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Review Article

Harmony of Science, Technology and Ethics

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Abstract

Introduction: From a long time ago, benefiting from technology has been an inevitable thing for human interests, which is born and based on science. It can be claimed that there is harmony between ethics, science and technology, which promote each other. In this article, the researcher discusses this harmony and compatibility.
Material and Methods: The current review study was descriptive and using the study of sources and research keywords among the books and articles published in the databases of Thomson Information Institute, Science Direct and Pub Med.
Conclusion: As science and technology continue to advance and become more integrated into our daily lives, ethical considerations become increasingly important. For example, the rise of artificial intelligence (AI) has raised questions about the potential implications of creating machines that can make autonomous decisions and take actions. If science and technology were considered as a tool, it should have been able to subjugate humans and influence all aspects of behavior and values. While it has become a problem that eventually becomes aligned with morality by applying reason, and people now seek help from it as a tool.
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INTRODUCTION

Science and technology have many impacts and have contributed to the development of more advanced economies (including today's global economy). But the innovative sciences and technologies resulting from them have always influenced the values of a society and raised new questions in the ethics of technology. So far, many studies have been proposed about the conflict between science, technology, and ethics, but in this research, researchers are trying to discuss the compatibility and harmony between these three components, namely, science, ethics, and technology.

MATERIAL AND METHODS

The current review study was descriptive and using the study of sources and research keywords among the books and articles published in the databases of Thomson Information Institute, Science Direct and Pub Med.

DISCUSSION

What is ethics?

In English, Ethics is mostly used as moral knowledge [that is, moral science and philosophy of moral science] and Morality is mostly used as moral norms and values. Therefore, in order to measure the ratio between ethics and other fields, including the field of technology, we must pay attention to these different meanings of ethics; It means to keep in mind that we mean moral

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norms or the teachings that speak about these norms. When we pay attention to moral knowledge, we must keep in mind that this knowledge is the science of ethics; That is, a science that questions the right and wrong, good and bad action, or a philosophy that we mean, that talks about the science of ethics and its ups and downs. Separating these three levels of analysis makes it easier for us to examine its relationship with technology [1, 2].

Technology and different approaches

There are many controversies about the definition and levels of technology. Undoubtedly, one of the most important and basic topics that is of interest in the philosophy of technology is the definition of technology. One of the most important approaches in defining technology is based on Wittgenstein's view of definition - in general. Wittgenstein, contrary to the tradition of essence thinking in the history of philosophy, which defines a concept or an object by its essence and nature, believed that the idea of a comprehensive definition and an obstacle based on nature should be abandoned and focus on the application of concepts. For this reason, if we want to know what technology or art are, we should go to different languages and see what these concepts are used in these languages and how they are used. With all this, both essentialist and non-essentialist definitions in technology are sometimes hardware and sometimes software. In the hardware view of technology, this area is considered tools and devices that make our lives more efficient and comfortable. The definition of software is more concerned with the thought behind these tools. In the history of the philosophy of technology, the hardware perspective takes precedence over the software perspective [3, 4].

In fact, the problems of the hardware perspective made technological thinkers pay special attention to the thought and approach that creates technological tools. However, the software perspective is not without problems. One of these problems is that this perspective cannot consider the role of executive, legal and ethical institutions and mechanisms that play a role in the technological system. This defect caused attention to the definition known as the institutional software definition of technology, that is, a set of institutions that are hardware, software and other institutions that are involved in the definition of technology. Due to the lack of human role in it, the institutional definition led to another definition, which is called the anthropomorphic definition. In this approach, the ratio of technological institutions and human beings is very much considered. Another way of looking at the definition of technology is to divide it into small and large definitions. The macro definition of any computational and rational tool is called technology. For example, in sports, there are many tools for better performance, which are called technology in this macro definition. Many tools that were used in the old world to organize individual and social life, but do not have the extent and development and generality of new technologies, are considered technology. In fact, here it is better to distinguish between technique and technology. Technique can lead to technology, but a distinction must be made between the two. Many techniques do not even lead to technology. For example, speaking methods, viewing habits, and dating etiquette are useful tools and techniques, but calling them technology creates a large scope that sometimes casts darkness and ambiguity on our goals. However, a macro view of technology considers all of these things to be technology [4-6].

A middle approach to the definition of technology does not exclude the technologies before the modern world from the category of technologies and considers them as technology. This approach is big enough from an anthropological and philosophical point of view

to consider most forms of material culture as technology. This approach also does not assume that every technology must be man-made. According to this perspective, it is impossible to find a culture in which technology is not present, whether it is old or new. However, the technologies of the old world followed very different principles, and it is very difficult to find common principles between old and new technology [7].

The narrow and narrow approach to the definition of technology considers only the technology of the new world as technology and shows the essential difference between these two types of technology. The rule is that they do not see the new technology and its various effects as comparable to other technologies and believe that this technology must be examined separately and independently. With this assumption, the following definition of technology reflects completely modern and new concepts to define technology and excludes other tools and approaches that are technological. Of course, what we have said are only a part of the many controversies that exist about the definition of the concept of technology, however, perhaps this whole can cover the general perspective of many parts that exist in the philosophy of technology [7].

Four approaches

Among the various definitions of technology, perhaps the definition and division of " Don Ihde" is one of the most famous. According to " Ihde ", there are four types of relationships between "us-technology-world" that define the nature of technology better and more for us. One type of human-technology relationship is the embodied relationship. In this regard, technology acts as a mediator for different human senses. When we see an object with glasses or see the moon with a telescope, these glasses and the telescope present the world to us in a different way than when we are not using them. This relationship, which is the relationship of "Me-Glasses (or telescope)-The world" always presents the world to us smaller, bigger, heavier, lighter, etc. than what they are. For this reason, they cannot act as our sense organs. We are willing to ignore the actual position of the object due to the emphasis on a component such as seeing larger. When we communicate with someone else through the Internet, it is as if the person is present with us, but this presence is in the form of text. His presence is limited to the text, but we can communicate with him; However, this communication is very different from face-to-face communication and internet presence lacks something from physical presence [8, 9].

The second type of our relationship with technology and media is the hermeneutic relationship. In this regard, they refer technology and media to something beyond themselves. When we pay attention to a map or a text, what we see is not the map or text itself, but the meaning that this map and text refers to. These maps and texts avoid being the world and only point to the world. Ihde characterizes this approach as "Me- World-Map" [9].

The third ratio is the ratio of otherness, in which media and technology are assumed as something other than me. In this type of relationship, it is as if technology and media exist by themselves. Ihde considers religious icons and robots as examples of this type of technology. As if in our relationship with them, these technologies themselves are another world and not that they point to another world. In this ratio, the real world disappears and they lead us to another possible world. For this reason, Ihde has compared the power of these technologies in separating us from the real world to the power of games, sports and art. Ihde calls this relation "Me-Technology- The world", in which technology marginalizes the world.

According to Ihde, the biggest symbol of this kind of relationship is the relationship we have with robots.

The fourth type of our relationship with technology is one in which technology does not enter into the story as a conscious process, but technology acts as a background and substrate. Ihde considers the central temperature control system of buildings and the traffic control system as examples of this type of media and technology. These systems are black boxes that we don't pay attention to, but we need them a lot in our developing life. These background technologies are not visible, but they shape our lives; However, they escape from our analysis. Ihde's four approaches remind us that whatever stance we take on technology, we are entering into a business where there is profit and loss. It is not the case that technologies and media are inherently harmful or beneficial. We are talking about a choice that, like any other choice, has positive and negative consequences. Ihde's four relations are presented on one level to answer the extreme positions of "Heidegger", "Borgman" and even "Dreyfus" [10].

Ratios of technology and ethics These definitions and divisions prepare the space for a better discussion of the ratio of ethics and technology. According to this conceptual division that has been created, we can identify many relationships between technology and ethics, and here we mention four of these relationships [10, 11]:

1. Sometimes this ratio means to see what moral consequences technology has. Usually, people who consider the ratio of technology and ethics, consider the effects of different technologies on ethics from this ratio. Some researchers believe that a school of "effects" can be identified under this study, which talks about the cultural, social, economic, psychological and cognitive effects of new technologies. Here, for example, we can say what the computer does to humans and how it affects human relationships; What effect or effects does the Internet have on the traditional relationships of man and on his personality, and how has our technological world affected the culture and social class relations. In this regard, there are two negative and positive approaches. Some point to the positive aspects and effects of these technologies, and some others touch on the points that technology has made human society less original and flourishing. Meanwhile, the impact of technology on moral values can be traced in two ways; Some people believe that technology has expanded communication, provided opportunity and leisure for man to do more serious work and provides his material well-being. But some others do not consider these points to be very strong compared to the disadvantages and weaknesses of technology. According to these people, technology as a whole has fueled a type of consumerism, has destroyed human relationships and harmed the rich and original human values such as chastity, dignity, honor, originality, etc. According to these people, technology and the modern world in general have weakened the spiritual values of the family, made people lonely and without a foundation, and finally created many spiritual and moral problems.
2. Another meaning that can be taken from the ratio of technology and ethics is the effect that technology has on the theories of science and the philosophy of ethics. Here, ethics does not mean moral norms and values, but moral knowledge, and this is based on the distinction we mentioned. Here we are talking about the effects that technology has left on moral theories. In the meantime, some people believe that these changes and effects can be developed and expanded in the heart of the three existing normative ethics, namely "Virtue", " Deontology " and "Utilitarianism".

While others believe, we should look for newer concepts and perspectives. According to these people, for example, in the Internet space, the concepts of action, self, agency, etc. have undergone fundamental changes, and new conceptual and analytical tools should be sought to expand these issues.

3. The third meaning that is taken from the relationship between ethics and technology is the moral values that have played a role in the formation of modern technology. In other words, its purpose is to determine what effect technology has on ethics, here the intention is to understand what moral values have played a role in the emergence and development of new technologies. With the new world, a new perspective and a new discourse came before mankind. Of course, this new approach was based on values and norms. Some thinkers have stated that criticizing instead of understanding, changing the world instead of interpreting, paying attention to the future instead of the past, and ultimately paying attention to the individual instead of the collective, are some of the value changes that the new humanity has seen. In this regard, the value origins of technology cannot be understood without these value changes. The school of social structuralism even considers the values involved in technology from the first decision stage to the construction of a technology. Researchers in this field have done this for technologies such as bicycles, cars, power plants, etc. Although we see different views here, but one of the relationships between ethics and technology is the value and moral origins of technology.
4. The fourth meaning obtained from the relationship between ethics and technology is the ethics that people who deal with technology must observe. This includes both the people who create the technology and those who use it and the people who analyze and criticize it. For example, engineers, as people who deal with the production of technology, should consider principles such as loyalty to their respective company or trying to build technologies with high security. On the other hand, the use of technology also requires certain ethics, and in both of these fields, ethical codes can be considered, as many have tried to present these ethical codes. In addition, technology criticism, like any other criticism, needs ethics. Of course, in this regard, all the cases that are mentioned under the title of ethics of criticism can also be considered for the ethics of technology criticism.

History of ethical technology

It should be remembered that man is a subject possessing authority and will that can choose two directions of right or wrong and dominate the relationship between man, God and nature in any material way or monotheistic rule. Therefore, the history of philosophy always considers two theories in order to measure the meaning and criterion of the truth of ideas: One is the theory of conformity (the conformity with the reality of a proposition as it is makes it correct) and the other is the theory of coherence (the correctness of a proposition is when it is compatible with other propositions of the same thought). Pragmatism in James also includes both attitudes, because paying attention to the result of thoughts and their correctness, on the one hand, they must have internal order and harmony, and on the other hand, they must not ignore reality in order to have a good and beneficial result, and not the other way around [12].

Similarly, in ancient Greece, it has been said that Aristotle considered the components of ethics for humans to have two questions. One is that a good person should be mainly employed in what activity. Another thing is what perfections and virtues a person should show in all his activities.

Rationality is that in the soul, intellect and other human powers that have a distinction, the non-rational component must obey what is called reason, or it can even be anti-rational in front of this rational act; Because moral virtues from Aristotle's point of view are obtained from the same reason when we are successful or unsuccessful in those types of activities that may be dictated by reason. Because of the activity that Aristotle considers to be the birth of rationality, which is thinking and the process of thinking that takes place in an anti-rational act, it will also cause it to be rational, so in any case, the origin and perfection is reason [13].

However, on the other hand, Aristotle considered ethics, statecraft, and education to be dependent on each other, as he stated in his book, " The Nicomachean Ethics "; On the one hand, he considers ethics as an input to statecraft, and on the other hand, he has brought the work of rulers and dealing with it as education into statecraft. Zeno of Citium also puts the achievement of mental peace, which is possible in the light of moral art and wisdom, as his ideal. According to his belief, wisdom in harmony with desires is necessary for a decent life along with peace, thus he explains with an allegory; A dog tied to a cart will be dragged if it does not run with the cart. What he means by this statement is that if someone stands up and disobeys the necessity that rules over the universe, he will be dragged behind this chariot. In a better way, a person cannot disrupt the inevitable course of events, but by recognizing and accepting it, he can get rid of distress and sorrow and reach peace. The peace that arises in this way is freedom from emotions [13, 14].

In this regard, Kant also believed that a person should do his duty and not be tied to its conclusion, because for him it was a moral law, an absolute and divine law. But the ideas after Kant, namely Jeremy Bentham and John Stuart Mill, have considered the results of work, human inclinations and special personal and social conditions as the main fields for measuring moral values.

A moral hedonist considers the meaning of pleasure apart from its results. This proposal, which developed normative ethics from the beginning with supporters of philosophers, is opposed to those who recognize happiness as the only thing that is intrinsically desirable. Pleasure means a possible situation among the situations that a person likes for himself, whether it is a tool or a state; But not that that situation is intrinsically and from the desirable basis of the common people, and this is different from utilitarianism - which has been the general principle - because it believes which is the morally correct action, therefore hedonism is only a statement of the good and bad of situations. And in these cases, if Bentham and Mill are called hedonic utilitarianism, it is a type of utilitarianism, not that all utilitarian were hedonistic, perhaps they are utilitarian who rejected hedonism.

However, someone like Foucault has separated two types of ethics; Aesthetic ethics, whose purpose is to build an individual's life and its main emphasis is on the relationship between the individual and himself, is another ethics whose main emphasis is on following a set of rules and regulations and moral values. Not that following the inevitable course of events is the goal of his ethics, because he considers power to be equal between the capitalist and the poor, ethics and its study also means the practical behavior of people and what is common among people [13].

Now, by combining viewpoints in different fields, it should be said that ethics seeks a rational answer; Normative ethics aims at how the propositions of fundamental normative ethics are rationally confirmed and strengthened. Strictly speaking, ethics seeks to explore the rational justification of normative propositions that derive from meta-ethical conceptual

propositions. That is to say, one cannot expect rational normative truth from it until it breaks into trans-ethical conflicts [14].

So, with a general look at what is, he has considered elements related to technology and ethics, by which ethics can be confronted, because the two should not be considered inconsistent, irrational, and far from reality. In this case;

- It is not possible to succeed in moral justification and appreciation of technological products, and to be more precise, normative ethics cannot be crystallized in the ethics of technology that actually exists, while it relies on conceptual analysis.
- The value of technology means why it is; Its moral reason. Why should it be confronted with the moral and why can't it be confronted with what is immoral, which means that the technological matter should not be immoral.

Elements related to technology

A) Modernity and postmodernity

The industrial revolution, or modernity, is a technological, socio-cultural development that slowly matured in England from the 18th century. At first, the change in agriculture in order to create more wealth led to the mechanization of the production of goods in factories, at that time, science and technology continued on their traditional paths separately. Their complete fusion in the more recent era, i.e. the 19th and 20th centuries, in such a way that the governments, by gradually accepting it, recognized the application and introduction of the full possibilities of theoretical research in science in the field of technology and industry. This is a reflection of another defining element of the industrial civilization of this time. The point here is that it is necessary to deal with its consequences in such a way that it is wise and justified. Whether technology came before science or not, it was science and technology came into being at a later stage is not consistent with its historical understanding, but we are trying to check that what is justified is values. If values are the criteria, what can be understood from the ratio of these two is their appropriateness and inappropriateness, which are the criteria of the action of reason, which places technology after science, and sometimes science after technology [15, 16].

Empiricism and rationalism are the two currents that emerged from the member countries of the Second World Movement, France and England. These two components were recognized as the purpose and criterion and the only criterion for identifying right and wrong as well as the value (good and bad) of the phenomena of existence and objects in such a way that the determination of the destiny and sovereignty of man was tied to them [15].

However, modernism, which is mainly used to describe nihilism and the fall of European cultural values, is considered to mean doing any action that is against reason. It is followed by Paranoias, which is a complex and diverse collection of thoughts, opinions and theories that emerged in the late 60s and is still continuing and expanding more and more. In postmodernism, only the interests of advanced and powerful societies are considered. Therefore, what is discussed in it is environmentalism, negation of social norms, extreme individualism, and the age of fleeting pleasures and pleasures, democratic and democratic politics and capitalist economy that ultimately leads to secularization.

In the era of modernity and today, that is, the transformed traditional world, we are faced with new ideas that are given special attention, in them, we are faced with values that, whether we like it or not, in such a situation, we talk about rationalizing them. Therefore, in this process, it is meant to completely abandon the traditions and turn to renewal and ideal life or not, but modernization is a valuable time in which the values, traditional and induced values of people

show themselves in a new form. Therefore, it is true that reason plays a role in both the new approach and the tradition, but what is appropriate and appropriate to ethics and moral values is manifested in a special way in both cases. In the first one, reason and approach to common sense, and in the second one, reason and custom, a custom that has been condemned by technology [16].

Because of this, technology is a discussion of modernity with regard to the rationalist approach, because where technology conflicts, morals and values come into question. In a more concrete sense, its technology is a rational truth that remains hidden and must be discovered. Its successes and even its conflicts have shown its progress; Its good, bad and failures indicate its reasonable scientific and epistemological progress.

B) Exploiting and achieving personal profit

Some believe that when things are done in a machine way, the human heart will also become a machine, and whoever has a machine heart will lose his innocence, whoever loses his innocence, his mind will be shaken, So, a shaky mind is not compatible with the Tao. This thinking is the answer to the dominance of technical thinking and the beginning of this thinking is the loss of human innocence.

Jeremy Bentham considered morality to seek pleasure and avoid pain in a way that includes the benefit of countless people. All of his efforts have been focused on this concept of pleasure and what increases pleasure. On the other hand, John Stewart added the quality of pleasure to Bentham's theory, not in the way that Bentham intended. Both of them think that by addressing the benefit of the group, the benefit of the individual can be saved. Because according to them, a person puts the collective benefit before his own benefit and does not pay attention to his own benefit; But even such a person, if he wants to work for the benefit of the community without having any eyes on that pleasure, so that the pleasure is given to them, he prefers to sit in the corner and do nothing.

Based on this, the theory of utilitarianism is more than a moral theory - it is a theory with a psychological background and social and political applications and goals. Because the fact that humans seek to achieve happiness and avoid suffering and any attempt to ignore these two goals is futile is itself a psychological theory.

Attention to rationality as a determining element in the harmony of science, technology and ethics

Attention to rationality as a determining element in the harmony of science, technology and ethics

In dealing with rationalism and rationalism, there are two different terms; One is rationality and the other is practical reason. It is quite difficult to separate the interwoven threads of these two, because talking about one always leads to talking about the other. Isn't a reasonable person the same as an economic activist who finds meaning in dealing with the society and culture around him? This is the cause of whether people act from the point of view of personal interest or whether they prefer to choose a situation that ends in their benefit. In more precise terms, what was their preference, in fact, what matters are more valuable to him. That this is such a proof of technological determinism in which sometimes clear priorities and sometimes profits become inevitable?

No matter how one imagines, a reasonable economic person always tries to maximize profits and minimize losses. This is where rationality is tied to practical reason. In this approach of the rationality of a reasonable person, it is too successful because only paying attention to individual interests does not make it possible to explain the interests of the group with it [17].

Social constructionists who research and analyze technology generally reject technological compensation in their preference and consider it as obsolete. But recent technological studies that

sometimes reach the other side of this spectrum indicate a kind of complete cultural determinism. This is partly due to the fact that social studies about technology emphasize scientific knowledge and ideas more than the tools and devices of technology and the resulting realism in philosophy. Therefore, what is the mode of studying technology is the one that entered the arena later, that is, the instrumental scientific knowledge of technologies [18], and this process is considered to be the intellect.

Rationality, in order to choose the best among many options, needs a way to make the best. But this problem is solved by having a method to determine the individual's choices. Because what is the best option for one person will not necessarily be the best option for all people, because when we come to technology, the main issue is to resolve differences of opinion about a handful of new machines and systems, which are resolved at the political or social level, not at the individual level. At the social level and group participation, the goals are different. Because in this regard, if there are people who think about profit, there are also people who think about better execution of affairs. It is suggested for the board of directors to turn again to an economic person to change his values in order to gain the approval of others to make a decision. This in turn is a very difficult matter. Even if we resort to self-interest, it will fail because it will only make the problem bigger; Because the change of values depends on the needs of the individual, not the society [19, 20].

This is where logic can only guarantee the accuracy of an argument and show the truth of the premises. Therefore, appeal to logic is good only when the initial claims are true. Its successful rationality is achieved when it is an irrational case and pattern. We say that he is irrational if he deliberately chooses an action that he knows will not achieve the results he is looking for; If the result is opposite to what he wants, then we say that he is an irrational person. Success means achieving a predetermined goal. Machine-like procedures can be called successful, but this does not prove that they are rational. Therefore, our review of what we know may be delayed. Because the consequences of new information for what we think we know may not be immediately clear, with this we will constantly rearrange the content of our beliefs and in light of that we will be forced to reconsider the merits of our goals and the appropriateness and structure of our value system. Based on this, technology means humanity in the position of work in such a way that it is not inevitable to look at the other side of it [19].

CONCLUSION

It is true that technology is not a white paper that we are responsible for writing, but it is a written book that we need to criticize. On the other hand, it is also true that the foundations of technology are based on human weaknesses. In order to face it and at any time, it should be understood that technology is not only based on science and experience, but even from personal and individual aspects. Rational technology is a tool that governs humans, which is always confronting and solving problems. Based on this, moral evaluation appears as a component that includes normative rationality. If science and technology were considered as tools, it should have been able to subjugate humans and influence all aspects of behavior and values. While it has come as a problem that eventually becomes aligned with morality by applying reason, and a person now seeks help from it as a tool.

ETHICAL CONSIDERATIONS

Ethical issues (such as plagiarism, conscious satisfaction, misleading, making and or forging data, publishing or sending to two places, redundancy and etc.) have been fully considered

by the writers.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interests.

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