Homo Faber: a Philosophy of Technology and Ethical Implications

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Abstract:

Homo faber is the name that is attributed to the human being in the process of technological development and it is also seen as one of the stages of human growth and a product of *homo sapiens*.

Technology has become an omnipresent phenomenon today in all the dimensions of human existence on earth. It is considered the most essential ingredient of human life that the technological equipments are supposed to be *sine qua non* conditions even for an ordinary way of living. Many superstitions and needless sufferings of the past have been eliminated. The present condition of human life with all its comforts, facilities and safety are to be attributed to the development of technology. Human progress would not have been realized without technological advancements. The constant growth in technology promises a new age of opportunity in all the human affairs. The tremendous growth of technology and its domination over mankind is expressed today by the terms megatechnology or technocracy. However, there are many issues raised by the impact of technology on the human beings.

The immense growth of technology has endowed the human agent with the capacity of destroying even the very conditions upon which life depends. The power of modern technology has changed the whole notion of human existence and there is a serious invitation for all, to reflect about the technological determinism and the potential threats to the human being and the environment posed by technicalization of life. The efforts to safeguard the integrity of the living world in the midst of the current technological crises must be taken by formulating the ethical imperatives for technological age.

A formulation of a philosophy of technology is required to look for an ethics based on responsibility and to deal with the deterministic character of technology. This article poses an invitation to contribute to the construction of a new humanism based on integral human values and concern for the environment.

Key Words:

Homo Faber; *technê*; Technocracy; Technicalization; Human Ascent; Baconian Programme; Technological Nihilism; Faustian Soul; Efficient Ordering; Biotechnology;

Introduction

Technology has become an omnipresent phenomenon in all dimensions of human existence. It is considered the most essential ingredient of contemporary human life that the technological equipments are deemed *sine qua non* conditions even for an ordinary way of living. The terms megatechnology or technocracy are used to express the tremendous growth of technology and its domination over mankind.

However, technological developments are seen by many thinkers as posing potential threats to the human being and the environment. There are many issues raised by the impact of technology on the human beings. In this context, the future of the human being has to be considered as ever more important, because new threats arising from thoughtless and

irresponsible human goals and projects, which, though good in themselves, fatally disturb the balance of nature on which the survival of the organism must depend. (Levy 2002: p.8)[1]

These provoke philosophical reflection on their origin and their ethical implications. Such an approach to the study of technology is placed within the context of philosophy and anthropology because the concentration is set on to examine how technology affects the integral nature of human beings and how it affects the relationship of human beings among themselves and with the nature. Here the analysis of the technological interventions on human nature will be limited to the essential understanding of its meaning, its history in brief and the recent endeavours for a philosophy of technology.

Homo faber is the name that is attributed to the human being in the process of technological development and it is also seen as one of the stages of human growth and a product of *Homo sapiens*.

In this research, the analysis of the ethical implications of technology relies on the contributions of some important philosophers who attempted to establish a philosophy of technology and thereafter an imperative of responsibility for the technological age as a response to the crises created by technological developments and their consequences on humankind.

Science and Technology: *Homo sapiens* and *Homo faber*

The human being, as *Homo sapiens*, is capable of science and science reflects the status of knowledge. For its own development science needs technology, and in this way technology becomes a tool: the cause of technology is science and the cause of science is human reason. (Kraus 1997: p.7)[2] This causal relationship between science and technology stimulates a key philosophical and ethical reflection on the responsible use of technology. (Jonas 1980: p.145)[3] Science grows through its interaction with technology and its influences on human life are carried out through technology. The emergence of man as *Homo sapiens* marked a significant point in the progress of human civilization where intellectual ascent was obtained. This ascent of mind led human beings to develop science and technology and it is in this that human ascent shows its singularity. (Drummond 1894: p.146)[4]

Man has tamed the entire atmosphere through scientific and technological advancement for his benefit. "Milestones in technological history are marked by the taming of nature towards human ends. Science is the discovery of how to do that; technology is that act of doing so. Technology tames entities and random or uncontrollable processes and events for human benefit." (Kraus 1997: p.2)[5] However it is notable that modern technology has developed so rapidly that it has become a human goal as opposed to its being a tool or means of science. In this way science and technology have transformed the contemporary culture to be essentially techno-scientific. Thus the nobility of science is lost due to the powerful image of technology and it manifests *homo faber* as the essential attribute of man. (Jonas 2004: p.24)[6]

[1] Levy, D. J. (2002) *Hans Jonas: The Integrity of Thinking*, Columbia, University of Missouri Press.
[2] Kraus, L. (1997) *The Art of Cloning and Eternal Life*, New York, Great Albany Books.
[3] Jonas, H. (1980) *Philosophical Essays: From Ancient Creed to Technological Man*, Chicago, The University of Chicago Press.
[4] Drummond, H. (1894) *The Lowell Lectures on the Ascent of Man*, New York, J. Pott & co.
[5] Kraus, L. (1997) *The Art of Cloning and Eternal Life*.
[6] Jonas, H. (2004) "Toward a Philosophy of Technology," in *Readings in the Philosophy of Technology*, ed., David M. Kaplan, Lanham, Rowman & Littlefield Publishers, Inc., pp.19-34.

Characterizing human being as *Homo faber* demonstrates the human being as the tool-maker and tool-user. Human history is filled with records of tools and technologies. Epochs are measured by their most important technological developments and the use of tools: the Stone Age, the Bronze Age and the Iron Age or the agrarian age, the industrial age and the information age.

The present stage to which humanity has arrived cannot be accidental. In all perspectives, whether social or political or cultural, humanity has reached the present status through a process that can be traced with the growth of science and technology down through many centuries. This growth of man is a process and it can be called as the process of ascension. Therefore the story of *Homo faber* is the record of human progress through technology.

The Meaning of 'Technology'

There is a popular understanding of technology which explains it as something connected to technical instruments or devices or tools. However, technology does not simply mean technical devices. The etymological analysis of the word technology, as *technê* and *logos*, shows that it is a discourse on art or craft. The Greek word *technê* (*τέχνη*) is often translated as craft or skill or art. Plato used the word *technê* in the sense of art or skill which for him is distinct from *epistêmê*.[7] For Aristotle *technê* is the artistic or technical knowledge to do things.[8] By distinguishing *technê* from *epistêmê* Plato and Aristotle distinguished craft from scientific knowledge. Therefore *technê* is a disposition to produce something which is concerned with bringing something into existence. (Aristotle, *Nicomachean Ethics*, 1140a120).[9] Thus basing on Plato and Aristotle, who have provided an earlier clarification on *technê*,[10] technology is understood as an artistic or skilful knowledge or a systematic use of knowledge for intelligent human action.

Basing on the Platonic and Aristotelian clarification of *technê*, many definitions were proposed for technology by various thinkers down through the centuries. Kant has spoken of three special gifts of human beings: the technical gift, the pragmatic gift and moral gift. The technical gift is connected to the practical reason. These qualities distinguish human being from the rest of creation. (Kant 1996: p.239)[11] For Heidegger "*technê* is the name not only for the activities and skills of the craftsman, but also for the arts of the mind and the fine arts." (Heidegger 1977: p.13)[12] For Monsma technology is the systematic treatment of an art.

[7] For Plato *epistêmê* is knowledge which means the ability to know the reality as it is (*Republic* IV 477b); medical knowledge is *epistêmê* in the sense that it is knowledge of health (*Charmides*, 165c); even the knowledge of carpentry is *epistêmê* (*Euthydemus*, 281a); however, the knowledge needed to rule the city is *technê*; ruling is a kind of *technê* that looks out after the welfare of the city (*Republic*, 342e).

[8] In his Nicomachean Ethics Aristotle identifies five intellectual virtues: scientific knowledge (epistêmê), artistic or technical knowledge (technê), intuitive reason (nous), practical wisdom (phronêsis) and philosophic wisdom (sophia). Scientific knowledge is to know what is necessary and universal. Artistic or technical knowledge is to know how to make things, or of how to develop a craft. Intuitive reason is the process that establishes the first principles of knowledge. Practical wisdom is the capacity to act in accordance with the good of humanity. Philosophic wisdom is the combination of intuitive reason and scientific knowledge.

[9] For Aristotle *technê* is end oriented. It aims at some good. (*Nicomachean Ethics*, 1094a5-10)

[10] But the use of *technê* as *ars* in Latin and as art or skill in English can be ambiguous. Art can mean both skill and fine arts.

[11] Kant, I. (1996) *Anthropology from a Pragmatic Point of View*, trans., Victor Lyle Dowell, Carbondale and Edwardsville, Southern Illinois University Press.

[12] Heidegger, M. (1977) *The Question Concerning Technology and Other Essays*, trans., W. Lovitt, New York, Harper & Row Publishers.

(Monsma 1986: p.11)[13] Robert Merton defines technology as "any complex of standardized means for attaining a predetermined result." (Robert Merton 1964: p.vi)[14] These definitions make clear that technology is a method or a tool rationally devised by the human effort and has absolute efficiency in every field of human activity.

The above etymological analyses of *technê* and different definitions of technology illustrate that technology does not refer simply to the technological devices. According to Heidegger technology cannot be merely reduced to technological devices or artifacts and not even to the techniques that produce those things. (Heidegger 1977: p.22)[15] 'Technology' refers to the very essence of man or to the human rational capacity whereas 'technological' can point out the attitude or the devices.

Technology and the Human Progress

The inferences drawn from the records of civilizations and archaeological discoveries of tools, weapons, pottery and art give evidence of the way of life led by the ancient people. The development of technology can be traced from the elementary use of sticks and stones by the human beings from very early stage which can be called as the first use of tools and weapons for their survival and self preservation. The use of stones and sticks lead the human mind to fasten on them as the first step towards tool making. From there different types of weapons and tools were developed to control nature and preserve life. The Stone Age thus marked the natural and the common way how every civilization began.

Some thinkers attest to the fact that how to start fire and to use its heat for warmth and cooking was perhaps the first discovery in which man brought the chaos of nature under his control. (Kraus 1997: p.2)[16] By the discovery of fire, man no longer had to rely on natural fires. As a whole the development of fire and food production, then eventually the wheel and the electric light were crucial steps towards the development of humankind. (Mondin 1982: p.69)[17] Although early technologies seem ridiculous when compared with the contemporary technology, yet for the ascent of the present day hi-tech the earliest forms were *sine qua non* conditions.

The progress of the human beings gained further impetus with the ability of communication. The language is also seen as a technique and tool with which humanity not only was able to communicate the skills and knowledge it gained to its peers but also was able to pass on the information down to the ensuing generations. Every successive generation while acquiring the wisdom of the past it added to it and improved on it. The development of language and communication continues even today with the technological development of distant communication which is the outcome of high-technology. As Carey would observe "with the tremendous development of communication technology human beings are now outgrowing the nation-state and a new form of world order is emerging, a global village, a universal brotherhood or world government on a shrunken planet." (Carey 1992: p.170)[18]

Technological progress has provided man with a better life. The tremendous growth of technology and its domination over mankind is expressed today by the terms megatechnology or technocracy. Contemporary technology aims not only to control nature,

[13] Monsma, S. (1986) *Responsible Technology: A Christian Perspective*, Grand Rapids, Eerdmans.
[14] Robert Merton, Forward in *The Technological Society*, Ellul, J. (1964) New York, Vintage.
[15] Heidegger, M. (1977) *The Question Concerning Technology and Other Essays*.
[16] Kraus, L. (1997) *The Art of Cloning and Eternal Life*. Asimov also attests to this fact.
[17] Mondin, B. (1982) *Una nuova cultura per una nuova società: Analisi della crisi epocale della cultura moderna e dei progetti per superarla*, Milano, Editrice Massimo.
[18] Carey, J. (1992) *Communication as Culture: Essays on Media and Society*, New York, Routledge.

but also to conquer time and space. It has influenced nearly every aspect of human life and offers a transcendent hope to achieve the eternal and the omniscient.

A Philosophy of Technology

Technology is seen as the focal point of contemporary life. The immense growth of technology has endowed the human beings with the capacity of destroying even the very conditions upon which life depends. In order to face this crisis and to examine the effects of technocratic culture on the contemporary human life situations and to estimate the ethical implications of technology, a philosophical study of technology is vital. It is necessary to formulate an imperative of responsibility for the technological age which has created an ethical vacuum. (Jonas 1980: p.12)[19] There is a philosophical ground for ethics because ethics, which is a doctrine of action, must ultimately be grounded in the philosophical and metaphysical principles which is a doctrine of being. That is why a formulation of a philosophy of technology precedes the ethical implications of technology in this study.

In the history of philosophy, there is no clear beginning for a philosophy of technology. Plato and Aristotle through their explanation given to *technê* started a philosophical understanding of technology. As a distinct and defined subject matter, philosophy of technology is a recent attempt in Western philosophy. Here an attempt is made to formulate a philosophy of technology starting from Aristotle together with a few important modern and contemporary contributions.

"Technology Imitates Nature": Aristotle

As already seen, Aristotle saw *technê* as a disposition to produce something. Thus for him technology is a technical knowledge or a systematic use of knowledge for intelligent human action. But in his *Physics*[20] when he deals with technology, one could observe that his notion of technology is essentially intermingled with nature. He affirms that 'technology imitates nature.' (Aristotle, Physics, II 194a13ff and 199a8ff) However, his affirmation seems inappropriate because contemporary technology has gone far away than nature. From the point of view of form and teleology Aristotle argues that technology imitates nature. Analogically he states that technology learns from nature.[21] He argues that architects are concerned with both matter and forms of their artifacts and they have an aim. (Aristotle, Physics, 194a23ff)

Further he also agrees that technology can surpass nature in producing new things that nature cannot produce on its own. Therefore Aristotle does not categorically affirm that every technological production is a copy or imitation of nature. The human hand is the 'tool of tools' because it is the exemplary tool and with it other artificial tools are made and handled as its extension. (Aristotle, Physics, 199a16) However, the tools which substitute human hands are more efficient and perfect than the natural human hands. What Aristotle affirms is that human technology imitates natural teleology or purposiveness. Thus nature provides for technology the way and the goal. While technology imitating nature, it also supplements and completes what nature herself leaves imperfect. Here Aristotle affirms the human purpose;

[19] Jonas, H. (1980) *Philosophical Essays*...

[20] Aristotle's view of technology and nature occurs mostly in his second book of Physics, in particular 194a13ff and 199a8ff.

[21] Even Plato's affirmation that the concept of technology as learning from or imitating nature was prevalent among ancient empiricist and materialist philosophers. Plato, *Nomoi* X, 899aff.

human beings take everything as means for their own purposes; for example, craftsmen produce new things from natural materials. (Aristotle, Physics, 199a8-33) Nature provides raw materials with which technology produces effects and thus nature is supplemented.

Aristotle also proposes a fundamental distinction between natural things and artifacts. For natural things Aristotle mentions animals, plants and the four elements. These natural things move, grow, change, and reproduce and are driven by purposes of nature. Artifacts, on the other hand, need human care and intervention and without human care they would perish. (Aristotle, Physics, 193a12) In this way Aristotle depending on the thought patterns of his time has presented his view of technology as something emerging from and connected with nature.

"Technology to Subdue Nature": Francis Bacon

During the modern times the rationalists and empiricists of the early seventeenth century were regarded as a source of thought for philosophy of technology with their combination of philosophy and science together with their mechanistic theories to compare organisms and machines. Francis Bacon with his programme of mastering nature saw science and technology as means for it. (Jonas 1984: p.140)[22] He is regarded as the first philosopher to focus the attention on the subject of technology. For him the invention of the magnetic compass, the printing press and gunpowder were the most important ones for the modern man. (Mitcham 1994: p.39)[23] His goal named as 'Baconian Programme' favoured the furthering of the scientific discoveries in order to subdue nature.

On contrary to the Aristotelian notion of technology which imitates nature, Bacon viewed it as an instrument to subdue nature.

"Technology as an Expression of the Ascent of Mind and Arrest of Physique: Drummond Henry

Henry Drummond observes the ascent of human mind as the cause for the development of technology which resulted in the ascent of human beings. This ascent of the mind has replaced the ascent of the body. That is, with the development of the mind mankind had developed technological devices that arrested the ascent of the body. For example, human hands lost their need to further develop with the discovery of tools. Henry Drummond sums it up: "Levers are the extensions of the bones of the arm. Hammers are callous substitute for the fist. Knives do the work of nails. The vice and the pincers replace the fingers." (Drummond 1894: p.102)[24]

Further scientific and technological inventions sealed the necessity of material development to the organs of the body. In the words of Henry Drummond, for "shaping things with the hand, he invented the turning-lathe; to save his fingers he requisitioned the loom; instead of working his muscles he gave out the contract to electricity and steam." (Drummond 1894: p.103)[25] Ernst Kapp developed the theory that tools and weapons are different kinds of 'organ projections'. (Mitcham 1994: p.23)[26] In this way it is apt to think of

[22] Jonas, H. (1984) *The Imperative of Responsibility: In Search of an Ethics for the Technological age*, trans. by, David, Chicago, University of Chicago press.
[23] Mitcham, C. (1994) *Thinking Through Technology: The Path Between Engineering and Philosophy*, Chicago, University of Chicago Press.
[24] Drummond, H. (1894) *The Lowell Lectures on the Ascent of Man*.
[25] Heidegger, M. (1977) *The Question Concerning Technology and Other Essays*.
[26] Mitcham, C. (1994) *Thinking Through Technology*…

the modern transportation systems as extended foot, glasses and telescopes the extended eyes, and computers as an extended brain.

Human mind invented through scientific processes many technologies and thereby caused an immense acceleration to the process of ascent of humanity. Technology replaced the organic involvement of mankind with efficiency and rapidity. Technological devices thus made the organs of the body redundant, preventing their further development, if not reduced their importance. With the ascent of the mind and with the development of science and technology the physical strength changed over to mental strength, the mind took control over the body.

The ascent of human mind which resulted in the technological development, not only arrested the physical ascent, but also put an end to the ascent of every other species in creation. Thus humans took charge of the ascent of nature by becoming the determining factor of every plant upon the universe whether they should bloom or fade; of every animal whether it should increase, change, or perish. Mankind has taken the control 'to subdue and conquer' the universe. (Drummond 1894: p.346)[27]

"An Ontological Understanding of Technology": Heidegger

It is generally accepted that Martin Heidegger is one of the pioneering philosophers to systematically develop a philosophy of technology. He makes a distinction between the traditional and modern views of technology. Traditional notion of it is "a means and a human activity, can therefore be called the instrumental and anthropological definition of technology." (Heidegger 1977: p.5)[28] He affirms the instrumental notion of technology in order to show the present state of human slavery to it. He writes "everywhere we remain unfree and chained to technology…we are delivered to it in a worst possible way." (Heidegger 1977: p.4)[29] Therefore for Heidegger technology has become a fate and destiny. By fate he means the inevitableness and destiny in the sense of revealing the end. Technology does not compel man to blindly follow it and he cannot also "rebel helplessly against it and curse it as the work of the devil" (Heidegger 1977: p.25)[30] because it has become a part and partial of human existence. While agreeing with the traditional views, he also thinks that they are insufficient for a better understanding of modern technology and to create a technological understanding of beings.

In his philosophy of technology Heidegger proposes that man as *dasein* must have a free relationship with technology in order to give a chance to *Being* to manifest in different ways. If *dasein* can have a free relationship with technology, then it is a new attitude and manifestation of *Being*. Thus for Heidegger, *Being* as *dasein*, chooses technology as a way for its revealing in the world of today. In this sense technology as such is a part of metaphysics, where one sees the disclosure of the *Being*." (Heidegger 1977: p.4)[31] This is Heidegger's ontological approach based on the technological understanding of being.

Heidegger's ontological approach to technology does not definitely say whether technology is good or evil. He does not deny serious problems that technology presents with the entire catastrophe. At the same time he also sees the positive aspects of technology. He

[27] Drummond, H. (1894) *The Lowell Lectures on the Ascent of Man.*
[28] Heidegger, M. (1977) *The Question Concerning Technology and Other Essays*.
[29] Ibid.
[30] Ibid.
[31] Ibid. Ernst Junger wrote that technology is the real metaphysics of the 20th century. Ellul, J. (1964) *The Technological Society*, New York, Vintage, p. ix. This runs in parallel to Heidegger's ontological notion of technology.

also said that "it would be shortsighted to condemn it as the work of the devil. We depend on technical devices; they even challenge us to ever greater advances." (Heidegger 1966: p.53)[32] He brings out the essence of technology in an objective manner, that is, without expressing likes and dislikes. In this way his philosophy of technology becomes an ontological understanding of technology. (Hubert 2004: p.53)[33]

The ontological understanding of technology surpasses all the pros and cons of technology. However, Heidegger sees a nihilistic situation facing modern man, a situation of the human distress caused by the technological understanding of being, rather than the destruction caused by specific technologies. Therefore the danger Heidegger sees, is not the destruction of nature or culture but a kind of our understanding of being which leads to technological nihilism. (Hubert 2004: p.55)[34]

Heidegger explains the concept of technological nihilism by introducing the German word *Bestand*.[35] Traditionally technology was considered as an instrument. With the Aristotelian causality Heidegger says that technology as an instrument becomes cause for its products. As the cause brings-forth (*poiêsis*) its effects, so also technology brings-forth. Here 'bringing-forth' signifies an unconcealment or revealing. Therefore the function of technology is revealing; the essence of technology is connected to the revealing of truth. But Heidegger observes that the modern technology is not revealing. He sees its nature of unconcealment as a challenging (*Herausfordern*) "which puts to nature the unreasonable demand that it supply energy which can be extracted and stored as such". (Heidegger 1977: p.10-12)[36] Thus the revealing of modern technology as challenging is explained by Heidegger's introduction of the idea of standing-reserve (*Bestand*).

For Heidegger considering everything, including human beings as standing-reserve is the instrumental orientation of modern technology. Thus modern technology transforms humanity itself into a standing-reserve, which means human beings are considered as raw materials of production and resources. This leads to the destruction of all potentials and values which is a nihilistic situation, brought about by technology. Thus rational beings becoming a part of the technical system as standing-reserves signify a technological nihilism. (Heidegger 1966: p.54)[37]

In this nihilistic situation brought about by modern technology Heidegger proposes a way out for human beings by the correct understanding of the essence of technology. He introduces the real essence of technology with the German word *Gestell (Enframing)*. *Enframing* is fundamentally a calling-forth. It is a 'challenging claim,' a demanding summon, that 'gathers' so as to reveal. Enframing is an abstract and ambiguous word. In this enframing, Heidegger sees the correct notion of modern technology with its danger and saving power; it is a peculiar phenomenon and a mystery in terms of its danger and saving power which manifest as two different moments of the same process. Man has to accept this fact of modern technology and learn to live with it. And accepting the enframing aspect of

[32] Heidegger, M. (1966) *Discourse on Thinking*, New York, Harper and Row.
[33] Hubert, D. (2004) 'Heidegger on Gaining a Free Relation to Technology', in *Readings in the Philosophy of Technology*, ed., David M. Kaplan, Lanham, Rowman & Littlefield Publishers, Inc., pp.53 - 66.
[34] Hubert, D. (2004) 'Heidegger on Gaining a Free Relation to Technology'.
[35] In English it is translated as standing-reserve or raw material or stock.
[36] Heidegger, M. (1977) *The Question Concerning Technology and Other Essays*. He brings the example of the Rhine River which was considered as a symbol of German national culture and a source for philosophical inspiration and poetry has now come to be considered as an energy source with its usage for hydroelectric power.
[37] Heidegger, M. (1966) *Discourse on Thinking*, New York, Harper and Row.

technology makes clear also the human responsibility to care for the world and to safeguard the essence of truth. (Heidegger 1977: p.33-35)[38]

Therefore instead of allowing technology to pose itself as a mode of human existence in the present world, Heidegger invites human beings to understand enframing as the essence of technology and to have a genuine and free relationship with it. For him through technology *Being* manifests itself in a different way. So technology creates a possibility for the *Being* to find a way out of its concealment and gives it an ability to manifest itself differently. For this task Heidegger invites human beings to become the shepherds of *Being* to prepare the way for a new way of presenting through technology. (Heidegger 1977: p.42)[39]

"Man as an Object of Technology": Hans Jonas

Jonas sees technology as the focal fact of modern life. His contribution to formulate a philosophy of technology makes him with Heidegger another pioneer in the Western philosophic tradition. (Lechner1971: p.75)[40] His essay "Toward a Philosophy of Technology" begins with the question whether there are philosophical aspects to technology. In his answer, he justifies a philosophy of technology because modern technology touches on almost everything vital to man's existence. Therefore, if there are philosophies of science, language, history, art, ethics and politics, then there can be a philosophy of technology also, because it is integral to all the above in the world of today. (Jonas 2004: p.17)[41]

For Jonas, a philosophy of technology, according to the classical tradition has two fundamental perspectives: the formal aspect (formal object) and the substantive content (material object). The formal aspect implies that technology is a continuing collective enterprise which has its own laws of motion, structure and is autonomous. It constitutes the abstract nature of technology. The substantive content, or material object of technology, is concerned with devices, tools and techniques which technology, "puts into human use, the powers it confers, the novel objectives it opens up or dictates, and the altered manner of human action by which these objectives are realized." (Jonas 2004: p.17)[42] To this division of formal and material objects of the philosophy of technology, Jonas also combines his division of classical and modern technology. With the formal object, he connects the classical technology and material objects are in line with the modern technology.

Though Jonas draws a distinction between classical and modern technology which are fundamentally different in nature, he deals mostly with modern technology. The chief distinction between classical and modern technologies is that the former was a possession and a state (static) while the latter is an enterprise and a process. In this sense modern technology pervades the whole of human existence. Classical technology was goal oriented. Each new discovery was a means to achieve an end. It was concerned with simple means to natural ends. (Jonas 2004: p.18-19)[43] Thus, classical technology was considered as something self sufficient and so its progress was halted. Modern technology does not strive for natural and immediate ends with simple means. It tries to surpass itself and to develop even further. It also spreads rapidly throughout the world due to communication systems which are among its achievements. (Carey 1992: p.170)[44]

[38] Heidegger, M. (1977) *The Question Concerning Technology and Other Essays*.
[39] Heidegger, M. (1977) *The Question Concerning Technology and Other Essays*.
[40] Lechner, R. "Toward a Philosophy of Technology", in *Philosophy Today*, 15(1971), 70-85.
[41] Jonas, H. (2004) "Toward a Philosophy of Technology".
[42] Ibid.
[43] Ibid.
[44] Carey, J. (1992) *Communication as Culture…*

Further, technology has the capacity of creating ends by offering new possibilities. Therefore progress is the inherent drive in modern technology. For Jonas, the progress inherent in technology, does not involve any values. As the destiny of humankind, technology has become restless. It is impelled by competition and by other factors like growth in population and restricted natural resources. Jonas states the driving force in technology is "the quasi-utopian vision of an ever better life, whether vulgarly conceived or nobly." (Jonas 2004: p.19-20)[45] He calls it a dynamism and explains it with the Spenglerian mystery of a 'Faustian soul' innate in Western culture, "that drives it, nonrationally, to infinite novelty and unplumbed possibilities for their own sake." (Jonas 2004: p.20)[46] When Jonas analyses the reason for this restlessness he finds the answer in the interaction between science and technology which he labels as the hallmark of modern progress. (Jonas 2004: p.22)[47]

Technology is a species of power. Machines are the arbiters of this power to achieve the objectives of technology. Machines have made man an object or another machine in the process of production. The Industrial Revolution is an early example of the power of technology where the increase in speed, ease and quantity of production were realized through machines. In the technocratic culture, machines become an essential part of life. For Jonas the greatest accomplishment of machines was to produce substitutes for natural materials which were scarce or costly. (Jonas 2004: p.24)[48] Machines themselves are artificial substitutes for the natural powers and organs. For example, Jonas sees the computer as the trans-nature of human making; for it is also a 'pervasive mentalization of physical relationships' which has its inherent paradox: "that it threatens the obsolescence of man himself, as increasing automation ousts him from the places of work where he formerly proved his humanhood." (Jonas 2004: p.28)[49] Contemporary technology, with its enormous growth of power engineering, electronics, aeronautics and computer technology, no longer imitates nature. Technology now does not help man with his deficiencies, but it actually does things that nature has never shown to humanity. Modern technology therefore aims at ends which have been created only by itself. According to Plato and Aristotle, *technê* was applied only to the nonhuman realm. Today man himself has been added to the objects of technology. Thus, "*homo faber* is turning upon himself and gets ready to make over the maker of all the rest." (Jonas 1984: p18)[50]

Jonas concludes his analysis of modern technology by saying that although humanity as a whole may have become powerful due to technology, men as individuals or even as large

[45] Jonas, H. (2004) "Toward a Philosophy of Technology".

[46] Ibid. Goethe's Faust is a classic poetic drama on humanism which tried to probe the new realities of the world after the technical and economic revolution of his time. Faust refers to the diabolic power. Basing on it Oswald Spengler introduced 'Faustian Soul' to indicate the nature of western culture. He refers to it also as 'Faustian culture.' Spengler, O. (1992) *Man and Technics: A Contribution to A Philosophy of Life*, London, European Books Society, p.59. He further explains this concept of 'Faustian Soul' in his *The Decline of the West*. "If, in fine, we look at the whole picture - the expansion of the Copernican world into that aspect of stellar space that we possess today; the development of Columbus's discovery into a world-wide command of the earth's surface by the West; the perspective of oil-painting and the theatre; the sublimation of the idea of home; the passion of our civilization for swift transit, the conquest of the air, the exploration of the Polar regions and the climbing of almost impossible mountain-peaks - we see, emerging everywhere, the prime symbol of the Faustian soul. ... And those specially Western creations of the soul-myth called 'Will', 'Force' and 'Deed' must be regarded as derivative of this prime symbol." Spengler, O. (1932) *The Decline of the West*, New York, Oxford University Press, p.99. On the whole the Faustian Soul refers to the above mentioned pressures and the limitless 'will' that characterizes Western culture and mentality.

[47] Jonas, H. (2004) "Toward a Philosophy of Technology".

[48] Ibid.

[49] Ibid.

[50] Jonas, H. (1984) *The Imperative of Responsibility*.

groups, have lost power. Their everyday lives may be improved, but should the system fail, their lives would be significantly worse than the lives of people, of old times. (Jonas 2004: p.30)[51] On the whole his philosophy of technology demonstrates the deterministic character of technology.

"Technology as Efficient Ordering of Human Activity": Jacques Ellul

Ellul was emphatically negative about technological development. He constantly criticized the domination of technology over the human beings and cautioned humankind of its disastrous effects. For Ellul modern technology has become a total phenomenon for civilization, the defining force of a new social order in which efficiency is no longer an option but a necessity imposed on all human activity. He envisions that in the end, technique has only one principle to become an 'efficient ordering.' Thus he views efficiency as a necessary commodity of technology. (Fasching 1981: p.17-18).[52]

Ellul says that at present age man cannot live without the technical gadgets. At the same time, man is also at the risk of their hazardous consequences. Instead of technology being subservient to man, humans have adopted themselves to the techniques. (Ellul 1989: p.136)[53] Therefore the nature of technology, for Ellul, is very influential that it escapes any judgment over it. Whether we judge it good or bad, it continues on its way and become a dominating point for humanity. Thus beyond being an instrument, technology has become an environment and a way of life. This aspect of technology is called the substantive impact and Ellul shares with this notion. (Feenberg 1991: p.8)[54]

Technological Dilemma: An Ethical Evaluation of the Technological Progress

Technological developments are seen today as having their good and evil effects for the human beings. They mark the liberation of mankind from many of the tyrannies of nature. So many great walls that stood as obstacles to the human growth have been demolished. The constant growth in technology promises a new age of opportunity in all the human affairs. Many superstitions and needless sufferings of the past have been eliminated. The present condition of human life with all its comforts, facilities and safety are to be attributed to the development of technology. Human progress would not have been realized without technological advancements. As Herder observed man as a deficient being must compensate for his lack of natural tools and weapons by the creative use of science and technology. (Herder 1985: p.118)[55] However, technological advancements while promoting the quality of life have, in the process, enslaved mankind. (Jonas 1982: p.893)[56]

The good and evil effects of technology have created a dilemma for the contemporary society and there are many issues raised by the development of technology as having their impact on the human beings. Among them ethical issues are crucial and urgent and they provoke a philosophical reflection. As proposed in the introduction and throughout this article, concentration is made on the philosophical aspects of the technological advancements in order to evaluate their ethical implications.

[51] Jonas, H. (2004) "Toward a Philosophy of Technology".
[52] Fasching, D. (1981). *The thought of Jacques Ellul: A Systematic Exposition*, New York, Edwin Mellen Press.
[53] Ellul, J. (1989) *What I believe.* Grand Rapids, Eerdmans.
[54] Feenberg, A. (1991) *Critical Theory of Technology*, New York, Oxford University Press.
[55] Herder, J.G. (1985) *Ideen zur Philosophie Geschichte der Menschheit*, Wiesbaden, Fourier.
[56] Jonas, H. "Technology as a Subject for Ethics", in *Social Research*, 49 (1982)4, 891-898.

At the same time it is also noted that beyond its good and evil, technology can also be viewed from a neutral point of view without adding any value to it. This means that technology in itself can be neither good nor bad. It can be used for any purpose by any persons. (Feenberg 1991: p.6)[57] This neutral aspect of technology affirms its instrumentality, which means that it is regarded as a tool which serves the purpose of the user. To use a popular example, technology is like a knife that can be used to cook, cure or kill. However, in such a situation, where technology has created a dilemma for the contemporary society with its good and evil aspects, such a philosophical consideration includes both of them leaving out its neutrality.

Aristotle's notion of technology as imitating nature is based on his time. Therefore his notion is incompatible with the contemporary age, where technology has superseded nature in many ways. But he gives a basic understanding of technology as that which originated from the imitation of nature and is motivated for the human use.

Bacon was already conscious of the power of contemporary technology and he proposed a goal or ideal for it, to manage the nature for the development of mankind. Heidegger neither supports nor rejects technology. He is analyzing it objectively with its pros and cons and ends up in an ontological understanding of it. So his philosophy of technology becomes a metaphysical exercise without any relation to life experiences and environmental realities of the world which confront the effects of contemporary technology because he affirms the danger and saving power of technology.

Jonas and Ellul assess the rightness or wrongness of technological interventions in human life and nature in terms of the value of their consequences. Ellul in contraposition to Bacon did not favour the domination of technology in human life. For him the technical progress has three kinds of effects; the desired, the foreseen, and the unforeseen. So he is affirming that man has to adapt technology to his life instead of becoming an object to technology which could be an unforeseen effect of technology. (Ellul 1990: p.61).[58] Jonas also pointed out the ominous side of the 'Baconian Ideal' as that marks the "danger derives from the excessive dimensions of the scientific-technological-industrial civilization." (Jonas 1984: p.140)[59] On this basis Jonas thinks that humankind has come to a point of no return where it will never succeed in regaining control over technology and assessing its values. He observes the ability of technology to play with the deepest core values of human nature. He identifies two ethical problems: first, the technological advancements, that is, the *Homo faber,* have attributed a new decree to human knowledge that is to the *Homo sapiens*; second, the promotion of new technologies must be concerned with the true destiny of humanity. (Jonas 2004: p.23, 29)[60]

Mankind's success as a tool-making and tool-using animal has soared to the present heights of megatechnology. Henry Drummond in his Lowell lectures explained the substitution of tools for human organs. Such a situation gradually turned humans into passive machine-serving animals and reduced them to creatures mastered by machines. (Spengler 1992: p.66)[61]

By the interpretation of the Greek concept *technê,* technology is understood as a rational entity and therefore universally applicable. In this sense one could observe that it has become the universal essence of humanity. It is leading towards a universal technocratic culture and in this it tends to unify all mankind in shaping a universal culture. Highly

[57] Feenberg, A. (1991) *Critical Theory of Technology*.
[58] Ellul, J. (1990) *The Technological BluffI,* Grand Rapids, Eerdmans.
[59] Jonas, H. (1984) *The Imperative of Responsibility*.
[60] Jonas, H. (2004) "Toward a Philosophy of Technology".
[61] Spengler, O. (1992) *Man and Technics*.

advanced communication systems and social media are visible signs for this trend. Thus technology has helped humanity for its ascent and empowered humans to control nature and opened up new frontiers to create a global village.

The immense technical possibilities have given an objective for the modern man not only to dominate the physical nature, but also the human nature. Biotechnology is seen as a recent manifestation of the technological progression. Since this article deals only with the philosophy of technology and its ethical implications, biotechnological developments and intervention on human nature are not considered.

Conclusion

The philosophical analysis of technology and its ethical implications envisages an orientation to understand the impacts of technological growth on humanity and environment, because the ends and means of contemporary technology have gone beyond the power of human ability to restrain it. This would endanger the future of the human being, destroy the dignity of life and shatter the environment of living organisms. This situation could result in all organisms including human beings, being treated as mere instruments for technological motives and as mere objects for experiments and manipulation. Jonas warns that such situation can lead to a future where all organisms may be considered as appendages to technological purposes. (Jonas 1984: p.ix)[62]

Attention has to be paid to view technology as a factor that promotes a dualism and alienation: a dualism of mind and body, where mind is elevated and body is suppressed, a dualism of man and machine and a dualism of human intelligence and artificial intelligence; an alienation of human nature and behaviour which has become more machinery and artificial than human, and an alienation of human talents and labour[63] which are substituted by machines and devices. In another sense, technological development signifies the state of the human growth as *homo faber* becoming a substitute for all other aspects of human identity and growth.

Contemporary technology is the destiny of humankind in the sense that, unlike traditional technology, it is an enterprise, a process and a dynamic thrust upon human nature. Thus it has become the goal and ultimate destiny of humanity. In other words contemporary technology has become the central purpose of all human endeavours. As a destiny of the humankind technology has enslaved humankind.

The megatechnology or technocracy has influenced nearly every aspect of human life that man needs to reconsider now in a substantial way the environment and human nature. The immense growth of technology in the present age has endowed the human beings with the capacity of destroying even the very conditions upon which life depends. The efforts to safeguard the integrity of the living world in the midst of such technological crises must be taken by formulating the imperatives for technological age. This will result in providing concerns regarding the ethical implications of the techno-scientific culture to liberate humankind from the deterministic character of technology.

Further philosophical reflections on technology are to be developed to analyze the issues resulting from the contemporary technocratic culture in an ultimate way, in order to defend the value and dignity of each individual human being which is lost by the technicalization of life with machines, which has done away the human dignity, individuality and originality.

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[62] Jonas, H. (1984) *The Imperative of Responsibility*.

[63] Alienation of man and labour as the result of industrial revolution has a detailed treatment by Karl Marx in *Das capital*.

In the contemporary society, there is a serious invitation for all, to reflect about the technological determinism and its potential threats to humanity. Such deterministic picture of technology challenges whether the contemporary society is ready to accept the above invitation to contribute to the construction of a new humanism based on integral human values and concern for the environment.

Science and technology are precious resources for promoting the integral development of man. They are ordered to man, from whom they take their origin and development. However their advancements have crated a technological dilemma and the fundamental symptoms of the technological crisis are scrutinized here. Still, with all its dilemmas, as A. Pacey observes, technology is seen as a part of contemporary life which is not something that can be kept in a separate compartment. (Pacey 1992: p.3)[64]

[64] Pacey, A. (1992) *The Culture of Technology*, Cambridge, MIT Press.