MORAL OBLIGATIONS AND TECHNOLOGICAL IMPERATIVE: ISSUES OF HUMAN DIGNITY IN GENETIC ENGINEERING

Oliver Tersoo Agundu
Benue State University

Abstract

Science and technology no doubt has played a significant role in the transformation of man's understanding of the universe, his position on earth, the values of his life as he experiments, discovers, measures and observes. It has also revealed man's creative genius and his ability to alter the anatomic and physiological constitution of the human person and also improved man's health. In fact, almost all facets of life in the society now have a glimpse of the golden touch of science and technology. However, there are moral concerns that hinged on the rightness and wrongness of scientific and technological intervention in the manipulation of the natural composition of the human person beyond therapeutic reasons especially in genetic engineering. In this respect, there is the question of the appropriateness of glorifying the achievements of technology to the neglect of the inherent and intrinsic moral implications it generates especially in the fields of genetic engineering? This is even more worrisome in the sense that this technology envision man's existence becoming increasingly dependent upon and inevitably indistinguishable from the vast array of artificially engineered genes and tissue – culture support systems needed to sustain the human person. More importantly, such techniques fail to offer a guaranteed solution to human problems but mere transient remedies in coping with man's medico-genetic dilemma. This work therefore, seeks to discuss the moral obligation that we have to ensure respect for human dignity vis-a-vis the imperativeness of technological advancements that seek to improve the lots of the human person. Methodologically, this work engages expository and Critical-evaluative approaches to lay bare the substance of the issue and to critically interrogate the moral concerns therein in view of articulating the way forward. It is to be noted that the issue of moral obligation and technological imperative is premised on the philosophical assumptions about the acquisition and use of scientific knowledge.

Introduction

The scientific and technological attainment of the contemporary age is pregnant with possibilities. It is capable of building and also destroying, capable of healing and also killing, capable of increasing humanity's happiness and also capable of reducing it and increasing their grief and sadness. This reflects man's true nature as an enigmatic and

unpredictable being that is capable of many things. Today's society is witnessing a paradigm shift where people are abandoning old loyalties and building new allegiance shaped by rapidly shifting ideas and hopes. All facets of the human society are experiencing these changes with correspondingly concomitant effects. These changes are also being experienced in the domain of medical science where the traditional task of physicians to alleviate human suffering and pain caused by biological disorders and disease where their skills permit is increasingly being challenged by the desire to even alter the anatomic and physiological composition of the human person himself through genetic engineering. Conceptually, genetic engineering refers to the direct intervention in the genetic make-up of an Organism through the manipulation of cells or genome by the use of biotechnology with the sole aim of altering its heritable elements so as to produce improved or new organisms. A product of genetic engineering is commonly known as a genetically modified organism (GMO). In this regard, Bio-reproductive technology and genetic engineering have emerged and with the microbial and viral medicine at their disposal they are committed to manipulate and modify the bedrock foundation of the human organism which is humanity's heredity. This is no longer a possibility but a reality. So,

> While not ignoring the direct benefits of science and technology which have helped man to free himself from material constraints imposed by the search for security, man has been similarly conferred with the knowledge and power to destroy the delicate network in which he is himself, as a creature of nature involved for better or for worse.[1]

In the face of this reality it is imperative to acknowledge the personal individual or collective responsibility and moral obligation for the preservation of the human dignity and humanity's common future. It is becoming clear that this age is experiencing an exhaustion of practical wisdom but at the same time an escalation in knowledge which results from scientific researches that are loaded with possibilities. Instead of being humanistic and creative, science and technology to some extent is becoming materialistic and mechanistic. This era therefore is experiencing a medico-genetic dilemmas that brings to the fore the perennial problem of the society's moral obligation of ensuring a humanistic oriented science and the technological imperative that empowers the societies in their objective pursuit of reality, and an unbiased search for the truths of nature. It is in this regard that this paper seeks to examine and juxtapose the technological imperative of genetic engineering of the human person and the moral obligation we have to ensure the respect of human dignity in all scientific and technological engagements.

The Concept and Nature of Genetic Engineering

Genetic engineering like other bio-reproductive techniques can be conceptualized variously depending on the process and applications. Genetic engineering is also called genetic modification which generally denotes the direct manipulation of an organism's genome using biotechnology.[2] It can also be referred to as a process of altering the genetic makeup of an organism using the techniques that removes heritable material or that introduce DNA (Deoxyribonucleic Acid) prepared outside the organism either directly into the host or into a cell that is then fused or hybridized with the host.[3] Conceptually, Deoxyribonucleic Acid (DNA) refers to a molecule that carries the genetic composition used in the growth development, functioning and reproduction of all living organisms. It is a

hereditary element in living organisms. The process of genetic engineering generally involves using recombinant nucleic acid (DNA or RNA) techniques to form new combinations of heritable genetic material followed by the incorporation of that material either indirectly through a vector system or directly through micro-injection, macro-injection and micro-encapsulation techniques.[4] Genetic engineering does not include traditional and plant breeding in vitro fertilization, induction of polyploidy mutagenesis and cell fusion techniques that do not use recombinant nucleic acids or a genetically modified organisms in the process. It is to be noted that, cloning and stem cell research although not considered genetic engineering are closely related and genetic engineering can be used with them.[5] Today, synthetic biology has emerged as an advanced step of genetic engineering by introducing artificially synthesized genetic material from raw materials into an organism.

It is to be noted that an organism that is produced through genetic engineering as stated earlier is refers to as genetically modified organism (GMO). Historically, the first GMOs were bacteria in 1973; meanwhile GM mice were generated in 1974 and the insulin-producing bacteria were commercialized in 1982 and since 1994, the genetically modified food has been sold. There are different processes in which genetic engineering can be carried out. However, the most common form of genetic engineering involves inserting new genetic material randomly within the host genome. Other techniques allow new genetic material to be inserted at a specific location in the host genome or generate mutations at desired genomic loci capable of knocking out endogenous genes.[6]when the technique of gene targeting is employed; it uses homologous recombination to target desired changes to a specific endogenous gene. This tends to occur at a relatively low frequency in plants and animals and generally requires the use of selectable markers. But the frequency of gene targeting can be greatly enhanced with the use of engineered nucleases such as zinc finger nucleases, engineered homing and nucleases or nucleases created from TAL effectors.[7] In addition to enhancing gene targeting, engineered nucleases can also be used to introduce mutations at endogenous genes that generate a gene knockout.

Furthermore, in the process of carrying out a genetic engineering, the gene to be inserted into the genetically modified organism must be combined with other genetic elements in order for it to work properly. The gene can also be modified at this stage for better expression or effectiveness. Again, a gene to be inserted in most constructs contains a promoter and terminator region as well as a selectable marker gene.

> The promoter region initiates transcription of the gene and can be used to control the location and level of gene expression while the terminator region ends transcription. The selectable marker, which in most cases confers antibiotic resistance to the organism it is expressed in, is needed to determine which cells are transformed with the new gene. The constructs are made using recombinant DNA techniques, such as restriction digests, litigations and molecular cloning.[8]

This practice of genetic engineering is increasingly finding applications in medicine, research, industry and agriculture and can also be used on a wide range of plants, animals and micro organism. But, this paper restricts itself to the deployment of genetic engineering techniques to artificially engineered human genes and alters their heritable elements. This concern is even more pertinent owing to the transient character of genetic techniques since the projected possibilities in this regard does not offer the prospects of the permanent change that can only be accomplished by changing the germ plasm itself, this

therefore offers only the illusionary hopes of altering the constituent elements of the human person and the dream of governing the genetic systems.

Genetic Engineering and the Place of Human Dignity

Down through the ages, physicians have been guided in their medical profession by the rationale of the Hippocratic Oath. The total thrust of this pledge is the physician's moral obligation to alleviate human suffering and pain caused by biological disorders and diseases where his skills allow him. Today, genetic engineering and our reproductive technology have catapulted the physician far beyond remedial medicine into the domain of creative designing and positive genetic planning. According to Robert Francoueur, two mainsprings underlie our reproductive and genetic technologies

> Man's age old desire to improve the quality of his domesticated animals and crops as a means to reducing hunger and starvation and our desire to relieve the human suffering which comes from sterility, premature delivery, miscarriages and mental retardation.[9]

It is tempting to go with Francoueur's reasons for man's engagement in genetic engineering. These motivational reasons sound appealing and the techniques promising for the future, but there is a danger in their seductiveness in the present. In the first place, they obfuscate the need for solving current problems facing humanity which do not need novel technical solutions such as genetic engineering. Secondly, they pose the threat of dehumanization that Jacques Ellul identifies with techniques. Ellul observes that:

> When technique enters into every area of life, including the human, it ceases to be external to man and becomes his very substance. It is no longer face to ace with man but is integrated with him and it progressively absorbs.[10]

So, at the heart of the problematics that are rooted in the practice of genetic engineering is the dignity of the human person. The question is, does this practice portents any injury to the dignity of the human person? Can it enhance the dignity of the human person? Anchoring his argument on the fact that the human being has dignity in his or her essential structure and also as a task to be accomplished Karl Rahner posited:

> In his or her personal nature, the human person is spirit, freedom, an individual (that is unique, never to be totally deduced), since the human being is unique with an eternal destination and destiny, "the individual person who is now, may never be forcibly sacrificed, in a manner which destroys him for the sake of humanity, or for the others who come after him. The present is never just the material for a utopian intramundane future.[11]

This position concurs Kant's view in his ethical theory of "categorical imperative" that "the rational being, is by its nature an end, and thus as an end in itself, must serve in every maxim as the condition restricting all merely relative and arbitrary ends".[12] The principle dictates that you "act with reference to every rational being (whether yourself or another) so that it is end in itself in your maxim" meaning that the rational being is "the basis of all maxims of action" and must be treated never as a mere means but as the supreme limiting condition in the use of all means i.e. as an end at the same time.[13]

Ensuing from the above, the gene of a human person cannot be genetically engineered so as to improve the quality of the future of human specie by altering heritable elements. Any medical intervention must be for the interest of the person involved and not

another. This is based on the inherent and intrinsic value of humanity which not only surpasses all other considerations, but cannot be destroyed for any other consideration:

> In so far as the human person is a being who possesses himself or herself knowingly, and in freedom, he or she does not ontologically have the character of a means, but an end. He or she has an absolute value and hence an absolute dignity.[14]

Commenting further in this regard, John Macquarie like Karl Rahner sees the human person beyond the ordinary. The human reality according to him points beyond itself, or seek to pass beyond itself because it contains intimations of the transcendent.

> … the immense potentials of each one is (or should be) in itself enough to generate that profound respect for the individual, his worth and dignity, that have to be defended against every attempts to transform him into a mere unit in some impersonal system, be it economic or even metaphysical.[15]

It goes to show that the human person is a being whose nature and inherent worth precludes him from any scientific and technological intervention that fails to treat him as an end but a means to an end. As a practice, genetic engineering like other aspects of the modern science and medicine is based on the radical conception of all organisms as individuals and as species in process. Contrary to the traditional conception of man, the modern science appears not to accept the nature of man a fixed unchanging datum. It sees the human person as species in process that can be explored to unravel his enigmatic nature. This thinking constitutes a foundational premise in which genetic engineering and other bio-techniques are engaged as technological imperatives.

Technological Imperative and Moral Obligations

The recent advances being recorded in scientific and technical knowledge especially in genetic engineering and bio-technology have reopened the perennial problem of man's freedom and its limits. This is becoming even more compelling owing to man's moral world, particularly in relation to the power that is increasingly accruing to him through the discoveries in genetics, embryology, pharmacology and biotechnology etc. This scientific and technological advances are pointing to man's success in his age-old quest to be in-charge of his body and its genetic development.[16] Theologically, man has from the very beginning designated as a co-creator with God and endowed with creative capacity to explore and manipulate the world for his well being. In line with this, man has over time involved in the process of improving himself and his environment through self-development and researches respectively. But until recently as captured by McNeil, his self-creation for example was "limited for the most part of his spiritual and social relations".[17] Corroborating, Karl Rahner notes that his freedom was exercised "almost exclusively in the area of contemplative knowledge of metaphysics and faith, and in the moral decisions by which man opened himself to God".[18] Today, man is changing himself radically on the empirical level consciously and deliberately:

> The power of self-creation rooted in man's spiritual freedom, has now grasped the physical, psychological and social dimensions of his existences, we are now witnesses to a historical break-through from thought to practice and from self awareness to self-creation.[19]

With the prospects in applied sciences in transforming the human person and the knowledge at the disposal of man to intervene and manipulate even his genetic composition

we are left with no option but to live up to our moral obligations in the face of technological imperative which expresses again man's right of inquiry. The universal declaration on the Human Genome and Human Rights adopted by the United Nations Educational, Scientific and Cultural Organization (UNESCO), notes the many potential social benefits of genetic research, but it also states that "such research should fully respect human dignity, freedom and human as well as the prohibitions of all forms of discrimination based on genetic characteristics".[20] In the same declaration Article 12(b) it is stated, "Freedom of research, which is necessary for the progress of knowledge is part of freedom of thoughts" and Article 14 and 15 both encouraged "governments to promote scientific research. But the same articles also make clear that governments should; consider the ethical, legal, social and economic implications of such research" and that research is to be conducted "with due regard for the principles set out in this Declaration, in order to safeguard respect for human rights, fundamental freedoms and human dignity and to protect health.[21] It is also in line with this thought pattern that the United States National Bioethics Advisory Commission (NBAC) acknowledged the cultural and instrumental values of free scientific inquiry, while also pointing to the Nuremberg Code, the Declaration of Helsinki, and other widely accepted restrictions on scientific research designed to protect community safety, human subjects and the welfare of animals, because "science is both a public and social enterprise and its application can have profound impact".[22] The report further notes that the;

> Society recognizes that the freedom of scientific inquiry is not an absolute right and scientists are expected to conduct their research according to widely held ethical principles.[23]

It is evident that there can be no solution that does not involve the recognition by the scientific community of the dangers of irresponsible exploitation of scientific skills and manipulative prowess. The imperative of technological advance is certainly acknowledge, but the plausibility of its achievements lies in its obligation to be morally accountable and responsible especially in regards to human dignity.

Towards a Genetic Engineering with a Human Face

The modern science and technology has enjoyed astonishing success in improving our knowledge of the natural world and has also devised techniques of improving and enhancing man's health and well being. In Africa to be specific, western technological endeavours have changed the once tagged "dark continent" and opened it up to benefit from the most glamorous of human civilizations in the area of economics, education, medical care, communication and industry among others.

According to Ehusani:

> Without the possibilities offered by modern science and technology, life would be impossible for many. The weak could become extremely vulnerable since they would be unequipped to deal with an otherwise hostile and unyielding nature.[24]

In the area of genetic engineering too, the positive touch of science is evident in Agriculture where crops that have been genetically engineered are made to increase their growth rates and resistance to different diseases caused by pathogens and parasites.[25] This is beneficial as it can greatly increase the production of food resources with the usage of fewer resources that would be required to host the world's growing populations. But even with this lofty feat, ethical and safety concerns have been raised around the use of genetically

modified food. A major safety concern relates to the human health implications of eating genetically modified food in particular whether toxic or allergic reaction could occur.[26] It has also been noted that gene flow into related non-transgenic crops, off target effects on beneficial organisms and the impact on biodiversity are important environment issues.[27] The implication is, whether genetic engineering is applied in agriculture, the human person is still at the receiving end as a consuming agent.

In medicine, genetic engineering has been used to mass-produce insulin, human growth hormones, follistin (for treating infertility), human albumin, monoclonal antibodies, antihemophilic factors, vaccines and many other drugs.[28] Genetically engineered viruses are also being developed that can still confer immunity, but lack the infectious sequences. The benefit of genetic engineering is also being experience in gene therapy where defective human genes are replaced with functional copies. It has also been used to treat patients suffering from immune deficiencies (notably severe combined immunodeficiency) and trials have been carried out on other genetic disorders.[29]

Worth nothing is the fact that in spite of the benefits of Gene therapy and other genetically engineered products, there are also ethical concerns that relates directly to the core values and dignity of the human person. There is a question of whether the technology be used not just for treatment but for enhancement, modification or alteration of a human begins adaptability, intelligence, character or behaviour.[30] Here, the imperative of drawing a distinction between cure and enhancement comes to the fore because the transhumanists are advocating loudly for the enhancement of humans. At the end of it all, the human person stands as a departure and arrival point of all technological achievements. Corroborating, Andrew Efemini explains that

> Anyone with scientific consciousness understand the place of science in man's struggle to improve his living condition on earth. He does not see science as something that should be pursued for its own sake but as something that should be pursued for man's benefit.[31]

This fact expresses the true African thinking that is hinged on humanism. It sees the human person as a focal point of the universe and it further indicates that the human person is the paramount creation from whom everything begins and to whom everything gravities and in whom all things in the world have meaning.[32] In this regard Alloy Ihuah notes "African humanistic heritage parades a man-centered philosophy of life which argued position is that the dialectics of social engineering is aimed ultimately at achieving true dignity and development for the whole of mankind.[32] The implication is that for the Africans, the value of concern for human well-being is a fundamental, intrinsic and self-justifying value which should be cordoned off against any technological subversion of it. It is in line with this long cherished African heritage that Kenneth Kaunda echoed this concern for Africa in the modern age that "the high valuation of man and respect for human dignity, which is a legacy of our tradition, should not be lost in the new Africa.[33] This is also the wish of this paper that in the face of scientific and technological advance especially in the area of genetic engineering our sense of moral obligation should be activated to insist on a technology that is humanistically driven.

Conclusion

In one of his famous essays "*Answering the Question: What is Enlightenment?",* Kant defined the Enlightenment as an age shaped by the Latin motto: Sapere aude "(Dare to know". This further substantiates the age-old saying that "what man can know, he ought to know". But there remains a perennial question as to the use man should make of that knowledge. This is because it does not necessarily follow that what man can also do, he ought to do. In this regard, McNeill admonished that "any drastic advance in human knowledge calls for an equally drastic advance in moral consciousness".[34] In the foregoing we have examined the rapid and sustainable growth of science and technology especially in the area of genetic engineering. We noted with excitement the breakthroughs being recorded in the area and their corresponding benefits accruing to man. But in keeping with our moral responsibility to ensure the respect for human dignity any where it is threatened, we raised fundamental ethical and humanistic questions in the practice of genetic engineering. This paper submits that man's right to scientific inquiry is not in doubt but the deployment and practice of his findings and knowledge must be exercised within the known ethical and professional standards that can help only to heal and not to kill, to build and not to destroy the human person who is the centre, basis and summit of all technological attainments.

End Notes

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