiry into existential phenomena is purely subjective and based on individual experiences of reality. This paradigm uses ‘meaning’ as opposed to ‘measurements’ to qualify data observations and rely on forming a more subjective relationship between research inquirer and research subject (Maruatona, 2013). Referring to existential knowledge, Kneller (1958) asserts that

“neither purely rationalistic nor purely empirical views are capable of internalizing human experience [rather] existentialist knowledge originates in, and is composed of, what exists in the individual’s consciousness and feelings as a result of his experiences likewise, the validity of knowledge is determined by its value to the individual” (p.58).

Thus, value according to Humanist ideology is subjective and the power to ascribe value resides with us human beings, through Humanist epistemic authority. This is not to say that values are a matter of personal idiosyncrasies and egos but rather that values are to be mediated and negotiated from individual levels to larger, more complex and collective human levels through forms of individuation and socialization such as the family unit, the community, the nation, etc.

Harari (2016) suggests that the experiences of an individual are central to how s/he forms knowledge about him/herself and by extension, the world around him/her, because Humanism understands, observes and interacts with the world from an anthropocentric-phenomenological position. This position informs our ethical behaviours and ultimately, how we understand/engage in ethical discourse. In order to conceptualize this ethical/existential knowledge-generating system, he proposes the following formula in Equation (3):

$$Knowledge = Experiences \times Sensitivity \quad (3)$$

Where *Experiences* are to be understood phenomenologically as the information gained by the human being from particular events/phenomena by direct or first-hand exposure to and involvement with said event or phenomenon (Dictionary.com, 2019), phenomenology deals with the study of phenomena within reality but particularly how we as human beings experience reality and give meaning to things within it. Smith (2003) asserts that

“accordingly, in the phenomenological tradition, phenomenology is given a much wider range, addressing the meaning things have in our experience, notably, the significance of objects, events, tools, the flow of time, the self, and others, as these things arise and are experienced in our life-world”.

Humanism, in its utilitarian form, is what became successful on a global scale in modernity as it was drawing on the Cartesian split between subjects and objects (in philosophy) and drawing on technological achievements (in [geo]politics, that is colonialism) – at the same time another form of Humanism, one based on the interpretative/existential understanding of reality, was trying to hegemonize modernity and establish itself as the dominant knowledge paradigm in world.

Sensitivity can be broadly defined as the degree to which an individual can perceive, process and/or engage with a particular event or a certain matter of interest using their sensory faculties such as vision, touch, hearing and even intuition and cognition, to interpret and/or give meaning to events and experiences in their life (Randerson, 2015). This is in contrast to the idea of desensitization, where repeated exposure to a certain experience leads to a decreased somatic, psychological, or emotional response to a catalyst (Patel, 2016). For example, sympathy and empathy for another individual’s circumstances is a product of sensitivity, while apathy is a product of desensitization to an event/experience. Going by this formula, the more sensitive, receptive and sensationally engaged we are with our (human) experiences, the more knowledge about ourselves and other individuals we can acquire, and this knowledge can, in turn, inform decisions on the ethicality of conduct towards human beings. As a result, Equation (3) provides a paradigm that can capture the ethical dimensions of knowledge generation and the epistemic authority in relation to knowledge generation.

In bioethics, for example, at the end of World War II, information and knowledge about rampant and morbid human experimentation committed by Nazi scientists on civilians and prisoners of war, led to the development and adoption of the Nuremberg Code – a response to the global experience of human suffering at the hands of an ethnocentric ideology and its medical malpractices. A move that was arguably evoked by universal sympathy and empathy for the victims of the war and its survivors. Sensitivity to phenomenal/existential events such as human suffering (and the responses to it) have consistently been prioritized over the experiences, the well-being and general existence of other entities in

our reality such as the environment, its natural resources, wildlife, and flora. The prioritization of the human experience, through Humanist ideology, has justified the misuse and abuse of these entities for the sake of alleviating negative existential events such as suffering and war by using them to provide positive experiences such as health, political stability and economic prosperity, much at the expense of the other facets of our ecology. The (ethical) knowledge we acquire/develop about our world as a result of the Humanist and utilitarian, anthropocentric understanding of experience (illustrated by the above formula), will undoubtedly be anthropocentric itself, because the most valuable experiences are those that belong to humanity, thus the knowledge developed from it will only benefit humanity. It is here that we see the crucial step that transforms experience from its modern understanding, that is, non-subjective experience being the only important data admissible to produce scientific knowledge and scientific authority, to its Humanist/postmodern meaning, in that sensitivity must be part of (scientific) experience in order to produce (ethical) knowledge and (ethical) authority.

The anthropocentric knowledge and benefits from knowledge generation will have multiple ethical angles which need to be mentioned here. The “focus” of knowledge on humanity and human well-being is still relevant and important today. This is the case as many parts of the world contain populations at risk, who face social, economic and other types of vulnerability. Various types of inequality and vulnerability must be eliminated and this can arguably only happen if humanity benefits from the knowledge generated under a humanistic ethical paradigm. However, the considerations beyond the benefits of knowledge for humanity must be taken into account the more humanity, its knowledge generation and the “benefits of human knowledge” start impacting on socio-ecological systems.

As discussed above, Humanism derives its authority through human experience. Paradoxically, meaning is also derived from the phenomenological interpretation of individual experiences. Thus, both meaning and authority are derived from the same source, namely, the human experience, understood in its ethical embeddedness (Smith, 2003). This creates a situation in which human action is ascribed meaning and authority by virtue of Humanist, self-derived epistemic authority, providing human societies with a form of self-justification of the ‘morality’ or ‘correctness’ of their choices. Mauthner asserts that Humanism is a “philosophical position that is anthropocentric and believes in human exceptionalism;

that is underpinned by an essentialist ontology” in which the world and its entities are understood to be fixed, unchanging, pre-emanating or ‘naturally given’” (Mauthner, 2019, p.8). Understanding the world and its entities as “naturally given” and ontologically separate from humanity, perpetuates the Cartesian, dualistic separation of mankind and nature where the former is a subject capable of experience and consciousness while the latter is objective and void of agency or as Mauthner puts it, “naturally given” (Mauthner, 2019).

In reference to Humanism, she goes on to state that “human knowers can discover foundational truths through the application of reason” and that “Humanism subscribes to a hierarchical and dualist distinction between facts and values in which truthful, certain or factual knowledge of the world is separate from, precedes and provides support and justification for, further derivative knowledge such as moral and ethical claims” (p.8). According to Mauthner, factual knowledge (or rather empirical knowledge) is separate from value-based (ethical) knowledge, and furthermore, knowledge about moral and ethical phenomena is derived from, secondary to and simultaneously justified by empirical/factual knowledge. However, the inconsistency is that different power structures govern knowledge drawn from empirical sciences and knowledge of value-based/ethical judgements – in that empirical knowledge is governed by natural laws and the laws of physics, while the authority governing moral, ethical and/or value-based judgements (according to Humanism) is the Humanist’s self-derived epistemic authority (Mauthner, 2019). From what Mauthner (2019) suggest about the nature of Humanism, it appears that the Humanist knowledge system seeks to use or apply reason (the empirical method) to discover truths about the phenomenal world but aims to understand (and maybe even quantify) the otherwise unquantifiable, qualitative aspects of human existence such as morality, justice and ethicality by simply deriving these facets from quantitative empirical knowledge. However, as stated above, factual, empirical knowledge is not governed by/does not possess the same authority/power structures as ethical/value-based knowledge systems and therefore cannot simply be derived from the same epistemic source.

This contrasts to a time where the ethicality, morality, correctness of a way of life or particular decision was determined by a deity. The source of epistemic authority has shifted from something outside humanity to something inside humanity which has altered our perception of ourselves, our understanding of our place in the world, our societal practices and

our loyalties in terms of what we value enough to treat with respect and dignity. Humanism pledges loyalty to the human agenda above all other forms of relationship that exist within earth's ecology and in the post-modern consumerist era, the needs of the human race are prioritized over ecological networks and extinguishable resources. Thus, the consumerist society has brought the epistemic anti-authoritarian shift to the extreme, in the sense that the only source of legitimacy has become the atomized individual and their libidinal investments.

4. CONSUMER CULTURE AND THE HUMANIST INFLUENCE

At its core, Humanism is about growth, primarily at the personal level, where our passage through life involves 'growing pains' and gradual maturation, which encompass a spectrum of human experiences and associated emotions ranging from love to hate or from fear to compassion and everything in between (Lamont, 1997). Our sensitivity to these experiences and emotions can also grow and mature, which can dictate the degree to which we engage with them and ultimately, how much knowledge we can acquire/develop from them. This is an accurate portrayal of the Humanist movement, as it was at its inception largely geared towards human positivity and self-affirmation (Lamont, 1997).

However, despite the evident benefits the movement has brought to the development of our species in terms of science, culture and art, there is a subtle yet insidious manner in which it has influenced the way we view ourselves and our place in the larger universe. Humanism places human beings at the top of the ontological pyramid while the experiences of all other life-forms are of secondary importance and are interpreted in terms of human experience. Nowhere is this more profound than in our current consumer culture, a phenomenon that is based on Humanism and Humanist ethics. Consumer culture seeks to satisfy personal urges and desires by suggesting that possessions, goods and services (often material) can provide happiness at a personal expense which is usually in the form of financial costs – "the demand side." Additionally, the systems providing these satisfactions – "supply-side" –, must also be efficient and equally zealous as the demand side in order to be on par with the requirements of the consumer. This meant that only one thing could sustain the culture of consumerism and that is economic growth, a similar parameter that is necessary for Humanist development but extrapo-

lated from personal growth and applied to the larger and more interdependent system of human beings: the economy. This consumer culture, which has been the economic theme of the last century, delegitimizes all other experiences that do not contribute to the satisfaction of human desires and the actualization of a full human experience, such as conservation and community endeavours which may limit the number of resources in the biosphere to which society has access.

As far as access to resources goes, before the Age of Science and Industrialization humans had become accustomed to viewing the world, its resources and combined economic potential as “static” in the sense that if one person’s wealth increased it meant that another’s decreased; a phenomenon that has come to be known as the ‘zero-sum fallacy’ (PovertyCure, 2013). This view was based on the idea that during the Middle Ages, access to resources was significantly less than what it is today, and economic growth was not sought after (or even considered necessary) as avariciously as it is now. Religious institutions during that period aimed to solve humanities’ issues by either redistributing the existing and finite resources here on earth, where one person’s gain meant another’s loss, or by promising abundant and infinite resources in the afterlife.

The Humanist belief is that economic growth is paramount to solving humanity’s most severe crises such as poverty, disease, famine and war, and this belief is evident throughout the socio-political and socio-economic facets of our postmodern era. For example, in many of today’s democratic countries, political parties whose socio-political agendas promote economic growth are often more popular than those whose main objective is the moderation of the current consumerist system or promotion of conservative economics. Rwandan President Paul Kagame and his Rwandan Patriotic Front (RPF) party have guided the country from the horrors of genocide to economic and political stability in just 25 years with promises of further economic development. His policies have been so successful that he has been elected to serve a third seven-year term in office (Howard, 2014). Japanese Prime Minister Shinzo Abe, when taking office in 2012, vowed to pluck Japan out of decades of economic decline and did so with such success that his methods have been called ‘Abenomics’ (JapanGov, 2019). Late Ethiopian Prime Minister, Meles Zenawi promised and delivered economic growth and development to the Ethiopian nation during an era of famine and extreme poverty, making him widely popular amongst various ethnic groups. His achievements have been heralded long after his death, despite his legacy consisting of

several human rights violations towards members of the press and political opponents (Mohammed and De Waal, 2012).

These examples are meant to illustrate that we as a society value, more than anything, the opportunities, security and even the luxuries that economic growth can bring. Furthermore, we have shown that we are willing to sacrifice moralities and sometimes even fundamental rights to achieve these desired economic goals. Harari (2016) draws parallels between the postmodern era and the Middle Ages in that during the Middle Ages, deities and the religions they bestowed on humanity were the moral and political authority on all matters pertaining to human existence. Humanism and the postmodern era has human beings playing the role of God, the role of 'religion' is free-market capitalism/consumerist economics and the role of the 'devil' is anything that hinders economic growth, e.g. the preservation of equality in the social sense, along with efforts in ecological and conservation sense.

As stated in the ethical implication of the anthropocentric production and beneficiation of knowledge, the "humanistic focus" and the linear paradigm of resource exploitation and consumer culture have assisted the worldwide containment and decrease in risks to humanity and its related vulnerabilities. However, increasingly the consumer culture and linear resource exploitation are also causing knock-on effects on socio-ecological systems. These knock-on effects impact the environment and indirectly also the human habitats. Environmental and natural resource management will both have ethical implications, and human actions with impact on the socio-ecological systems will have to be considered essential factors in the knowledge generation paradigms and equations which can describe them. Further, and most importantly, ethical consideration will have to be part of what counts as equitable access to and distribution of resources in the scope of human activities.

5. LINEAR ECONOMIC PHILOSOPHY AND THE ARK SYNDROME

The 18th- and 19th-century Industrial Revolution ushered in the culture of consumerism and high production output that is observed today, a culture which was adopted and accelerated by the age of globalization into the current Free-Market Capitalist (FMC) economy we all know and willfully or begrudgingly embraced. This has been dubbed the Lin-

ear Economy because the system involves extracting raw materials from the biosphere, processing them for human utility and then discarding non-recyclable waste back into the environment. It is a system that is heavily reliant on the environment to produce enough resources to sustain not only our current growth but also any future development as humans (Stahel, 2016). The limitations of this economic system are the obvious unsustainable nature of its processes. There is a finite amount of material resource available in the biosphere and the human population is growing at a faster rate than nature can replenish its resources (Sariatli, 2017). This beckons the question of sustainable growth and development.

Sustainable development is certainly not a new concept, nor has it lacked the opportunity for implementation in modern society. The United Nations Development Program (UNDP) in 2016 formulated and implemented Sustainable Development Goals (SDGs) which are aimed at achieving various socio-economic goals ranging from abolishing hunger and poverty, potentiating gender equality and economic growth, addressing climate change to environmental degradation and several others by the year 2030 (UNDP, 2019). Similar goals were set out in the Millennium Development Goals (MDGs) from 2000 to 2015, several of which aimed at moderating ecological damage, increasing conservation efforts and innovating with efficiency (Coonrod, 2014). Despite these global initiatives and their significant impact on society, the observed phenomenon is that sustainability and the linear economic culture of FMC are contradictory and cannot be practiced in harmony but exist in competition with one another.

As mentioned previously, Humanism can morally justify its unsustainable use of resources to achieve limitless growth, but the idea of limitless growth in linear economics implies the presence of inexhaustible resources – the two parameters go hand-in-hand. European imperialists understood this notion very well, that is to say, that in order to grow their economies and expand their power structures, they rationalized seeking resources outside the limits of their geographical boundaries and thus sought to colonize the resource-abundant territories of the African continent. The linear economic model and the related exploitation of resources was thus a result of ethically questionable practices. This needs to change as the knowledge generated and related to the linear economic model might have associated with its ethical conundrums. This needs to be changed in the future. More simply put, knowledge generation which supports the linear economic model and the exploitation of resources

requires a change – a change which can arguably be affected through the manners in which knowledge is generated.

The endless pursuit of access to and exploitation of resources has not changed in the contemporary age. Organizations such as NASA and SpaceX are constantly searching for planets and other celestial bodies that are abundant in mineral resources that we may one day harness and utilize here on earth, once all of earth resources are exhausted. Dr. Jeff Smith, Chief of the Science and Technology Projects Divisions at Kennedy Space Centre was quoted in an article by Amanda Griffin, titled *Tapping Resources in Space and the Community* as saying: “There are abundant resources on the moon, on Mars, and throughout our solar system but we need to challenge and inspire the next generation of space explorers to figure out how to get to those resources, collect them and then use them” (Griffin, 2017). This quote highlights two very important aspects of human development in the contemporary era; firstly the acknowledgment that resources on earth are indeed finite and exhaustible, and secondly, that future generations will undoubtedly have to carry the torch of human development forward and simultaneously deal with the consequences of the actions of previous generations.

An example of this development is our constant search for energy resources. The 19th and 20th centuries saw major oil booms across the world in countries such as the United States, Russia, China, Venezuela, Nigeria and various Middle Eastern nations such as Saudi Arabia, Iran and Iraq (CNNMoney, 2016). Consumption of fossil fuels and the resulting changes in atmospheric homeostasis have been the most significant threat to our existence in recent times. The evidence for climate change is irrefutable, yet this realization has not altered our consumerist culture, nor has it promoted rigorous change to our economic systems that are still highly dependent on fossil fuels. Global CO₂ emissions have only increased over the last 50 years (US EPA, 2017-2019) despite climate change and environmental destruction being key topics at Global summits such as the Earth Summit in Rio de Janeiro in 1992 and 2012, the Kyoto Protocol of 1997, the Copenhagen Accords of 2008 and most recently the Paris Climate Accords of 2015.

Current governments and industrial corporations can reap the benefits of appearing environmentally conscious while consistently defaulting on their commitments to prevent ecological collapse and do so by passing the real brunt of the repercussions to the future generation(s). This phenomenon of passing the proverbial torch is an inherently human trait that

psychologists have termed ‘bystander apathy’ or the ‘bystander effect’ – a socio-psychological phenomenon where a person’s willingness to aid a situation significantly decreases due to the presence of other people, often due to the assumption that someone else will intervene (Hortensius and de Gelder, 2018).

Until recently, humanity has been rather fortunate in that our societies and economies have been able to sustain exponential growth without catastrophic ecological collapse that would end human life as we know it. With science at the forefront of human development, humanity in the postmodern era finds increasing comfort in the fact that science has presented ‘miracle solutions’ to many historical dangers. Treatments for disease, solutions to food insecurity and protection from natural disasters to name a few threats, have put a quasi-religious faith in science, one that is very similar to the phenomenon of bystander apathy. Our apparent history of apathy towards ecological collapse, to a large degree, reflects this faith in science to provide miracle solutions to not only our present crises but more importantly to any potential crises in the future. Harari uses the Old Testament symbolism of Noah’s Ark to illustrate how humanity is counting on its history of scientific ingenuity to construct or develop some form of salvation to any potential future catastrophes, or otherwise termed, The Ark Syndrome (Harari, 2016, p. 216).

The Ark Syndrome is a symptom of Linear Economics and FMC and it influences almost every industry and enterprise we know of today, most prevalently the pharmaceutical industry and modern-day medicine systems. As a result, the economic growth of such industries is viewed as the main priority and they have and are willing to continue to pursue these goals at the expense of the natural environment and the people that directly depend on these natural resources for their livelihood, such as indigenous communities. These instances include cases of mass deforestation, biopiracy, bio-prospecting and cultural/traditional knowledge appropriation (Ambang, Alloggio and Tandlich, 2019).

6. HOW HUMANISM CORRUPTS RESEARCH INTEGRITY: FMC AND CONSUMER CULTURE

This section of the paper aims to justly problematize the predominant FMC consumer culture of the postmodern era and also to explain the etiology of this culture by proposing a causal link between products of

socio-economic systems (such as FMC), the cultures and the people they produce (consumer culture and a society of consumers), and the ideology that these cultures stem from (Humanism). It is hoped that the proposed causality can explain the rationale behind the various environmental transgressions that occur in both the global scene and in the more organized contexts of academia and industry, on pertinent issues such as ethical research on indigenous land, where instances of bio-prospecting, biopiracy and the appropriation of traditional knowledge have become common environmental problems in the 21st century. The discussion will be particularly aimed at exploring how this consumer culture (and the application of its ethics) has influenced research culture and research integrity in academia and industrial pharmaceutical enterprise. With the knowledge that Humanism is ultimately an anthropocentric philosophical position, we have a starting point for understanding the basis of most modern pharmaceutical endeavours, the morals they operate under, and the ethics that guide their conduct.

6.1. WHAT IS RESEARCH INTEGRITY? AND WHAT CONSTITUTES ETHICAL RESEARCH?

Let us start by discussing what one means by research integrity and what it means to research ethically in both academic and industrial contexts. In the European framework, the history and evolution of research ethics are closely tied to human rights litigation, post-World War II (The European Commission, 2013). The adoption and implementation of the Nuremberg Code of 1947 served as one of the most significant moments in the development and understanding of human rights and ethical research practices (The European Commission, 2013). Following the surrender of the German forces at the end of World War II, the document was developed in response to the cruel and inhumane experiments performed by Nazi physicians and investigators on non-consenting research participants who were mainly civilians and war prisoners (Ghooi, 2011). The ratification of the Nuremberg code had massive implications for the global geopolitical landscape and made important contributions to international law and ethics as well as the ethics of research inquiry into human beings (Jackson, 2007).

Ironically there is much debate over the ethicality of the Nuremberg Code itself. Six of the ten principles of the Nuremberg Code are derived

from the Guidelines for Human Experimentation of 1931, one of the earliest known ethics protocols for research on the human subject (Ghooi, 2011). However, there was arguably little to no reference made to the Guidelines when ratifying the Nuremberg Code and as per our understanding of ethics today this would be considered plagiarism, and therefore unethical. In addition to this, the Nuremberg Code is not kept up to date based on the evolving and dynamic understanding of ethics in the current era (Ghooi, 2011). In spite of this, the Nuremberg Code has influenced the research world by shifting its ethical focus toward the research participant and away from the predominant authoritarian research institutions. Prior to this, ethical codes were geared towards prioritizing the needs of the investigator/researcher while transforming the research subject or participant into a secondary concern (The European Commission, 2013). The research institution was also the authority on what constituted ethical research practices and also set the standards for research integrity, and as a result, it could justify the atrocities committed by claiming they were for the good of society. The Nuremberg Code awarded more human rights security and protection to the subjects/participants of research endeavours, making the researchers more accountable for the wellbeing of the subjects.

Similarly, The Oviedo Convention of 1996, more elaborately known as '*The Convention for the Protection of Human Rights and Dignity of the Human Being with regard to the Application of Biology and Medicine*' was adopted in Oviedo, Spain, to address any ethical discourse that would arise in academic and industrial fields of research that predominantly dealt with human participants (The European Commission, 2013). The leading ethical concern in the field of biomedical research are the interests and welfare of a human being as a subject of study, their informed consent and respect for privacy towards sensitive information (The European Commission, 2013), all of which aim to preserve the fundamental rights of human beings. This protocol recognizes that while biomedical research can and does positively contribute to the improvement of the human condition, this type of research is also capable of infringing on fundamental human rights, the rights to dignity and the safety of the participant (Andorno, 2005). In the event of such circumstances, the protocol mandates the immediate cessation of such research/inquiry. The following are some examples of the institutions that serve as ethical authorities in predominantly 'Western' countries, and their take on what constitutes ethical research.

6.2. INTERNATIONAL SOCIETY OF ETHNOBIOLOGY: CODE OF ETHICS

The International Society of Ethnobiology Code of Ethics (ISE-CoE) is a document comprised of 17 principles and 12 practical guidelines that give provisions for ideal ethical research practices in all fields of academia but especially focus on ethical practices that involve the misuse or appropriation of traditional knowledge, illegally obtaining genetic data from natural resources and other exploitative practices (International Society of Ethnobiology, 2006). Research integrity, according to the ISE-CoE, is those research practices which “facilitate ethical conduct and equitable relationships and foster a commitment to meaningful collaboration and reciprocal responsibilities by all parties” (International Society of Ethnobiology, 2006).

According to this document, research integrity is maintained when the 17 principles in the ISE-CoE are observed throughout the research endeavour (Europa, 2017). These principles share elements similar to the codes of conduct of the various healthcare professions. Respect for persons, the right to confidentiality, informed consent and full disclosure are common principles in the ISE-CoE and the Health Professionals Council of South Africa (HPCSA), for example (International Society of Ethnobiology, 2006; Hpcsa.co.za, 2016). The ISE deems that the fundamental value in their CoE is the concept of ‘mindfulness’, which they define as “a continual willingness to evaluate one’s understandings, actions, and responsibilities to others”, i.e. the aim of these endeavours has been to facilitate the mutually beneficial “coexistence between humanity and the environment and the continued sustainability of environmental resources for future generations” (International Society of Ethnobiology, 2006). This is why more specific provisions such as traditional guardianship, reciprocity, mutual benefit, contributory acknowledgment and due credit are incorporated, to provide added protection to the otherwise vulnerable and exploitable indigenous communities. ‘Mindfulness’ is the suggested basis for research integrity according to the ISE because being mindful acknowledges harms, in the biological and cultural context, that would have been the outcomes of research conducted without the informed and comprehensive consent of the indigenous stakeholders (International Society of Ethnobiology, 2006). In addition, appropriate reparations are considered and should be settled to prevent such “research incidents” in the forthcoming research endeavours (International Society of Ethnobiology, 2006).

The 12 practical guidelines of the ISE-COE are meant to provide tools to navigate the relationship between researcher(s), indigenous participants and indigenous environmental resources. The most nuanced of these is arguably the call for the understanding of local community institutions, authorities and protocols (p.9). This is of particular interest because it involves restructuring and redefining the power dynamics between the often wealthy and predominantly Western research institutions and the more vulnerable indigenous community and their environment. Previously, institutions were the primary authority of their ethical conduct and could justify the exploitation and disenfranchisement of indigenous communities (International Society of Ethnobiology, 2006). However, the increasing involvement and empowerment of traditional knowledge systems within mainstream healthcare and ethics institutions, such as the WHO and ISE, have given indigenous communities and their cultures more recognition for their integral role in ethnobotanical research but, equally importantly, has protected them against research malpractice.

6.3. THE WORLD INTELLECTUAL PROPERTY ORGANIZATION

The World Intellectual Property Organization (WIPO) is the world leading authority in Intellectual Property (IP) and patent dispute resolution. Their goal is to “promote innovation and creativity for the economic, social and cultural development of all countries through a balanced and effective international IP system” (WIPO, 2019). They are also an authority when it comes to the ethical conduct of research practices in circumstances where research involves collaborative efforts and information sharing between different parties, commonly indigenous communities and research industries/institutions. The WIPO endorses and adopts several guidelines from different institutions across the world relating to the ethical interaction between researchers and indigenous communities, of which the most commonly cited is that provided by The Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS). Although this guideline was intended for research sponsored by AIATSIS, the institution holds the position that the ethical guidelines can inform all research that involves cooperation with indigenous communities (AIATSIS, 2000). The guidelines consist of 11 principles but can be summarized into three main categories:

1. **Principles of Consultation, negotiation, and mutual understanding:** It is made clear that the ideals of consultation, negotiation and free and informed consent are the fundamental morals of research with or about indigenous persons. It emphasizes the open exchange of information but also open and continuous communication between parties throughout the project. This is to ensure transparency by both parties and also to ensure continued and mutual consent during the research endeavour, keeping malpractices to a minimum (AIATSIS, 2000).
2. **Respect, Recognition and Involvement:** These guidelines call for a change in the relationship paradigm between the researcher and their indigenous counterparts. It emphasizes the value of the heritage system that forms traditional knowledge (TK) and recognizes TK as an indispensable part of modern research. It is the goal that these communities be seen as 'indigenous researchers' with a knowledge database worthy of respect. As such, it mandates the recognition of the diversity of cultures and furthermore, the diversity of persons within a culture, and advocates respect between collaborators in joint endeavours. 'Recognition' according to these guidelines also encompasses legal protection under IP law for cultural facets such as TK, rites or other cultural rituals in an effort to ensure that the contributions of these communities are justly compensated for (AIATSIS, 2000).
3. **Benefits, Outcomes and Agreements:** The remaining principles deal with reciprocity ethics and mutual benefit practices. According to this document, the use of research results should be freely available to the community and such agreements must be legally binding before beginning the research. It states that the commitment to reciprocity is one that should specifically benefit the community's needs and in no way disadvantage it, a relationship which over time can accrue resulting in frequent, consistent and intimate access to personal and community knowledge (AIATSIS, 2000).

It is the desire of the AIATSIS that by following these 11 principles researchers will be able to navigate ethical uncertainties that arise from collaborative work so that the research is done in a way that is ethical and fair. The integrity of research is upheld by keeping the above principles as the status quo and recognizing TK systems and the communities they come from as indispensable components of this type of research. Similar

ethical guidelines have been contributed to the WIPO data pool by institutions such as The American Anthropology Association, The Society for Economic Botany and The Society for Conservation Biology, to name a few.

6.4. RESEARCH ETHICS IN AFRICA

Development of the relevant research ethics systems on the African continent had begun through the establishment and development of research oversight systems, commonly referred to as Research Ethics Committees (RECs) (Kruger, Ndebele and Horn, 2014). These are initiatives that aim at safeguarding the welfare of research participants (Kruger, Ndebele and Horn, 2014). The first documented cases put forward for ethical review are reported to be from the University of Witwatersrand, South Africa, which established a REC in 1966 for health-related research (Kruger, Ndebele and Horn, 2014). Since then other health research authorities have been established throughout the continent such as the Medicine Control Council (MCC) and The National Health Research Ethics Council (NHREC) in South Africa, The National Institute for Medical Research in Tanzania (NIMR), The Cameroon National Research Ethics Committee for Human Health (CNREC) and The Kenyan Medical Research Institute (KEMRI). The principles and ethical guidelines of the HPCSA and the South African Pharmacy Council (SAPC) are detailed in Ambang, Alloggio and Tandlich (2019).

Research Ethics, as they pertain to indigenous African communities, must consider the role of traditional medicine systems and their practitioners who are not only integral to the culture of certain communities as providers of primary healthcare but also as cultural/spiritual leaders (Campbell et al., 2013). Traditional medicine has deep historical roots in many African cultures and to this day it is widely practiced throughout the continent. Traditional medicine consists of a variety of practices that use various plants, animals and insects for the treatment or prophylaxis of ailments of both the physical and spiritual kind (Kruger, Ndebele and Horn, 2014). The ethical consideration here is finding a means to integrate cultural plurality and respect for individual culture into the realm of healthcare – similar to the fundamental value of ‘mindfulness’ emphasized by the ISE-CoE. Mindfulness in this context applies to the diversity of culture and knowledge brought forth by both the researcher and the lo-

cal community and thus falls under the umbrella of the ‘Respect of Persons’ tenet of Gillon’s *Principlism* (Kruger, Ndebele and Horn, 2014).

Another major ethical principle of significance to African research ethics is that which states, “First do no harm,” from the tenets of Gallion’s *Principlism*. The use of traditional medicine is not without risks as many of the methods and products are not assessed for safety/efficacy profiles using modern scientific methods. However, the idea that the use of all-natural products or traditional medications is without side effects is untrue, especially when used alongside modern synthetic medications. In some instances, the concomitant use of traditional therapy and modern synthetic medicine has been reported to cause adverse events such as hepatotoxicity, postoperative haemorrhage and allergic reactions (Nyika, 2007). For example, St. John’s wort is a widely used natural plant product used to treat mild to moderate depression, anxiety, and also haemorrhoids, but the product also increases the metabolic clearance of cyclosporin, fluoxetine and digoxin by inducing the hepatic enzyme cytochrome P450, resulting in decreased efficacy of the medication (Komorowski et al., 2004). *Ginkgo biloba* is a tree used commonly in Chinese traditional medicine. Extracts of the leaves have been used to treat cognitive disorders such as Alzheimer’s disease, but studies have shown that its concomitant use with warfarin or aspirin leads to severe haemorrhaging (Pal and Shukla, 2003).

With the potential for harm that may come with using traditional medicine, it is important to establish a system of evaluating the safety and efficacy profile of a natural remedy before dispensing it to ill patients, in order to ethically abide by the ‘first do no harm’ tenant of *Principlism*. In contemporary medical research, this evaluation is performed through randomized controlled trials (RCT) and considered the best method to obtain evidence-based information (Kruger, Ndebele and Horn, 2014). The challenges of incorporating that method into research based on traditional medicine and practices are two-fold; firstly, traditional therapy is often individualized, administered in a variety of doses and dosage forms, usually in combination with other natural products (Kruger, Ndebele and Horn, 2014). As a result, making a specific and precise dose for replicable studies becomes a major challenge and the outcomes of the results may not accurately reflect what real-life usage will be like as the outcomes (positive and negative) are mostly case-by-case. In addition to this, the use of traditional remedies is closely influenced by the diagnostic methods used by traditional medicine practitioners that are often very

different from those of modern physicians. Modern cardiologists would most likely base their clinical decisions and treatment of patients on the American Heart Association criteria, which are a guideline for the diagnosis of the “stage of a condition such as health failure and make recommendations as to the efficacy of a certain natural or pharmaceutical remedy” (Kruger, Ndebele and Horn, 2014 p.113). On the other hand, traditional Chinese physicians base their treatment and clinical management of the patient on the “deficiency or excess of heart ‘yang chi’ or ‘bad energy’ which is a non-empirical measure of heart health” (Kruger, Ndebele and Horn, 2014 p.113).

Thus, the ethical conundrum here is how research integrity is upheld when we attempt to incorporate traditional medicine systems into mainstream healthcare? There is a need for an accountability system such as RCT that can substantiate or validate the claims of traditional medicine therapies as a measure of safety towards its consumers. Ethical collaborative research with traditional medicine systems would have to involve a balance of trying to provide traditional physicians with a platform to share their traditional phyto-therapeutic knowledge and practices to consumers but also ensuring that the natural products that reach the consumer are tried, tested, safe and efficacious using accountability systems that are mindful of cultural diversity (Kruger, Ndebele and Horn, 2014).

7. DEVIATION FROM ETHICAL IDEALS

The above-mentioned authorities and their respective guidelines are the ideal examples of what ethical research practices should consist of, however the apparent reality is that the vast majority of research projects (academic and industrial) are still geared towards making profits from indigenous pharmacologically relevant flora and fauna, and have succeeded in doing so until the present day (Shiva, 2007). The system of patent protection under IP law is a product of FMC that is meant to safeguard the investments of an industry/institution (both time and money) that are devoted to researching a product that could be a potential market success (Andersen, 2003). Often these products are ‘sourced’ from an indigenous community by academic bio-prospectors who convey the resource and its information to an industrial corporation that can capitalize on it financially without acknowledgment or remuneration

towards its indigenous origin, a practice consistent with linear economics (Shiva, 2007). Dr. Kelly Bannister, chairwoman of the ISE, was quoted stating “[the] distancing of knowledge and resources from their Aboriginal origins has weakened legal rights of Aboriginal peoples and dulled the sense of moral obligation by downstream users such as other academics, government scientists, and the private sector” (Bannister, 2005).

The Nagoya Protocol of 2010 on Access and Benefit Sharing (ABS) is a supplementary agreement to the Convention on Biological Diversity (CBD) (Koutouki, 2011). In the 21st century, genetic resources must be exploited for the overall good and improved conditions of the human race, as we face many challenges and this framework is aimed at maintaining an equitable approach to the exploitation and use of said genetic resources (CBDa, 2019). Contracting parties are obligated to address genetic resources, such as phytoflora, as integral cultural facets to indigenous and local communities, and must establish rights for them to access the benefits of their commercial endeavours (CBDa, 2019). One particular provision of interest is Article 8 of the protocol, which describes what research integrity should entail, and it states that contracting parties should “create conditions to promote and encourage research which contributes to the conservation and sustainable use of biological diversity, particularly in developing countries” (CBDb, 2019). It goes on to state “through simplified measures on access for non-commercial research purposes, taking into account the need to address a change of intent for such research” (CBDb, 2019).

The deviation from ideal ethical conduct arises when one tries to distinguish commercial research from non-commercial research. This makes the terms for granting “simplified access” difficult to predetermine. Laird and Wynberg (2003) illustrate how the vast majority of companies acquire the rights to indigenous genetic biodiversity through academic institutions or similar *ex-situ* entities acting as ‘middle-men’ despite the institutions themselves being supposedly not-for-profit. The reality is that FMC has entrenched itself into modern academic research practices and has corrupted the fundamental understanding of research integrity and research ethics, complicating and hindering access rather than assisting it. Major public and private universities and institutions operate under the model of output efficiency, that is to say, the more academic research that translates into marketable outcomes, the more job security that particular researcher is likely to have (Edem and Olat La-wal, 1999), essentially adopting the capitalist consumer culture of the

postmodern era of research. The following examples are meant to illustrate how presently existing institutions and major corporations deviate from the research guidelines provided by ethical authorities such as those mentioned above due to the inherent capitalist nature of most research endeavours.

7.1. THE LUCUMO TREE

Hammond (2012) details the following case of a New Jersey (U.S.A.) university that sought to file a patent on the fruit of the Lucumo tree (*Pouteria lucuma*), a plant that is native to the Andes valley of Peru. It claimed that it had discovered dermatological properties from the oil of the seeds. The patent filed by the university claimed that there was “virtually no information on the effect of lucuma on human health” in addition to claiming that the extraction techniques the institution proposed were novel (p. 37). These claims of novelty were dismissed by investigations that revealed earlier studies on the effect of the plant on the GIT by researchers in Paris and the UK, as early as 1888. Additionally, this claim implies that the indigenous Andean communities were oblivious to the nutraceutical benefits of a well-known plant that was indigenous to their land, a claim that cannot be true as the Peruvian government published a report to the United Nations Food and Agricultural Organization (FAO) in 1995 stating that the plant was among the country’s most valued nutraceuticals and acknowledged its cosmetic and dermatological potential. In an effort to better their patent claim and simultaneously exotify the product to cosmetic consumers, the university went so far as to rebrand their extract from the lucumo tree into a product called “Incan Golden Fruit.”

It is worth mentioning that this New Jersey university has had ties to Lipo Chemicals Inc., a subsidiary of the large Miami investment firm, HIG Capital (Dayan and Kromidas, 2011), a partnership that calls into question the idea of non-commercial research. As a signatory to the Nagoya Protocol, the U.S.A., on behalf of the New Jersey university, could be accused of violating the agreement by failing to comply with the non-commercial stipulation clearly stated in the document. However, this accusation (and others like it) can be and often are refuted by the fact that there is no easy way that a generally defensible definition of non-commercial research can be stipulated (Kamau, Winter and Stoll, 2017). As

a result, public research institutions, such as the New Jersey university, who have ties to other private or government institutions such as Lipo Chemicals Inc., cannot assume that they are involved in performing non-commercial research activities. Therefore they are not entitled to the same leniency when it comes to liberty of access to indigenous data, not without biopiracy becoming an inevitable consequence. The example of “Incan Golden Fruit” demonstrates the urgent need to define the meaning and practical execution/practices of non-commercial research and to adopt a clear set of guidelines or a binding legal framework for academic endeavours based on the exploitation of genetic resources.

7.2. THE PATENTING PROFESSOR

Another university in the state of Montana, U.S.A., has been known for a lengthy history in collecting and patenting various species of fungi from countries across the world including Malaysia, Nepal, Yemen, Madagascar, South Africa, Papua New Guinea, Northern Australia and nearly the whole of South America (JUSTIA, 2019). Over the decades, the work done by this Montana university academic bio-prospecting has caught the attention of several multinational pharmaceutical companies to which it has sold several of the patents. Companies such as Novo Nordisk, Eli Lilly and Synthetic Genomics, and BMS have approached the university for the licenses to nearly a dozen of his patents, the most notable of which was Prof. Strobel’s discovery and subsequent sale of a patented endophyte that is able to produce a semi-synthetic form of the drug Paclitaxel (Taxol) (JUSTIA, 2019). The university’s patent on the microbe *Muscodora albus* was sought out by agricultural giants such as Agraquest, California, which have bought the patent to develop the microbe further to be used as an alternative to the soil polluting fumigant methyl bromide, a potentially lucrative market endeavour for Agraquest should it succeed (Banerjee et al, 2013).

There is little evidence to suggest that the university, in its 20 years of “academic” bio-prospecting, has paid ABS to the communities it has collected samples from, but much evidence to suggest that it has made bio-prospecting a lucrative academic pursuit. Since practices such as these are commonplace, there is little reason for non-member nations of the Nagoya Protocol to become signatories. Additionally, there are seemingly little to no consequences for current signatories who violate the

ideals of research integrity as put forth by the protocol, because these institutions can claim to be operating under vaguely defined, non-commercial research ethics, all the while profiteering of bio-prospecting, biopiracy and traditional knowledge appropriation. This means that no prior assumptions can be made on behalf of academic institutions or corporations that can grant themselves non-commercial access to indigenous genetic resources. To quote Hammond, in reference to having the above a priori assumption, "To do so would be to take a quaint view of contemporary Western academic biological science, wherein professors, universities, and research institutes are major owners and brokers of patented biodiversity (p. 49).

There are evident parallels between Hammond's view on the above paradigm and Harari's view on Humanism as a philosophical ontology. Hammond's view reflects the dangers of making these institutions anthropocentric in the sense that making them 'major brokers' or authorities over genetic resources means they can ascribe any meaning they desire to their own actions, thereby justifying their malpractices. The concern is that empowering research institutions with the ideology that they are both the source of authority and meaning in matters pertaining to the use of indigenous genetic resources, will result in the same situation in which human action was ascribed meaning and authority by Humanism, an ideology that has arguably led to the irreversible damage of several integral facets of our biosphere. The above cases serve as evidence that this ideology has indeed embedded itself in research culture and is ultimately providing institutions and multinational corporations with justification for their ecological transgressions and ethical deviations. These cases of bioprospecting exemplify and problematize the unsustainable linear economic practices that are symptomatic of the modern era's consumer culture.

7.3. LINEAR RESEARCH PRACTICES

The diversity of disciplines within the realm of academic research also complicates issues surrounding ABS in both the legal and ethical sense. Bannister (2005) asserts that social sciences primarily deal with human subjects and their dynamics, artifacts and historical dimensions. Social science research is mostly qualitative and has greater concern for ethics as they pertain to human interaction and do not put much stock in IP

ownership issues. Natural science research is more geared towards understanding non-human objects and their multi-layered combinations. It is more concerned with quantitative results that have potential commercial value and, as a result, tends to disproportionately involve more IP litigation than human research ethics (Bannister, 2005). Thus, in the world of medicinal plant research, ethnobotanists and ethnopharmacologists are arguably at the forefront of the pursuit for novel natural products and not surprisingly also at the center of most biopiracy and bioprospecting scandals.

The Montana University and other similar institutions have either actively or subconsciously become a part of the phenomenon that is the capitalist system but are operating within the microcosm of academia. This reflects the extent to which human beings resonate with Humanist ideology and anthropocentrism. The linear economic practices that are typical of multinational corporations at the global level are equally as problematic and dangerous when applied to the academic space. It has made research in academia focused on a one-way flow of resources and raw materials where traditional knowledge and plant materials resources are extracted from the indigenous communal territory and sold to the highest bidder, without any recompense for the source (Elisabetsky, 1991). Logically, we should expect the same ecological, cultural and socio-economic demise within the academic space that is being observed at the global level, should we continue our linear economic practices.

In summary, the following can be stated about the research ethics and the various paradigms considered and analysed in this first of our two papers. The challenges of current human existence require ongoing and constant knowledge generation. The paradigms under which this takes place must be framed by taking into account global and localised factors, sensitivities, historical context, as well as the impact on the populations and socio-ecological systems. In part 2 of the study, we will further report upon knowledge-generation paradigms and how they develop.

ACKNOWLEDGEMENTS

The authors would like to thank the Rhodes University Sandisa Imbewu Fund for funding the study in part through providing a Master of Science in Pharmacy scholarship for the first author and travel funds for the second author to attend research trips to several destinations, e.g. the

exchange at the Faculty of Health Sciences of the technical University in Liberec, Czech Republic.

8. REFERENCES

- AHD. (2019). *The American Heritage Dictionary: Mathematics* [online]. Available at: <https://ahdictionary.com/word/search.html?q=mathematics> [Accessed 6 Apr. 2019].
- AIATSIS. (2000). *Guidelines for Ethical Research in Indigenous Studies* [online]. Available at: https://www.wipo.int/export/sites/www/tk/en/databases/creative_heritage/docs/aiatsis_ethical_research.pdf [Accessed 28 Feb. 2019].
- Ambang, O. A., Alloggio, S., Tandlich, R. (2019). Moral reciprocity, ethics of appropriation of indigenous medicinal plant knowledge and associated biopiracy. *Acta Educationis Generalis* 9(2): 24-65.
- American Humanist Association (2003). *Humanism and Its Aspirations: Humanist Manifesto III, a Successor to the Humanist Manifesto of 1933 - American Humanist Association* [online]. Available at: <https://americanHumanist.org/what-is-Humanism/manifesto3/> [Accessed 4 Apr. 2019].
- Aminov, R. (2010). A Brief History of the Antibiotic Era: Lessons Learned and Challenges for the Future. *Frontiers in Microbiology*, 1: Article 134.
- Andersen, B. (2003). The Rationales for Intellectual Property Rights: The Twenty-First Century Controversies. Available at: https://www.researchgate.net/publication/228871485_The_Rationales_for_Intellectual_Property_Rights_The_Twenty-First_Century_Controversies [Accessed 30 December 2019].
- Andorno, R. (2005). The Oviedo Convention: A European Legal Framework at the Intersection of Human Rights and Health Law. *Journal of International Biotechnology Law*, 2(4): 133-143.
- Banerjee, D., Pandey, A., Jana, M. and Strobel, G. (2013). *Muscodor albus* MOW12 an Endophyte of *Piper nigrum* L. (Piperaceae) collected from North East India produces volatile antimicrobials. *Indian Journal of Microbiology*, 54(1): 27-32.
- Bannister, K. (2005). University research on traditional medicines: implications for Aboriginal communities. *Workshop on ABS from the Use of Genetic Resources and Associated Traditional Knowledge*,

- pp.1-11. Available at: https://www.academia.edu/16964980/University_Research_on_Traditional_Medicines_Implications_for_Aboriginal_Communities_1 [Accessed 30 December 2019].
- Baylor, E. (2012). Ethnocentrism. *Oxford Bibliographies Online Datasets* [online]. Available at: <https://www.oxfordbibliographies.com/view/document/obo-9780199766567/obo-9780199766567-0045.xml> [Accessed 14 Jun. 2019].
- Bible Hub (2004-2020a). Holy Bible: Job 38:13. Available at: <https://biblehub.com/job/38-13.htm> [Accessed 24 Jul. 2020].
- Bible Hub (2004-2020b). Holy Bible Daniel 4:11. Available at: <https://biblehub.com/daniel/4-10.htm> [Accessed 24 Jul. 2020].
- Bolisani, E. and Bratianu, C. (2018). *The Elusive Definition of Knowledge* [online]. Available at: <https://www.researchgate.net/publication/318235014> [Accessed 5 Apr. 2019].
- Borry, P., Schotsmans, P. and Dierickx, K. (2005). The birth of the empirical turn in bioethics. *Bioethics*, 19(1): 49-71.
- Campbell, B., Wilborn, C., La Bounty, P., Taylor, L., Nelson, M. T., Greenwood, M., Ziegenfuss, T. N., López, H. L., Hoffman, J. R., Stout, J. R., Schmitz, S., Collins, R., Kalman, D. S., Antonio, J. and Kreider, R. B. (2013). International Society of Sports Nutrition position stand: energy drinks. *Journal of the International Society of Sports Nutrition*, 10(1): Article 1.
- Clark, A. (2012). Embodied, embedded, and extended cognition. *The Cambridge Handbook of Cognitive Science* (eds. Keith Frankish, Milton Keynes, William Ramsey), Cambridge University Press, Cambridge, United Kingdom, pp.275-291.
- CNNMoney. (2016). *World's top oil producers - CNNMoney* [online]. Available at: <https://money.cnn.com/interactive/news/economy/worlds-biggest-oil-producers/index.html> [Accessed 22 Feb. 2019].
- Convention on Biological Diversity (CBDa, 2019). About the Nagoya Protocol [online]. Available at: <https://www.cbd.int/abs/about/default.shtml/> [Accessed 2 Mar. 2019].
- Convention on Biological Diversity (CBDb, 2019). Article 8: Special considerations [online]. Available at: <https://www.cbd.int/abs/text/articles/?sec=abs-08> [Accessed 2 Mar. 2019].
- Coonrod, J. (2014). *MDGs to SDGs: Top 10 Differences* [online]. Global Advocacy: Gender-Focused Community-led Development for All. Available at: <https://advocacy.thp.org/2014/08/08/mdgs-to-sdgs/> [Accessed 21 Feb. 2019].

- Creath, R. (2011). *Logical Empiricism* (Stanford Encyclopedia of Philosophy) [online]. Plato.stanford.edu. Available at: <https://plato.stanford.edu/entries/logical-empiricism/> [Accessed 17 Apr. 2019].
- Dayan, N. and Kromidas, L. (2011). *Formulating, packaging and marketing of natural cosmetic products*. Hoboken, N.J.: Wiley, p.430.
- De George, R. (1970). The function and limits of epistemic authority. *The Southern Journal of Philosophy*, 8(2-3):199-204.
- Dictionary.com. (2019). *The definition of experiences* [online]. Available at: <https://www.dictionary.com/browse/experiences> [Accessed 6 Apr. 2019].
- Edem, U. and Olat Lawal, O. (1999). Job satisfaction and publication output among librarians in Nigerian universities. *Library Management*, 20(1): 39-46.
- Ehrenfeld, D. (1981). *The arrogance of Humanism*. Oxford: Oxford University Press.
- Elisabetsky, E. (1991). Sociopolitical, economical and ethical issues in medicinal plant research. *Journal of Ethnopharmacology*, 32(1-3): 235-239.
- Encyclopedia Britannica. (2019). *Enlightenment | Definition, History, & Facts* [online by Brian Duigan]. Available at: <https://www.britannica.com/event/Enlightenment-European-history> [Accessed 4 Apr. 2019].
- Europa. (2017). *The European Code of Conduct for Research Integrity* [online]. Available at: https://ec.europa.eu/research/participants/data/ref/h2020/other/hi/h2020-ethics_code-of-conduct_en.pdf [Accessed 26 Feb. 2019].
- Foley, R. (1994) "Egoism in Epistemology" in F. Schmitt (ed.) *Socializing Epistemology*, Rowman & Littlefield, pp. 53-74
- Freudenberg, N. (2000). Health and Culture: Beyond the Western Paradigm. *Health Education Research*, 15(4): 508-510.
- Fricker, E. (2006). Second-Hand Knowledge. *Philosophy and Phenomenological Research*, 73(3): 592-618.
- Garthwaite, C. and Duggan, M. (2010). Empirical Evidence on the Value of Pharmaceuticals. *Stanford.edu* [online], pp.1-40. Available at: http://web.stanford.edu/~mgduggan/Research/Value_of_Pharmaceuticals.pdf [Accessed 6 Apr. 2019].
- Ghooi, R. (2011). The Nuremberg Code-A critique. *Perspectives in Clinical Research*, 2(2): 72-76.
- Grey, W. (1998). Environmental value and Anthropocentrism. *Ethics and the Environment*, 3(1): 97-103.

- Griffin, A. (2017). Tapping resources in space and the community [online]. NASA. Available at: <https://www.nasa.gov/feature/tapping-resources-in-space-and-the-community> [Accessed 22 Feb. 2019].
- Guides.libraries.psu.edu. (2019). Library Guides: Empirical Research in the Social Sciences and Education: What is Empirical Research? [online]. Available at: <https://guides.libraries.psu.edu/emp> [Accessed 6 Apr. 2019].
- Haila, Y. (2000). Beyond the nature-culture dualism. *Biology & Philosophy*, 15(2):155-175.
- Hammond, E. (2012). US researchers file for patent on the lucuma fruit, a “flagship product” of Peru [online]. Available at: <https://www.cbd.int/abs/side-events/icnp2/twn-icnp2-no4-Lucuma-Peru.pdf> [Accessed 24 May 2019].
- Hammond, E. (2013). *Biopiracy Continues - A compilation of some recent cases*. 1st ed. Penang: Third World Network, pp.1-44.
- Harari, Y. (2016). *Homo Deus: A brief history of tomorrow*. 1st ed. London: Harvill Secker.
- Herlihy, D. (1987). The family and religious ideologies in medieval Europe. *Journal of Family History*, 12(1-3): 3-17.
- Higgs, J., Titchen, A. (1995). The nature, generation and verification of knowledge. *Physiotherapy*, 81(9): 521-530.
- Hortensius, R. and de Gelder, B. (2018). From empathy to apathy: the bystander effect revisited. *Current Directions in Psychological Science*, 27(4): 249-256.
- Howard, E. (2014). Rwanda, 20 years on: how a country is rebuilding itself [online]. Available at: <https://www.theguardian.com/global-development/2014/apr/03/rwanda-20-years-on-how-a-country-is-rebuilding-itself> [Accessed 17 Apr. 2019].
- Hpcs.co.za. (2016). *General ethical guidelines for the healthcare professions* [online]. Available at: <http://www.hpcs.co.za/Conduct/Ethics> [Accessed 2 Oct. 2018].
- International Humanist and Ethics Union (IHEU, undated). What is humanism? Available at: <https://humanists.international/what-is-humanism/> (website accessed on 17th May 2021).
- International Society of Ethnobiology. (2006). The ISE Code of Ethics - International Society of Ethnobiology [online]. Available at: <http://ethnobiology.net/code-of-ethics> [Accessed 27 Feb. 2019].
- Jackson, P. (2007). Nuremberg: Nazis on Trial. *Totalitarian Movements and Political Religions*, 8(1):145-148.

- JapanGov. (2019). *Abenomics* [online]. Available at: <https://www.japan.go.jp/abenomics/index.html> [Accessed 20 Feb. 2019].
- Jeffries-Martins, J. (2015). *The Renaissance World*. Routledge – Taylor and Francis Group, New York/London.
- Johns, R. K. C. (1959). The figure of the Earth. *Journal of the Royal Astronomical Society of Canada*, 53, pp.257-263.
- JUSTIA. (2019). Gary Strobel inventions, patents and patent applications - justia patents search [online]. Available at: <https://patents.justia.com/inventor/gary-strobel> [Accessed 24 May 2019].
- Kamau, E., Winter, G. and Stoll, P. (2017). *Research and development on genetic resources*. Abingdon, Oxon [UK]: Earthscan, pp.60-74.
- Keeling, D. and Lehman, M. N. (2018). Posthumanism. *Oxford Research Encyclopedia of Communication*. (DOI: <https://dx.doi.org/10.1093/acrefore/9780190228613.013.627>).
- Khan, L. (2015). What is Mathematics - an Overview. *International Journal of Mathematics and Computational Science*, 1(3): pp.98-101.
- Kneller, G. F. (1958). *Existentialism and Education*. Science Editions, Wiley. New York.
- Komoroski, B.J., Zhang, S., Cai, H., Hutzler, J. M., Frye, R., Tracy, T. S., Strom, S. C., Lehmann, T., Ang, C. Y., Cui, Y. Y., Venkataraman, R. (2004). Induction and inhibition of cytochromes P450 by the St. John's Wort constituent hyperforin in human hepatocyte cultures. *Drug Metabolism and Disposition*, 32(5): 512-518.
- Koutouki, K. (2011). *The Nagoya Protocol: status of indigenous and local communities* [online]. [cisdl.org](http://cisdl.org/public/docs/legal/The%20Nagoya%20Protocol%20-%20Status%20of%20Indigenous%20and%20Local%20Communities.pdf). Available at: <http://cisdl.org/public/docs/legal/The%20Nagoya%20Protocol%20-%20Status%20of%20Indigenous%20and%20Local%20Communities.pdf> [Accessed 19 Jun. 2019].
- Kristeller, P. (1978). Humanism. *Minerva*, 16(4), pp.586-595.
- Kruger M, Horn L, Ndebele P. (2014). *Research Ethics in Africa: A resource for research ethics committees*. Stellenbosch: Sun Media.
- Laird, S. and Wynberg, R. (2003). *Biodiversity prospecting & access and benefit-sharing*. [online] Available at: <https://portals.iucn.org/library/sites/library/files/documents/2003-025.pdf> [Accessed 24 May 2019].
- Lamont, C. (1997). *The philosophy of Humanism*. Amherst, N.Y.: Humanist Press. Available at: <https://www.corliss-lamont.org/philos8.pdf> [Accessed on 30 December 2019].

- Lyotard, J.-F. (1999). The postmodern condition. *Modernity: Critical Concepts*. (Volume 4 - After modernity, ed. M. Walters), London/ New York, Routledge, pp.161-177.
- Maruatona, T. (2013). Foundations of qualitative research: Interpretive and critical approaches by W. Jerry Willis (Book review). *New Horizons in Adult Education and Human Resource Development*, 25(1): pp.83-85.
- Mauthner, N. S. (2019). Toward a Posthumanist ethics of qualitative research in a big data era. *American Behavioral Scientist*, 63(6): 669-698.
- Mohammed, A. and De Waal, A. (2012). Opinion | Meles Zenawi and Ethiopia's Grand Experiment [online]. *Nytimes.com*. Available at: <https://www.nytimes.com/2012/08/23/opinion/meles-zenawi-and-ethiopias-grand-experiment.html> [Accessed 20 Feb. 2019].
- Mohanty, B. B. (2007). Challenging Western Paradigm on Social Knowledge: Need for Genuine Indigenous Lenses. *Sociological Bulletin*, 56(3): 435-438.
- Nilsson, A. and Strupp-Levitsky, M. (2016). Humanistic and normativistic metaphysics, epistemology, and conative orientation: two fundamental systems of meaning. *Personality and Individual Differences*, 100: 85-94.
- Nyika, A. (2007). Ethical and regulatory issues surrounding African traditional medicine in the context of HIV/AIDS. *Developing World Bioethics*, 7(1): 25-34.
- Pal, S. K., Shukla, Y. (2003). Herbal Medicine: current status and the future. *Asian Pacific Journal of Cancer Prevention*, 4(1): 281-288.
- Patel, J. (2016). Becoming desensitized to violence - The Triangle [online]. The Triangle. Available at: <https://www.thetriangle.org/opinion/becoming-desensitized-to-violence/> [Accessed 24 Apr 2019].
- Piper, K. (2018). Human history, in one chart [online]. Available at: <https://www.vox.com/future-perfect/2018/11/8/18052076/human-history-in-one-chart-industrial-revolution> [Accessed 13 Jun. 2019].
- PovertyCure (2013). The Zero Sum Fallacy [PovertyCure Episode 2] [online]. Available at: https://www.youtube.com/watch?v=OYyNY_5ACFc [Accessed 17 Apr. 2019].
- Randerson, A. K. (2015). Human sensitivity towards nature: Eastern and Western perspectives. *World Journal of Science, Technology and Sustainable Development*, 12(3): 172-182.
- Salloch, S., Wäscher, S., Vollmann, J. and Schildmann, J. (2015). The normative background of empirical-ethical research: first steps towards

- a transparent and reasoned approach in the selection of an ethical theory. *BMC Medical Ethics*, 16(1): Article number: 20.
- Sariatli, F. (2017). Linear Economy Versus Circular Economy: A Comparative and Analyzer Study for Optimization of Economy for Sustainability. *Visegrad Journal on Bioeconomy and Sustainable Development*, 6(1): 31-34.
- Sharp A. (2012) Humanistic Approaches to Learning. In: Seel N.M. (eds) *Encyclopedia of the Sciences of Learning*. Springer, Boston, MA, pp.1469-1471.
- Shiva, V. (2007). Bioprospecting as sophisticated biopiracy. *Signs: Journal of Women in Culture and Society*, 32(2): 307-313.
- Smith, D. (2003). Phenomenology (Stanford Encyclopedia of Philosophy) [online]. Available at: <https://plato.stanford.edu/entries/phenomenology/#PhenPhen> [Accessed 22 Apr. 2019].
- Spaić, B. (2018). Justified epistemic authority (in legal interpretation). *Anali Pravnog fakulteta u Beogradu*, 66(4): 143-155.
- Stahel, W. (2013). Policy for material efficiency–sustainable taxation as a departure from the throwaway society. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 371: 20110567. (<http://dx.doi.org/10.1098/rsta.2011.0567>).
- Taylor, L. (2019). The discovery of ignorance. [online] e-Learning. Available at: <https://louisecharente.wordpress.com/2013/10/24/the-discovery-of-ignorance/> [Accessed 4 Apr. 2019].
- The European Commission (2013). *Ethics for researchers*. Luxembourg: Office of the European Union, pp.2-30.
- Treanor, N. (2006). The Cogito and the Metaphysics of Mind. *Philosophical Studies*, 130(2): 247-271.
- United Nations Development Programme (UNDP, 2019). Sustainable Development Goals | UNDP [online]. Available at: <https://www.undp.org/content/undp/en/home/sustainable-development-goals.html> [Accessed 21 Feb. 2019].
- US EPA. (2017-2019). Global greenhouse gas emissions data | US EPA. [online] Available at: <https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data> [Accessed 22 Feb. 2019].
- Webb, W. M. (2018). Rationalism, empiricism, and evidence-based medicine: a call for a new Galenic synthesis. *Medicines*, 5(2): E40.
- WIPO. (2019). Inside WIPO [online]. Available at: <https://www.wipo.int/about-wipo/en/> [Accessed 28 Feb. 2019].

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Submission: December, 30th 2019
Acceptance: July, 29th 2020