An Inquiry into the Meaning and Essence of Technology

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ABSTRACT

Most definitions of technology offer simple and unobstructed descriptions of this term, while some of them also add a description of technology's essence, the latter of which has also been questioned by some authors. In light of the foregoing, this paper has two tasks: 1) to define technology for both its material and immaterial effects, making note of tools, devices, machines, and apparatuses on the one hand, and procedures, organisations, methods, and strategies on the other, and 2) to discuss and identify its essence. In this twofold attempt, the relationship between definition and essence is analysed. Apart from any underlying complexity, this relationship indicates that essence means something other than a simple definition because definition and essence are not conterminous.

1. INTRODUCTION

In conjunction with James Joyce's attempt to explain an intricate term as given in A Portrait of the Artist as a Young Man (1916, p. 216) when defining beauty, we should add that the meaning of anything requires a mechanism that must be equated with some type of measure for its message. In most situations, language is the mechanism. Although indispensable in achieving

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its goals, language also contains innate imperfections and latent ambiguities that can lead to misunderstandings. Despite these shortcomings, it is the intention of this paper to uncover the meaning and essence of technology, while hopefully avoiding negative connotations. We will also attempt to avoid difficulties associated with the philosophy of meaning, particularly in light of its semantic and foundational theories.

Regarding language, there must be agreement as to what words mean; otherwise, communication would be impossible. We communicate because we agree, but the same referent may mean slightly different things if a word is concrete (referring to things) or abstract (referring to ideas), a denotation (designation) or connotation (suggestion), or if a word has different meanings from slightly different contexts, however, defined. Concrete refers to words whose referent can be depicted or specified, whereas abstract refers to words whose referent is seemingly less visualised due to generality or complexity. Words that are concrete are usually more precise, and words that are abstract are usually less precise, although living in the world naturally puts more emphasis on concrete words. A denotation (or designation) gives an interpretive stance commonly associated with entries in a dictionary, but when a word does more than simply designate a meaning, we encounter a connotation (or suggestion) that would add an attribute or quality to its meaning. Usually, connotation precedes denotation.

The definition of anything may bring to mind the idea that it should include an underlying reality or essence of the thing defined. As commonly understood, essence means the basic nature or hidden structure of something. It may be a natural inclination to search for the meaning of anything, but to search for the meaning of essence may be extremely difficult. Regardless of sincere attempts at definition, an answer can still be found. At the very least, a definition is an attempt to explain the phenomena of the world. Although grammars and dictionaries are produced later in a language's evolution, they appear to be afterthoughts when compared with the appearance of words. Somewhere along the way in the definition of anything inevitably lies the idea of essence, which compels us to confront the task that we have before us which not only attempts to find the meaning of technology, but

also attempts to search for its essence [1]. Although it may be asked if technology has an essence, we should also ask how it is understood. Is it understood merely as the equivalent of a simple description, which would parallel a definition, or is it a way of revealing its fundamental nature or underlying purpose? No essence is the cause of the being of a thing. Rather, it is a description of its being as we understand the term[2] [1].

An essence is a description of the underlying nature of a thing. It is a summary of what makes a thing what it is, but an essence does not pre-exist before its being came to be. No essence represents the existence of a universal ante rem. Although the essence of a thing does not exist before the thing that has an essence exists, it signifies that something is, and that is all that it signifies. If an essence is delineated within a conceptual rather than an empirical sense, we would not have to posit the existence of its being if we wanted merely to understand its essence, but then again we would not experience it either. Nevertheless, in general, we can say that an essence is noteworthy by its simplicity, and yet it does not survive the demise of its being. Its significance is not some hypothetical immortality, but the embodiment of a being, which in itself is profound.

In our discussion, technology encompasses material and immaterial (or non-material) effects of its presence in the world, comprising tools (including weapons), devices, machines, apparatuses (artifacts in general) such as clay pots, electric drills, and jet airplanes on the one hand, and procedures, organisations, methods (including techniques), strategies (including tactics), and anything else that emanates from its presence such as industrialisation, nanotechnology, and artificial intelligence on the other. Of these two categories, the latter may be just as important as the former, which implies that humans are not only toolmakers, but also

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[1] *The fact that the meaning of definition can be confused with essence should bring to mind how commonplace it is to misinterpret anything, as watts are confused with lumens, love with romance, or moral strength with perseverance, to name a few. It should also remind us that terms with a wide and conflicting range of meanings may be deliberately distorted, such as illiberalism, because they do not represent clear or coherent ideas.*
[2] *Because of the influence of the Catholic Church and its supportive theology in the Middle Ages, essence was equated with substance or nature, although originally it described being (einai or ousia) in its beingness.*

organisers. Technology is found in its individual parts because it exists in the whole of them. The inclusiveness of technology's material and immaterial effects may seem prohibitive to finding answers to our inquiry, but regardless how we proceed, any study of technology will be complicated by the meaning of its definition.

Questions regarding essence are often associated with the ancient Greeks, particularly with Aristotle, who concluded that definition may be equated with essence [2,3] although it might be easier to define what a thing is without disclosing its underlying reality. If this observation is correct, then we should be aware that an essence entails something other than a simple definition. We should keep in mind that we cannot refer to anything without in some way introducing words or phrases that allegedly refer to the thing itself when compared with its attributes or characteristics, as discussed by Ayer [4], which seems contradicted by Frege [5] who supported the idea that a definition does not really describe anything at all about a thing, but simply equates it with words or signs that supposedly represent what the thing is. Apart from these contradictory views, Ayer and Frege seem to agree that definitions remain elusive.

The relationship between definition and essence concerns two separate domains without recourse to a commonality. Both are limited, but a definition is limited by the comprehension of what it purports to be, even when not dependent upon perception, and an essence is limited by the nature inherent in its reality as a description of its being. Although these two domains appear to be similar, they are really dissimilar because a definition is comprehensible by its limitations, whereas an essence is comprehensible by its latency.

Like the Latin infinitive definire from which it is derived, a definition sets limits, but a limitation (or definition) is devised in order to develop the idea of something. It is more than a delineation of a term because it comprises an explanation of the presumed nature of things as represented by a term. Even if a definition attempts to do more than develop an idea, it must also control the limits of that idea, such as what a thing does, what it is made of, how it is used, where it is found, or how it appears. Definitions by description may be less precise than formal definitions, but they are more useful. At the very least, a definition should be an honest attempt to describe the things of the world without being

burdened by uncertainties. It remains a means, not an end, to understanding. Because definitions are intended to serve specific purposes, they fall into distinct categories, most notably real or nominal, extensive or intensive, analytic or synthetic, denotative or implicative, lexical or explicative, contextual or conditional, all of which are applicable to specific conditions that lack universality [6,7].

We indicated that a definition is derived from the boundaries of a thing, and once they are set, it acquires a meaning. In all fairness, we should inquire about the criteria that set the boundaries of anything because they are everywhere, in our politics, in our laws, in our religions, in our worldviews that we know will change for better or worse at a later date. A definition should be objective and rational, and if it fails to achieve this result, it is self-defeating. Like partisan politics, a definition may give an unreliable assessment of reality. Unintelligible definitions are useless, but a definition in itself does not verify existence. All definitions are supplemental to existence because existence precedes definition, that is, formulating a definition of anything is subordinate to the verification of the existence of a thing [8]. Although a definition sets the limits of something, this does not mean that it is an accurate reflection of reality. It remains merely a humble attempt to uncover the truth allegedly contained within words that hopefully describe the truth contained within things.

But how can we set the boundaries of an essence? Since boundaries are supposedly set by the nature of the thing that has an essence, we would have no input in determining its boundaries nor make any contribution in assessing its meaning. Stated simply, a definition cannot be equivalent to an essence. If an essence is fundamental, a definition is supplemental. A definition is an attempt to assess reality, but an essence already is assumed to be reality. Since essence is described by Aristotle as "that which it is said to be" (to ti en einai) [9], it seems to give the impression of a derivation from the past. In Aristotelian tradition, it seems more likely to be timeless. In what sense is essence contemporaneous with a present state of being if presence concerns existence? We should reiterate that according to the Greeks, essence and existence were never separated because both were associated with einai. Only in the Middle Ages was it assumed that the essence of God as the supreme entity must precede all

other beings, and only then were essence and existence separated. The presumed pre-existence of essence takes us back to Plato's theory of ideas (or forms) that strongly opposed the Heraclitean doctrine of flux [10], but it also takes us back to a worldview that is impossible to prove.

Even in Heideggerian terminology, essence—an underlying reality—is hidden and not present, and is expressed by Heidegger as something that is real in its readiness (Zuhandenheit or readiness-to-hand) to be actualised when manifested into a presence (Vorhandenheit or presence-at-hand) [3] [11]. More than this distinction when Heidegger describes technology, he fails to define it precisely and fails to clarify its presumed essence, even apart from his acknowledgment that technology is a way of knowing. His description of "enframing" as a "challenging forth" for the essence of technology (known in German as Gesell that allows humans to reveal reality as a type of "standing-reserve") explains very little [4] [12,13]. As a criticism of Heidegger, we may say that since definitions and essences are different in regard to their meanings, they cannot be conterminous because they do not have similar or coincident boundaries that determine what they are [14]. A definition is meaningful because its limitations determine what it is (as derived from definire), whereas an essence is self-determined regardless of any verbal identification. Enframing may be an attribute of technology, but it certainly is not a definition.

To further this argument, we can say that it is one thing to affirm that a predicate should be equal to the subject of a sentence when the latter is offered as a definition, but it is another thing to say that a predicate is equal to an essence. The subject of a sentence is known as the definiendum (that which is defined) and the predicate of a sentence is known as the definiens (that which does the defining). The definiendum and the definiens are interdependent because neither can exist without the other, but this relationship has nothing to do with essence, which would or would not exist regardless of any definition. A definition may reveal what already

exists, and yet falls short of a complete understanding. It is merely a reflection of knowledge, whereas an essence hints at what lies deeper. This conclusion is true because the subject of a definition is conditioned by the meaning of words, but an essence is conditioned by the meaning of being, which is unrelated and may exist before any words, or may fail to describe what essence is accurately. Although words are used in order to formulate an understanding of things, definitions remain auxiliary to the identification process that constitutes a thing. The identification of anything and its definition, for example, are different from the identification and definition of another thing, and both things are different from the identification of something else. When a thing is distinguished from another, it is identified as a different being, and when it is identified as a different being, It is distinguished from another. Identification is the means that allows us to differentiate one entity from another, and it is directly related to the evolutionary process of object identification that originated with our hominid ancestors on the African continent.

Because a name helps to identify a thing, it allows us to describe what a thing is, and it is language that does this. It should not be denied that language has facilitated our coming of age, so to speak. It enables us to ask questions and to seek answers about the state of the world. But language is also needed to think about essence. As we indicated above, our concern with essence concerns its relationship with definition, and both are relevant to the meaning of technology; but the difference in interpretation regarding the importance of toolmaking or language as the deciding factor in devising technology has little or no bearing on defining it or identifying its essence. Even accepting the fact that tools and language do have an influence on technology does not displace the realisation of technology's existence or its impact on the world.

In addition to boundaries, the circumstances or applications of a thing determine its definition, although it may be concluded that any condition can bring about an influence on a thing's state of being as a way of determining what it is. Therefore, the existence of the world or the natural environment as a distinct entity has a direct and irreversible influence on what a thing is. This interplay helps us understand reality, as it also helps us understand the milieu of the past, impacting ourselves and other life forms. It is

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[3] *"Aber Zuhandenes 'gibt es' doch nur auf dem Grunde von Vorhandenem. Folgt aber—diese These einmal zugestanden—hieraus, dass Zuhandenheit ontologisch in Vorhandenheit fundiert ist?"*
[4] *Despite this criticism of Heidegger, we cannot ignore the indispensability of his metaphysics and his sincere attempt to understand the "hidden" reality within things.*

common knowledge that things do not exist in a vacuum because they display a dependency on everything else. It is also common knowledge that the natural environment originally was more important than our social environment, although today less so, because it helped to create us. Even before humans became toolmakers, they most likely observed the ways of other animals, and imitated their skills of survival. Although not toolmaking per se, imitation symbolised techniques that may be perceived as early forms of technology.

Because technology is influenced by historical nuances and cultural contexts, it is deemed particular in one sense, but general in another. For example, many cultures developed iron metallurgy, but its appli-cation varied widely from primitive metalworking among the Mesopotamians to the ulfberht swords used by the Vikings to sophisticated technological expertise among the highly-skilled samurai of medieval Japan. The Mesopotamians, Vikings, and Japanese pursued iron technology, and despite improvements over time, only the Japanese culturally and existentially transformed it into a life-long devotion to iron weaponry with a supportive code of honor (bushido). This observation indicates that the circumstances or applications of technology are universally applicable within non-universal settings.

It should be noted that unlike medieval philosophy's preoccupation with essence as fundamental to being, modern philosophy is less essentially directed. Apart from challenges by analytic philosophy, particularly by Wittgenstein, Russell, and Quine, a description of essence is still useful. And despite the lack of support by some writers of technology, the relationship of essence with metaphysics is still important. It is still important in the thought of Rapp, who in addition to inferring that an essence is a definition, limits its importance to material technology only, the latter of which is derivable either from engineering or science [15], as it is also important to Hickman in his interpretation of Dewey in which essence is not definable as something fixed, but as something variable that results from inquiry [16]. Additionally, Dusek stresses the difficulty in defining essence, but he also emphasises that many writers do not know what essence means, who then present confused or inaccurate understandings thereof [17].

Although no longer pursued by logicians, but given support by some critics, such as Putnam and Kripke, essence will continue to be a part of philosophy, and it should remind us that once an idea or concept is introduced, it may continue to stimulate discussion.

2. DISCUSSION

An inquiry into the nature of technology should acknowledge how other thinkers have defined this term. Although attributed by some scholars to the early nineteenth century, the word "technology" first appeared in English in the early seventeenth century[5]. Originally a description for the mechanical arts, technology acquired additional meanings in the twentieth century that indicated a greater inclusivity, and hopefully, a greater understanding. In light of this, technology has been defined as an expression of life's inner conflict (Spengler), a reform, but not a reaction, to nature or circumstance (Ortega y Gasset), the use of nature for producing useful objects and effects (Jaspers), the preservation of the human environment through design (Dessauer), the totality of methods having absolute efficiency in every human endeavor (Ellul), applied science when expressed through rules based on laws (Bunge), the life-centered mechanism for self-transformation (Mumford), the transformation of nature (Beck), organised knowledge for practical purposes (Mesthene), systematised knowledge embodied in practical skills enabling society to produce goods and services through skills, organisations, or machinery (Gendron), the embodiment of technique (Barrett), a form of human activity (McGinn), the application of knowledge for practical tasks (Pacey), practical implementation derived from intelligence (Ferré),

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[5] *Buck,G., The Third Universitie of England, section 48 and conclusion: "… and to retaine their principles, and rules, in minde and remembrance (and which may also serve for an apt close [appropriate closure] of this general Technologie) I must not omit that …" Buck's treatise appeared as an appendix to The Annales, or Generall Chronicle of England, began first by maister John Stow, and after him continued and augmented … unto the ende of this present yeere 1614 by Edmond Howes, gentleman, Londini: Thomas Adams, 1615, 988. This etymological reference to Buck's treatise is given in abbreviated form in the Oxford English Dictionary, eds. Simpson, J.A., Weiner, E.S.C., 2nd ed., 20 vols., Oxford: Oxford University Press, 1989, vol. XVII, 705, s.v. "technology." Since many technicians of the medieval and early modern periods, if not all periods before them, were often illiterate artisans, the term "technology" may have been known for many years before it was first written down in what appears to be—based on the historical evidence—in Buck's treatise. The spelling and substitution of "technology" (English) for "technologie" (French) appeared by the early eighteenth century.*

the totality of artifacts and methods used to shape a relationship with the world (Rothenberg), the manufacture and use of artifacts (Mitcham), a program of phenomena that is purposeful (Arthur), or the guiding principle of human behavior and interaction when determined materially (Böhme) [18-35].

Although more definitions could be added to this list, most of the definitions presented here indicate or imply the embodiment of some type of skill. In one way or another, they are not inaccurate, but many of them circumvent the complexity of such an ambiguous and ubiquitous term. All of them indicate that there are layers (or levels) to the meaning of technology, like the layers of an onion. Whether denotative or connotative in meaning as discussed above, the definition of technology should bring to mind other terms that also have equally broad applications, terms that entail more than a simple meaning of a singular condition from a limited perspective. Although the meaning of technology is reflective of the perceiver, this understanding must in some way relate to a universal definition.

We have indicated that technology is both material and immaterial, which includes tools, devices, machines, and apparatuses as one category, and procedures, organisations, methods, and strategies as the other. Disregarding artificially contrived novelties, all technologies are fabricated toward specific goals. If these goals are fulfilled, it is because they are devised for specific purposes, but no technology is a goal in itself. Rather, it is the means to achieving one. Nevertheless, if essence identifies what something is in itself by allowing a thing to be what it is, then technology serves something other than itself because it is relative to the service it performs, which is true for both its material and immaterial effects. It exists because it has been conceived as the means for the completion of what has not existed before and may not exist again, although the perpetuation of earlier forms may be sustained indefinitely into the future. The hammer, for example, is useful because it fulfills an appointed task with a distinct specificity. Since all things may be assumed to have some innate purpose, such as plants or animals serving as a food source for other organisms, this relationship is intensified with unnatural things, such as hammers, because they do not have a goal in themselves, but are designed in order to achieve one. Its design constitutes a process. Although

a hammer can also be used as a weapon, it is commonly used as a driving mechanism (such as driving nails) by directing pressure to specific areas. Even its misuse does not displace its original purpose. Therefore, in addition to being essential, unnatural or human-generated things are also teleological, which has been greatly augmented in the modern age. Although the ends of technology that originated in prehistory and increased in antiquity and the Middle Ages have been extenuated with its means in the modern age, in what sense does teleology relate to essence?

In a general sense, an essence concerns the nature of what makes a thing, entity, being, or object be what it is. The essence of a rose is different from the essence of an elephant, and both are different from the essence of a volcano. Because the notion of what constitutes the essence of a thing has long been equated with its definition, this equivalence has produced difficulties for human-generated entities or unnatural objects. In a simple comparison between natural and human-generated things, it can be said that if there is an essence of a natural thing, it must be determinate in the nature of what that thing is, a truth that compels us to conclude that an unnatural thing (or artifact) must also be determinate in its nature, such as hammers, and yet is supplemented by what it does, since an unnatural thing is created above and beyond the natural development of things. All unnatural objects contain something natural, either in its material constitution, or in the process by which they were formed, such as by smelting, or fabricating, or shearing, to name a few.

It would be true to say as well that natural things, such as trees, that have been removed from their natural habitats and placed somewhere else for landscaping or prevention of soil erosion still retain their essences while fulfilling technological roles. If it cannot be concluded that everything has a use that helps to determine what it is, then it also cannot be concluded that utility must be associated with objectivity, since a wild and dangerous alligator, whether or not it is useful, is as much an object as a gentle and harmless dog.

A natural thing is innate to itself, self-contained, self-defined, and self-oriented to what it is, but an unnatural thing acquires additional traits, which is why it is unnatural. A wild goat or sheep has acquired additional qualities when domesticated. As difficult as it may be to explain their

domesticated role among humans, we must admit that they are unlike their native stock. They retain their essences, even the collective experiences of their species through instincts, but they have also acquired something additional. They have been domesticated by genetic changes brought about over many generations that have been environmentally enforced [36]. Domestication means that an animal has the ability to live within close proximity to humans because the latter desire it. The issue for our discussion centers around things that are not natural or things modified from their natural state. It is not so much because they have been deliberately altered in some way, but because they are purposefully different from what they are in reference to what they do, and what they do defines them in reference to what they are, an idea applicable to goats and sheep, tools and machines, organisations and methods, the internet and genetically-modified food. Since what they do is purposefully different as a deciding factor of what they are, it is a deciding factor of technology.

The essence of a thing, much like consciousness of it, must be distinguished from the essence of essence because the former is existentially opposed to the latter. This is to say that whatever exists has its own essence that must be differentiated from all other essences that it is not, but an essence does not create or form anything. Although anything may be assumed to have an essence because it has a structure or nature, it cannot be attested that a thing lacks an essence because its nature does not penetrate to the essential embodiment of what it is. How would this be possible if a thing conceivably had no essence and still remained what it is? An essence must have an existence, otherwise it would not be an essence, but it also must have a being for the same reason. An essence is not predetermined. It exists only when its corresponding being exists. If existence verifies essence, then essence reaffirms existence. This relationship is true because an existent is its essence. If existence verifies being, then being reaffirms existence. Technically, an essence is not in its existent, but is the disclosure of its being[6]. Therefore, essence, being, and existence are correlative or reciprocal, but they are not identical. The existence of a thing must be

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[6] *Which is to be distinguished from Sartre's understanding that existence precedes essence, that is, the totality of our daily existence—existentially—can be equated with an essence upon death.*

external to its essence in order to be that thing, but it must also relate to its essence that makes it what it is and distinguishes it from what it is not. An essence must be particular because its corresponding being is particular.

Saying that the individual and categorical effects associated with technology are too varied to have an essence ignores the obvious, that is, if anything lacks an essence for what it is, it would not be what it is. But neither do these individual effects share a common essence. Each effect must have its own essence that makes it distinct. Nevertheless, the notion of essence is not complicated. It simply means that there is a ground to the being that goes to make it up, an idea that has been compared to Aristotle's formal cause. If an essence is a description for what is basic to a being and is not concrete to it, it still remains a viable concept for understanding what it is. The simplicity of an essence concerns the presence of its corresponding entity, and it has nothing to do in fact with any alleged universal that may be compared with other individuals. If an essence is the confirmation of an entity, it does not need to transcend to anything else to affirm that it exists. An essence, marked not by complexity, but by simplicity, is not a profound idea, and it does not need anything to affirm its meaning. A natural being, such as a butterfly, must be both essential and existent. Any difficulty with this metaphysical reasoning concerns beings that are not natural, such as a chair. Although a chair is made for a specific purpose because it is desired for sitting upon, does it have an essence? Since a chair exists as an embodiment of technology and is one of its individual effects, it must have an essence in so far that it exists and also fulfills the role for sitting. Nevertheless, the essence of a chair is different from the essence of a butterfly, since what distinguishes them is immediately apparent, and their differences are known intuitively [37].

Any difficulty with this reasoning does not concern the nature of essence so much, but the nature of its extended meaning. If butterflies and chairs have essences, are they important because of their nature or some other factor, such as their utility? As we investigate the nature of a chair or any unnatural thing, we can uncover the meaning of its being in relationship to its utility that determines its quiddity, while maintaining that its utility is supplemental to its being. Comparatively, there is no utility for butterflies because their existence is unrelated to anything beyond what they are. Butterflies are

situated within being unaffected by a utilitarian directive and chairs are situated within being because they are affected. Therefore, utility is a primary distinction between butterflies and chairs. If chairs lost their utility, they would still exist, but we would be compelled to ask for what purpose are they useful. Although many tools and machines have been superseded, they may still be used. They may be displayed in museums as representations of inventions and innovations that are no longer relevant, but their lack of relevancy does not eliminate their existence. Typewriters and word processors can still be used today, but computers are generally used instead.

We should also question the idea that technology remains definable by its use even when presumably lacking an essence [38]. Such an idea ignores the fundamental truth that even when something is no longer useful, it still is, like an old pair of socks with holes in them. Landfills and garbage dumps are filled with objects that have been discarded for many reasons, only one of which is utility, but their replacement by other objects does not eliminate the fact that they exist, or in the case of discomposed matter, that they did exist. Furthermore, the idea of the lack of an essence ignores the understanding that an essence is an explanation of the ground of a being.

Just as perception places restrictions on how we see something, utility is also the effect of perception, and it indicates that the use of anything is reflective of how we look at it. But not all technologies are intrinsically useful, which is also true for some traits of evolution, because some novelties or trinkets have no practicality, and must be manipulated in order to be useful. Although they must be contrived in order to acquire meaning, the fact that they can be sold to generate a profit for their makers hardly justifies their usefulness.

As the embodiment of diverse technologies, technology as a cumulative word conceals nothing, a truth that is meaningful even when technologies are deliberately hidden, such as the production of silk in ancient China, "Greek fire" in the Byzantine empire, or the protection of craft secrets by medieval guilds. Technology as a phenomenon is characterised by a revelation of what it is in reference to what it does. It promotes the functions of culture and the functionality of all that it contains. It is a worldly manifestation because it is completely phenomenal. Human-based technology, which is

not to be confused with the proto-technology of some animals, has no connection with nature, except that it emanates from us[7]. The specific purposes technology fulfills must not be confused with the understanding that no essence is concrete in its being, and yet is actualised in the being it is posited with. Technology is also posited with its being, but it achieves this position through our agency. We become the basis for technology and its motivating factor because we facilitate the way in which it is revealed, an idea that is fundamental to a basic understanding of technology.

To cite an example, there is a major difference between a natural and unaltered block of marble lying in a quarry somewhere and the unnatural object known as Michelangelo's David because the former is defined simply as a type of stone, whereas the latter is defined not only by marble as a particular type of stone, but also as a statue created by Michelangelo. The fact that the statue is made of marble is not crucial because it could have been made of bronze, wood, or some other type of stone. This comparison is further augmented by the statue's original purpose since it was intended to be positioned in conjunction with other statues along the roof of the cathedral in Florence, Italy, although it was positioned instead In the public square in front of the Florentine government office (Palazzo della Signoria), where it stood for a little more than 350 years. When people visit Florence to see this statue that is now housed in the Accademia Gallery, they do not expect to see an amorphous and unmodified block of stone, but a highly sculpted and technically crafted male nude of white marble by the Renaissance artist Michelangelo Buonarroti, and when they see this statue they learn that it is a human creation designed and shaped by one of the world's greatest artists. Michelangelo's David has become one of the most recognisable and most representative objects of all the art produced by the Italian Renaissance.

Technology, including the object known as Michelangelo's David, is a bringing forth of what did not exist before that contains an essence manifested within its individual parts that is reflective of its nature. Because technology, much like progress itself, is based on the result of previous experience, it is empirical. It is an understatement to say that technology is tied to

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[7] *I am grateful to Jordan L. Flint for his insightful understanding of essence and its relationship to technology.*

the world because the world is tied to it. Epistemologically, technology is a posteriori, not a priori [8]. Since a priori means prior to experience and relates to knowledge independent of anything based on it (as it also relates to innate forms of intuition such as perception or apprehension), it makes no sense that technology can be derived non-empirically because it is a temporal and worldly phenomenon, but this conclusion does not ignore the development of humanity's collectiveness, whether it is equated with group conscious-ness or some other inherited mechanism. In this sense, intuition must be under-stood psychologically, not technologically. Psychologically, intuition refers to the effects of the evolutionary process that formulated humanity's adaptations occurring over millennia[9]. Because technology is empirically derived from trial and error, it is expressed pragmatically, not theoretically. It is defined not from pre-existing conditions, but from conditions defined from circumstance—some accidental and some deliberate, some derivative and some self-generated, some isolated and some performed in concert with others.

Although we might say that the use of utility, without stating the obvious, applies to the idea of usefulness, it should not be confused with consequentialism, that is, the idea that an action is dependent solely upon its consequences or something that relates to it. To assume that technology's essence is based solely upon utility, even in a non-Ellulian sense, does not

completely explain its meaning. There must be something else that connects utility to unnatural or humanly-generated artifacts, objects, or entities. Even the term "artifact" is deceptive because its derivation from Latin means "something made by skill" (arte and factum), particularly in reference to objects, but it does not explain all the other technologies that are not objects, such as methods or systems. We said above that unnatural or human-generated things are defined by what they do, and what they do is a deciding factor of what they are. Nevertheless, there must be other factors that determine what they are. Even when we include politics or religion as having an influence on technology, we should admit that both of them are sociologically based, that is, humanly-generated.

Within the context of utility and its relationship to essence lies the designation and impact of the "fourth industrial revolution," which is a description of the rapid technologisation and digitalisation (or automatism) of contemporary life [39]. This revolution signifies more than changes to industry because it also deals with the effects of the internet, artificial intelligence, robotics, and digital technology in all their manifestations. Although societal changes caused by this revolution are characterised by the combination of these technologies, it is assumed that they will be harmonised into an integrated whole [40]. Since harmonisation is considered to be the underlying nature of this revolution, a period of stability is predicted for present and future generations. Regardless how the fourth industrial revolution evolves, its influence indicates the essential features of life in a technological age, from politics to economics, academia to civil society, engineering to science. It concerns the accelerated frequency at which every aspect of contemporary life is integrated, emphasising their utility in reference to society and individuals alike.

3. CONCLUSION

In general, we may conclude that the utility of anything is the result of actions activated by forethought. It is perceived as the means applicable to predetermined ends, for even a torture chamber to some extent is designed and customised before it is used. Therefore, utility is the result of planning tethered to prevailing conditions that might be beneficial to some people, but not to all. The goal of utility should not be misconceived because even its end may

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[8] *Dessauer believes that inventions lie hidden and dormant within a so-called otherworldly "fourth realm" until they are discovered. This "fourth realm," which is a description of an idea, not a place, is similar to how the ancient Greeks defined truth as the revelation of what was previously concealed. Unfortunately, such a view relegates inventions to a subordinate position. It demotes inventors to non-participants, as if they were spectators of creative activity. Although it does not eliminate ontological freedom, this condition reduces the latter to a type of instinct, and it nearly eliminates responsibility. Furthermore, Dessauer assumes that the essences of these inventions also reside within this fourth realm, that is, they reside within a domain of ideas. See Dessauer, F., Philosophie der Technik: Das Problem der Realisierung, 3rd ed., Bonn: Friedrich Cohen Verlag, 1933, 48-49 and 137-39. Because this interpretation takes an a priori view of humanity's inventiveness and technology's underpinning, it renders humanity blameless for any of technology's failures. Similarly, Heidegger's understanding of technology also posits an a priori character that parallels Dessauer's. Not surprisingly, whatever is accredited to a priori removes accountability for human actions. For Heidegger, see n. 11 above, esp. p. 19.*
[9] *Because intuition is fundamental to an understanding of technology (and its artifice), a future paper will address this topic.*

be equated with the means to other ends. An end may always be projected for the means to do something, but a means may be projected for the end of its success, since a new model of four-wheel drive automobiles, for example, may itself be transformed into the process that produced them. As old as the idea is when it first appeared in prehistory that tools may be devised to make other tools, specialisation led to improved techniques. Although an entity may have utility, it is not an attribute of its being. Rather, it is a function of a being's performance. And regardless how utility is perceived, it becomes the method for some other goal that, in large part, may be far more meaningful. The long-term effect of utility is never itself, but something else. Nevertheless, how are these thoughts applicable to technology, and how do they relate to its definition?

The many definitions of technology noted above indicate its ambiguity and complexity. No definition of technology is initially incorrect because all of them reveal some truth about its nature. Our task, however, is to offer a definition that is relevant to all its applications. If technology is equated, for example, with applied science, then it is not applicable to society, which is a type of technology, since society is not based on science. If technology uses nature to produce useful objects, then it is not applicable when useless objects are produced. If technology represents a reformation of nature, then it is not applicable to the numerous aspects of nature untouched. If technology indicates the methods used to generate efficiency everywhere, then it is not applicable to any situation that is inefficient. If technology concerns the making and using of artifacts to the making and using of anything else, then it is not applicable to any immaterial application. And the objections continue.

Technology is an indefinite term, even if we disregard its Greek derivation from techne and logia, meaning a methodical treatment of art or skill, although many developments and effects of technology have nothing to do with either. Some technologies are arbitrarily produced. Others are the result of unintended consequences or accidents, while others are irrationally conceived and yet are still applicable. Not all manifestations of technology are thoughtfully analysed or carefully produced in a laboratory. It should be concluded that technology is a term that describes any number of circumstances,

representing an environment laden with values and controversies.

If technology refers only to scientific or technical applications, then a technologically related term is needed in order to explain what remains. All effects systematically, that is, procedures, processes, organisations, programs, paradigms, strategies, tactics, methods, and techniques would require another technologically relevant word that connects the latter with the former. In lieu of devising a new term, technology seems to bear witness to a universal application, both to its material and immaterial effects. To describe society, for example, as a non-technologically based entity seems to circumvent its basic premise of being a mechanism for human interaction and cooperation. Whether society is intentionally or inadvertently devised is unrelated to society being a technology, that is, to its internalised state of being for human application (positive or negative). Because society is definable by culture and not by biology, it is definable by technology.

In the broadest sense, technology is both the cause and effect of culture, but first it was the cause. Human evolution started with the natural environment that related to humans as mammals, but eventually the natural environment was supplemented by culture that related to humans as human beings who are still mammals, but who are altered by a process that deliberately modifies nature. At that junction, technology became a deciding factor in human evolution, and it demonstrated that culture was variable because technology indicated the same quality. When humanity emphasised its cultural, rather than its biological importance, it became technological. As stated above, technology promotes the functions of culture and the functionality of all that it contains. The first hominid who picked up a stone to use as an implement so long ago began a process that led eventually to culture and its transformation. It supposed some type of social apparatus or group infrastructure that itself was primevally technological. From that event began the technological evolution of humans. Therefore, technology is a cultural phenomenon. It is the motivator of all the adaptations that have appeared in prehistory and history alike. Since culture is the result of human selection, it is the result of an openness within our being. It is the

effect, like many other things, of ontological freedom[10].

Since an essence is not the cause of the being of a thing, but a description of its being as it is understood, the essence of technology may be equated with its applications. Technology is not self-serving, but serves something other than itself, and because it is not self-serving, it is not autonomous. Since these goals are variable, technology is not a constant, but a process. It cannot be defined explicitly by its goals, but how they are applied. When limited to tools and machines, technology makes contributions to the world for human interaction, but what interaction remains for society, politics, economics, religion, or science? Since the totality of reality is constituted and mediated by its individual parts, is it not shortsighted to assign an importance to technology while ignoring everything else?

Although technology is teleological, it is also indeterminate. Teleology means having an aim or purpose, but it also means, like the notion of definition as derived from the Latin infinitive definire, that it is bound in some way. This variability of goals explains why the being of technology is different from its essence. Given that human choice is part of the relationship that introduces a motivating factor into its matrix, technology is definable by the conditions that relate to it, however they are placed and wherever they arise. These conditions are not pre-existing, but contingent. Because humans are the motivating factor that ties technology to its utility, determined by use and characterised by circumstance, it is defined by what it does, which leads us to conclude that technology is a mechanism generated by human choice that enables humanity to express itself in the world. It shapes the context in which it appears, adding to or subtracting from where it began.

We can expand what has been said elsewhere that the essence of technology is its presence when expressed through its involvement in the world [41]. Since no essence is concrete in its being, this understanding also relates to technology. And because the actualisation of essence is posited in its being, this understanding means that technology's essence is predicated by its applications. It should be apparent that technology means more than material culture, more than tools that have technical significance, and more than machines that supplement them. Because of the energy and procedures needed for the design and fabrication of these things, technology requires the direction of and guidance from people individually or collectively. It is as much the result of artifacts as it is of the process that produced them. It is as much the embodiment of social pressure within society as it is of social upbringing. When these factors are considered, we may conclude that technology facilitated the means of interaction that led to the development of social behavior, applicable for both hominids and humans alike despite the presence of fear, the defense of territory, and the pursuit of sex.

It might be easier to define what something is without revealing its underlying reality, but the essence of anything as well as the essence of technology means something other than a simple definition[11]. Regardless of essences, we should state once again that definitions are determined by the boundaries of the thing defined. A definition is supplemental to the basic meaning of an essence, and because a definition and its affiliated essence are different, they cannot be conterminous. Since technology allows us to modify our state of being, it may be defined as a cultural phenomenon that determines human existence. And because technology serves something other than itself, it remains relative to the end it serves which means that its essence, that is, its nature, structure, or composition, is definable by open-endedness that affects all circumstances pertinent to human development. It is not contradictory to say that the essence of technology is not technological, but ontological. Contained within this definition and this essence reside all the modes and manifestations of technology.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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[10] *If it can be said that there are events, happenings, and occurrences that are the result of cause and effect relationships, then it can be said that determinism is a consequence of those relationships. Therefore, there is a connection between actions caused by us as free agents and actions caused by external forces, but regardless of determinism, freedom (or free will) still exists, although it is not unlimited.*

[11] *Looking for more than the definition of a thing seems to have compelled Aristotle to inquire about its essence. Otherwise, a definition would be reduced simply to an account of an object. See Deslauriers, M., Aristotle on Definition, Leiden: Brill, 2007, 192-97.*

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