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Technology as A Global Pillar and Its Main Features in Greek-Rome Age

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Abstract: The purpose of this study is to discuss technology as a global pillar that is used to support the world. Today's world is based on technology, technological developments, discoveries, technological theories and technological advancements which are used by human being to solve their daily life problems. This study also deals with the main features in different ages of Greek-Rome and the long-term changes in the relationship between science and technology. The study is based on Joseph Pitt's definition of technology Building on What We Have Learned: The Relationship between Science and Technology. The Symbiotic Relationship of Science and Technology in the 21st Century. The basic concept of the study is based on Techne, Technology and Tragedy.

Key words: Craft man, techne, handicraft, which craft, catapult, rafts

INTRODUCTION

Besides its broad nature, technology as a topic is very complicated. Before we commence to expatiate the importance, development and discoveries of technology, it is worth understanding the actual term technology. Though it is very difficult to state exactly what the first discovery of technology is or when the concept of technology came into the human mind, with regards to the scientists, philosophers and clergy man's have views and ideas, which naturally differ in diverse ways-we will find the meaning of technology.

As a scientist, engineer or an engineering student it is necessary for them to learn the general obstacles of technological developments, to know some thing about the special essence of technology, theories of technological innovation, in order to determine the correct direction, strategy of technological development.

Before 18th century a few scholars researched technology in general meaning or in philosophical way. After the industrial revolution in Germany, Kapp published his work Essentials of philosophy of Technology in 1877; he was regarded as the founder of philosophy of technology. Following that, philosophy of technology was researched in many countries in Europe, America and varieties of academic faction have been formed at present.

Now a days technology is playing a role of a pillar in our world because world is based on technology, information and human being. These are major components of the world. Technology and human being are live components. The system of the world is based on supply of right information to the right person at the right time. We could say that these are the main objectives of today's world. The achievement of these objectives is not possible without the support of technology. Delivery of right information from and to, the right person at the right time is only possible if we follow the importance of technology.

Technology as a word or term has been of long standing. In ancient China, about 2000 years ago, there had been the saying "Craft man possesses Skills". In the West, technology came from the ancient Greek word "techne", means "brilliant wisdom or intelligence for manufacturing". So there had been a long history for technology which was taken as manufacturing methods or handicraft.

In 17th century, techne was combined with logos to form the word technology, which originally meant "discussion or description of all kinds of practical skills". Generally, the ancient Greek word "techne" is translated as "craft" or "art" but also "knowledge". Of these definitions, "knowledge" seems best[1]. Technology has been present from the very beginning of the appearance of human being on earth. Everyone has been images and representations from primitive cultures, dating from thousands of years before our era. The Egyptian civilization has been able to build constructions which have our admiration of technical knowledge and ability. In the Western culture, modern science and technology, as they are practiced today have their roots in the 16th and 17th century, in the period of the Enlightenment. Among thinkers about the phenomenon of technology, one of the philosophers of the period of Enlightenment, who has written about science and its application, is most certainly Francis Bacon. He wrote the novel "The New Atlantis", which unfortunately has been unfinished and was published in 1642. In this novel he describes the perspectives of how scientific knowledge and its applications will bring about solutions for problems

encountered in daily life. Technological progress and innovation, indeed, have provided humanity considerable comfort in different respects. In the 19th and above all in mostly 20th century industrialization of the Western world took place. The start of the industrialization of the Western world has been based on invention in the field of thermodynamics with the production of heat and mechanical energy, on inventions in the field of electro mechanics with the application of electricity, on inventions in the field of materials with the application of steel and many others which are today of common use in our daily life. The first archaeological evidence of human culture is stone tools. The oldest discovered so far date back 2.5 million years and initiate the period called the Old Stone Age (Paleolithic). This period covers 99 percent of the cultural record of human activity in terms of time. Everything from the New Stone Age (Neolithic), 30,000 years ago, through the Iron Age (3000 years ago) and up to modern history takes place in the remaining 1 percent. Although the oldest surviving tools are made of stone, it is possible that tools of organic materials were in use earlier and have not survived. Animal bones, feather quills, claws and objects of wood or fiber could have all been used as tools before stone.

By Joseph Pitt's definition of technology, Philosophy counts as a technology: a tool for making sense of things. He also views technology assessment as essential. In Thinking About Technology, Joseph Pitt's main tool appears to be those of the philosophy of Science, so it is not surprising that he claims most problems of philosophy of technology as epistemic problems. Robert E. Innis has explained the meaning of technology in multiple ways.

THE IMPORTANCE OF TECHNOLOGY

In the early 1900's, technology as a word had been widely used. People often use or talk about technology in daily life, but for what technology exactly is, there are varieties of comprehensions. Philosophers, economists, scientists, engineers, historians all have made their own definitions for technology in different ways. Some people had ever taken technology as certain kinds of skill or craftsmanship gained from experiences. With the upgrade of industrial revolution and the coming of great machine times, some people had ever turned to stress the importance of implements of production and machines and taken technology as the summation of productive or labor means.

In modern time, some scholars also regard technology as approach or methods of manufacturing or doing something, some even in a broad sense take technology a way of human behavior or action which would inevitably include something like political trickery, witchcraft and thief's skill for stealing etc, this we certainly can not accept as what we say technology in common meaning. Besides, due to science ever increasing to become the guide or precursor of technology, some scientists lay stress on that technology is nothing but the practical application of scientific, or even to regard technology just as a sub-system or a branch of science.

We should say all these definitions and views above have their own arguments or ground and all show some features of technology from different aspects, but their common elements to technology, or just paying attention to examine technology in a way of research its static state. So they all could not reveal or bring to light the full essence of technology. Thus, in order to illustrate what technology is, we favor to examine technology in view of system and dynamic way, from such way, we should make the definition of technology in the light of Joseph Pitt's and Robbert E. Innis definition of technology as below:

Technology is a dynamic system through which human being, in the light of their intensions of needs, with their knowledge, abilities and implements create artificial world.

This definition could be explained from the following four points:

- Technology belongs to the range of human remarking nature and so reflects essentially man's initiative or dynamic role. We can find technology only in the process of man's creating artificial nature or world. The process for man to utilize and revoke nature is just a dynamic system of transformation material, energy and information. During this process, there is input material, energy and information, through which processing and controlling turns out the output of material, energy and information, so the function of technology system just lies in the realization of transformation input into output. Machines which do not set in motion or technical knowledge written on books, could not realize the function above, so they could not be regarded as technology but just like elements of technology.
- Technology, as a means of creating artificial world, has been created to meet man's needs, or we'd say any kind of technology has its particular aims or purpose from their generation. The formation of these aims is a dynamic process. Technology is held responsible for the transformation from mentality to substance. The human aim or purpose of technology is an important aspect to reveal the essence of

technology; it shows that technology is not only a natural system but also a social system, for it had to serve to man's purpose.

- Technology can create artificial world only when subjective key elements (including experience, scientific knowledge and skill or technical ability etc) and objective key elements (including implements, machines and equipments etc), combine organically into dynamic system. Whatever scientific knowledge, experience, skill, implement of machine, if they exit in separate or divided way without linkage to each other, could not from valid technology.
- The development of technology is a dynamic process of transformation from invisible to visible, from potentiality to reality, from low-level to high-level.

Any technology grows out of nothing, first comes man's certain needs in order to meet the need, comes some conception, from the conception and after some ones endeavors, comes the design of certain kind of invention, but all of these are still invisible on in substantial as designing drawings and even inventions. But for inventions, they are still not realistic or practical technology, or we should say they are just potential technology. We have to transform these potential technology into productive technology that's what we say realistic technology.

THE EVOLUTION OF TECHNOLOGY

At this juncture, we would like to bring into light the relationship between technology and the human being. In the components of universe, human being and technology are two major components. Now, on comparing and contrasting the aforementioned technology came with the creation of human being on this earth. It is therefore logical to assume that both technology and the history of mankind are of the same age. Coming back to the creation of technology that is how and when human being felt the necessity of technology. The history of technology is the history of human being. Moreover, when human being was created their major requirement was to eat, drink, wear shelter etc. If this is a fact, then it is also a fact that most tools were associated with basic activities of survival, food gathering and shelter construction. Tools for fleecing animals, for cutting and shaping wood and for gathering and preparing food were primary.

Consequently, they needed to kill animals and birds with some tools and since there was nothing like a gun, bronze or iron tools, they had to resort to use wood and stones. Now the point is what particular tools they used for their basic activities of survival. For small birds they used small pieces of stones thrown by a Y-shaped the wooden stick called catapult. They also used slings for same purpose. For bigger and wider animals they made some tools with stones like spears. The first creation of technology is a stone knife and stone axe. Gradually they felt the need for other tools like stone spear and bow and arrow. In order to diversity their mode of transportation, our forefathers had to use rafts to cross rivers because they realized logs could float on water, this lead to the technology of ship building. Another competing theory is that fire making tools, agricultural tools, house building tools and medical treatment (witchcraft) came before stone axes, knives and spears. This would mean fire making, agricultural, house building tools and medical treatment were the beginning of technology but scientific investigation has disproved this later theory because these were secondary human being requirements. The creation of stone tools marked the origination of technology, for it showed that man had begun to remark nature. So the origination of technology can be dated back to one million years or 3.5 million years as long as man's own history, as we know human being originated from the creation of stone tools.

Contemporary technology, on the other hand, most often refers to the product itself, tools and devices i.e. the microprocessor is technology. However, it goes without saying that there are many things that distinguish the products of ancient techne from those of contemporary technology. The meager crafts of the ancient blacksmith and cobbler, for example, are hardly comparable to the computers and genetic engineering of today's technologists. This said quantitative interpreters of technology do not find any essential difference between these two ways of making. In fact, they do not accept the distinction between techne and technology at all and instead present contemporary technology as the result of the accumulation and development of earlier, more primitive technology. A good example of this quantitative distinction is the claim of anthropologists that many things as the stone chip spears or flints of early humans are the foundations for later and more complicated technologies. This type of interpretation is also available in other scholarly and academic approaches to technology. A, Emerson Wiens, a professor of industrial technology, begins his "Timeline of the Science and Technology Events Leading to Genetic Engineering" with the making of beer in Babylon at around 5,000 BC (1999). Dudley Shapere, from a philosophy and history of technology perspective, tries to apply an evolution theory normally associated with biology to the development of technology and declares that technology is as old as humankind (1998). Similarly, the International Technology

Education Association, made up of technology educators, developers, administrators, academics and corporate managers, point out that. "Technology has been going on ever since humans…harnessed fire, or dragged a stick across the ground to create a furrow for planning seeds, but today it exists to a degree unprecedented in history. Furthermore, technology is evolving at an extraordinary rate, with new technologies being created and existing technologies being improved and extended[2].

GREEK-ROME AGE OF TECHNOLOGY

We can confidently term the Greek and Rome periods as the golden periods. This stems from the fact that those periods saw the advent of modern tools and creation of modern technology such as navigation, industry, commerce, philosophy of nature etc.

On recalling the metallurgical age, we can vividly say it also led to navigation and industry since metals formed the fundamental elements used. With the beginning of metallurgy, the Stone Age came to an end.

One of the beginnings most overlooked occurred during the Middle Ages, a period in the civilization process often considered barren of significant technological accomplishment.

From 500 to 1500 were the years in which the base for industrialization began. It was during this period that the creation of machine and machine elements – gear, cams and mechanisms, necessary for the application of heat energy through the use of steam engines took place. It was during this period that western civilization began the move from a predominantly rural agrarian society to an urban industrial society. The critical turning point in the civilization process has been related to humankind's adaptive systems (the cultural means of manipulating nature for the production and reproduction of the material requirements of society) which have altered the potential and thus the choices of people in the organization and structure of their private lives and their society. Typical example of these turning points or transformations includes agriculture and metallurgy.

The main features in different ages of Greek and Rome are given below:

- During Greek period (5th century B.C), Rome (1st century B.C) was metallurgical revolution. During this period Forged iron, Coinage, Rotary millstone, Bucket wheel, Crane, Iron tools and Weapons, Aqueduct, Hydraulic Mills, Alphabet, Decimal notations, Lighthouses were found.
- During Greek's historical period (000 B.C ~ 400B.C), scientists achieved splendid civilization, especially philosophy of nature.
- During (400 B.C ~ 30 B.C), one group of scientists, philosophers and scholars, they found out a new form of science that is called knowledge of the nature. The creation of a new form of science is the main feature of this period.
- During the Rome period (30 B.C ~ 500 A.D), the philosophy of nature declined, but achieved a lot in technology especially in architecture, created the Rome segue character in architecture, such as the Arena, the highway, the bridge and waterway to the Rome.
- Most important feature of Greek time is industry and commerce. During this period industry and commerce were flourishing and had well developed navigation trade.
- To find out the fundamental element of the world was also main feature of this period.
- Democrit's atomic theory is another significant feature in this age. Democrit found out that atom is the smallest element of the world, it is invisible.
- During Greek and Rome period Britain chemist, Dullton suggest a new theory – ancient atomic theory. This theory was totally different from the Democrit's atomic theory; this theory is called the scientific atomic theory. Some other methods like analysis method and synthesis method, emphasized by Europeans and Chinese during this period.
- During Greek and Rome period, geocentric theory of universe was also introduced. In this regard, Alisidark introduced another most powerful theory – heliocentric theory, which tells us that the sun is the center of the universe.
- The main feature of this age is Newton's scientific knowledge system, which differentiate theoretical knowledge about nature and the philosophy of nature and also he tells us that the theoretical knowledge about nature is expressed in the form of theorem or laws. He also discovered that the theoretical knowledge about nature is based on the experiment of nature, but the philosophy is based on guessing and philosophical thinking.
- The most important feature of Greek period is the Archimidiz's buoyancy law, through this law he found out the knowledge about the pure gold. Actually he wanted to know that whether the royal crown is made of pure gold or not. As Archimidiz was also an engineer, so he invented the first screw jump, when Rome troops attacked his country, he invented many weapons to help resist.
- During this period some mathematical theorems and chemical equipments were introduced, likewise the concept of the Euclid geometry.
- Tuobermy's theory of earth and Gallon's medical theory are main theories of this period, particularly

Gallon's theory of intelligent gas about human tissue. The main feature of Gallon's theory is that he divided human tissue into three levels – liver, heart and brain. From medical point of view, this theory was most important facts about the circulation of blood in human body.

- During this period, Puliney's discovered the history of nature, which is concerned with astronomy, geography, botany, zoology, mineralogy, metallurgy and medicine.

RELATIONSHIPS AND DIFFERENCES BETWEEN SCIENCE AND TECHNOLOGY

The relationship between science and technology has become more problematic on several levels in the 21st century. In the face of an ever-growing complexity, technology has become more scientific and the natural sciences more technological.

Before commencing, we would first touch on the relationships and differences between science and technology. It is also worth understanding, what science and technology are by definition. This will apparently clarify relationships and differences between them.

Why are we interested to know the relationships and differences between science and technology? The primary reason for the interest in determining the relationships and differences is because of the impact of technology and technological change on mankind and society. Particularly, those who are involved in decision making about the future (future planning), elected representatives, corporate managers and people in general, are concerned about impacts of science and technology on society and individuals.

Now, we split science and technology into three terms i.e.; goal, problem and setting.

- The goal of science is to obtain fundamental understanding of nature and the physical universe, whereas the goal of technology is to increase the working efficiency of human being; to do; to create new and useful products, devices, machines, tools, systems etc.
- Mostly the problems related to science; small, high detailed. Manageable problems designed to contribute to a body of information that may provide the base for generalizable theories, whereas the problems associated with technology; complex and interrelated problems involving design, materials, energy, information and control. Many variables, both technical and social are involved in total system designing.
- Setting, in science, this term is isolated from requirement of meeting direct social needs, whereas, technological meaning of setting is situated directly in the social milieu.

For the relationships and differences, different writers have given their own ideas. Most writers concluded that there are differences between science and technology. Most writers, to a greater or lesser degree, attempt to show relationships with few definitive conclusions.

In my view, the relationships are more than the differences. If we check the purpose or goal of both, then we can easily say that there is a very close relationship.

The goal of science is to find out fundamental truth/moral rule or uprightness about the material world (nature) and to expand the human knowledge or to make human being able to create technology (weapons, electric equipments etc).

The main objective or goal of technology is to increase the human creation power and to provide different kind of facilities for human being (e.g.; transportation and protection/defense). Now, we simply can say that when human being uses their ideas or knowledge in practical, they get new ideas and through those ideas and observations they create different physical things for human being. This is a one powerful proof of a close relationship between science and technology.

There are some differences but those differences are not effective than relationships. One difference between science and technology is that science is only to broaden the knowledge of human being and it provides some laws about nature, whereas technology answers how and what to do, Means technology helps to create physical things (e.g. weapons, equipments).

There are two best ways to differentiate science and technology: one way is to probe the historical antecedents of each discipline, the ideologies on which they are based and the philosophical positions. Another best way is to examine the body of knowledge of each endeavor and compare the structure of body of knowledge and the agreed upon methods of adding new knowledge.

Historically, science and technology have different antecedents. Technology has always been situated directly in the social milieu and conditioned by values, attitudes and economic factor.

The fact is, science creates new knowledge which technologists then apply is stated so often that it has been accepted as true.

Yet, many individuals exploring the relationship between science and technology restrict technology to invention or the application of a scientific theory or law to

a specific technical device. By doing so, they restrict not only the true meaning of technology but that of science as well. The fact is that technology is the translation of scientific knowledge into practical form is held primarily by individuals outside the field of science and technology.

The history of science and scientific ideas has been better served than has the history of technology, rimarily because of the experience and background of those who have written about science and technology.

In reality, science and technology represent different communities, each with different goals, sets of values, social controls and reward systems.

From economic point of view, scientific research could be (taken) considered to involve too much money. Because, there are instances, when a research is carried out negative result is obtained. In this case, money put into such a research is regarded as a waste. Furthermore, even if a positive result is obtained, the benefits are not directly realized.

On the other hand, any investment made towards technological creation is directly realized after the sale of the technological creation.

One of the differences between science and technology is that the scientific theories (laws about nature, e.g.; Darwin's theory, Addison's theory, Newton's law of motion, Einstein's theory of relativity etc.) are the same in the whole world. But the creation of technology is not same in the world. New creation of technology depends on the concerned country's economic conditions, international relations, religious sanctions, skills and intellectuals.

If considering the revolutionary side, there is also difference because scientific and technological revolutions came in different periods.

CONCLUSIONS

Now a days technology is to be considered as strong pillar of the world because the major creation of the world is human being and human being is based on technology, technological developments, discoveries and theories. World is the name of human being and creation of human being that is based on technology. By considering all above facts and figures, we can say that technology is a main pillar of the world.

We can easily say that the most important creations were metallurgy, industry, commerce, chemicals and medicine. Due to above given facts, we can say that Greek-Rome age was golden age towards creation of technology.

We can confidently term the Greek and Rome periods as the golden periods. This stems from the fact that those periods saw the advent of modern tools and creation of modern technology such as navigation, industry, commerce, philosophy of nature etc.

On recalling the metallurgical age, we can vividly say it also led to navigation and industry since metals formed the fundamental elements used. With the beginning of metallurgy, the Stone Age came to an end. One of the beginnings most overlooked occurred during the Middle Ages, a period in the civilization process often considered barren of significant technological accomplishment. Despite of the differences between science and technology, it still remains substantial fact that they are utterly inseparable because all scientific researches lead to technological development.

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