

Should the engineers
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technology?

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Abstract Nowadays, it is common for engineers to overpromise or exaggerate the technology's advantages while neglecting its potential disadvantages in order to get more attention and investment, which is actually a form of 'rhetoric strategy'. In this paper, the notion of 'rhetoric' in term of technical field will be briefly defined, including the definition, the applying stages and connection with ethic issues. To develop the arguments, a case study of the development of solar energy technology will be drawn upon.

Afterwards, the ethical cycle will be used to analyze its potential ethical problem. Last but not least, the conclusion will be given.

1. Definition of Rhetoric The best known definition of 'rhetoric' comes from Aristotle, who considers it a counterpart of both logic and politics, and calls it "the faculty of observing in any given cases the available means of persuasion" [5]. Generally, rhetoric is the art of discourse, an art that aims to improve the facility of speakers or writers who attempt to inform, persuade, or motivate particular audiences in specific situations [4].

Two decades ago in UK, the notion of strategic science and technology emerged [1]. It is a different kind of research located in different way from traditional science and technology. Expectations and promises are investigated in strategic science instead of actually achieved understanding or immediate application.

In this way, the rise of strategic science has created a 'space' in which promises can be floated, which is generally for whoever is willing to listen

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and specifically directed toward sponsors of R&D who have an interest in the promising areas of science.

Such space is called 'rhetorical space', which voices promises about new technology, gets a hearing and mobilizes audiences. The rhetoric could increase the technology's popularity and help R&D to attract not only capital investment, but also policy support, because sometimes government agencies are even eager to fill their portfolios with attractive-sounding R&D programs. 2. Stages of applying rhetoric To develop a new technology with rhetoric strategy, a spokesman (lobbyist), argumentation (statements in texts), and audience (creating presentations /brochures) are needed.

1.

Firstly, to come clear the technology, definition of the umbrella term is introduced by engineers to the public. Now a technology in the rhetorical space can be defined in a single definition, it is possible to make an index of the technology development over time. 2. Secondly, to attract public attention, relevant articles with the topics (argumentation) of this technology is published to make the technology popular.

Behind these articles are authors who try to convince readership. they are spokesman or promise champions, who speak for a technology rather than for an organization or own interest. . Thirdly, audience is another important pillar needed in the rhetorical space. To raise an audience, presentations are created. 4.

Last but not least, to interest the industry, public lecture is conducted by government or association of engineers. Because of such promotion, more industries will show interest in this technology. 3. Nexus connects Rhetoric to Ethics Issues As rhetoric is treated as the art in discourse, rhetoric is treated as the strategic science, in terms of technology.

It is increasingly prevalent for engineers to apply rhetoric to introduce, describe and popularize the technology. At first glance, engineers just serve their technological enthusiasm, the ideal of wanting to develop new technological possibilities and taking up technological challenges, rather than their personal or others' interests.

It is reasonable and nature to exaggerate the bright side or use the euphuism to describe their technologies for engineers. Since technologies consist of engineers' beliefs, values and desire to change the world.

Based on Kant's theory, the universal law would be read as follows: "Engineers can use the rhetoric to introduce, describe or popularize what they believe. " It is quite acceptable that people can picture the promising future of what they believe. Therefore this behavior is morally correct.

However, the consequences of applying rhetoric seem quite unpredictable. We will introduce the case study of solar technology at next chapter as an example to demonstrate that, although the rise of solar technology is based on the good will of and technological enthusiasm of engineers and it riggers thousands of breakthrough in sustainable energy technology, there are some certain influence and relevant consequences neglected by society. 4. Case Study—Solar Energy Because of the energy crisis and environmental issue, <https://assignbuster.com/should-the-engineers-apply-rhetoric-strategy-to-popularized-technology/>

the early development of solar technology started in 1860s [2].

Simultaneously, the rhetoric was used to increase its popularity. In the following century, solar energy technology was promoted by being positioned as renewable, sustainable, and eco-friendly technology to mankind, relatively well spread over the global.

Besides, it was argued that the operating and financial attributes of solar energy technology including modularity, flexibility and low operating costs would be considerably superior to those for traditional fossil based technologies, which included large capital investments, long implementation lead times, operating cost uncertainties and regarding future fuel costs [2]. It was described as the ideal substitutes for existing technologies. Figure 1 solar panels Due to the successful rhetorical strategy, large quantities of companies got involved in this field.

Some business realized that renewable energy would be profitable to invest in. Other business realized that getting involved in solar energy technology would not only make money, but also benefit from the ethical way their business may be judged. They could win good reputation to create a loyal customer base by appearing to be ethic.

Besides, governments provide state subsidies to support the development of solar energy in order to solve the environmental issue and energy crisis in the future. All of these actions push forward the development of this green technology to the climax.

Thus, the rhetoric provide has provided solar energy plenty of capital investment as well as policy support. However, the disadvantages of solar <https://assignbuster.com/should-the-engineers-apply-rhetoric-strategy-to-popularized-technology/>

energy were neglected in the early phase of development. It isn't always as reliable as other forms of power and tends to be expensive to install and maintain, because the devices rely on a steady supply of sunlight to generate power. The equipment is not that efficient, typically converting just 10% to 18% of the sun's energy into electricity [3].

On top of the price of panels themselves, the cost of installing them varies greatly by location and climate.

By most estimates, it takes at least six years for the initial costs to be repaid in saving from power generation under the best circumstances, and double that time under less ideal conditions [3]. Besides, the batteries and safety serve as potential problems. Since it is impossible to generate solar power 24 hours a day, batteries are needed for most systems to store excess power for use at night and rainy days. Unfortunately, these batteries can be expensive and have a shorter lifespan than solar panels. The solar energy technology cannot perform as well as promised.

In early 20th century, the solar markets tended to be saturated on account that the market was not as big as expected. Many companies getting involved in went bankruptcy. The development of the green technology slowed down, and even stagnated. Many countries (including Germany, Spain, UK, China, etc.) successively declared that the subsidies for solar energy will be cut down in order to control the overinvestment in this field.

Many graduates majoring in solar energy lose their job because of the recession.

Besides, the resources and funds of the whole society are limited, other substitutes like nuclear energy lose opportunities to be invested and developed when people's attentions were all attracted by solar energy. Such unbalanced resource allocation caused by ' rhetorical strategy' restrained the fair competition among alternative technologies. The real promising technology can hardly stand out or even be crowded out if the rhetorical strategy has been utilized by other competitors. 5.

Methodology Moral problem-solving is a messy and complex process.

A systematic approach might even be required to avoid the reduction of moral judgment to mere gut-feeling without any attempt to understand the moral problems or to justify one's actions. The ethical cycle is a helpful tool in structuring and improving moral decisions, trying to avoid certain shortcuts such as neglecting certain relevant features of problem [6]. Figure 2 The ethical cycle Phase1. Moral problem statement The problem is that engineers popularize their technology, using rhetorical methods is morally acceptable or not.

It is obviously that engineers are the decision-makers and the moral nature of the problem is engineers might be misled by their emotions: their enthusiasm about a technology can lead them to overlook certain risks. All involved parties might be biased, and their emotions might reinforce those biases. Sunstein calls this ' probability neglect' and argues that emotions are especially prone to let laypeople neglect probabilities [7]. Phase2. Problem analysis Shareholders and their interests: Shareholders| Description| Interests|

Engineers| Use rhetorical methods to introduce or propagate their own technology to audiences| popularize technology, attract investment and value by society| Audiences| Listen to the speech of promising champions and convince by engineers| transform the promising technology into social reality and take first move| Promising champions| Serve technology interest rather than every one's interest and highly believe in the future of the technology| attract audiences' attentions and promise the future of technology| Counterparts| Work in the same field of the rhetorical engineers and popularize their technologies based on empirical facts| Popularize technology without applying extra strategic science| Relevant, uncertain and possible missing facts: Engineers use rhetoric to popularize technology should take the active responsibility before something has happened.

They should act in such a way that undesired consequences are avoided as much as possible. However the consequences are always neglected by engineers based on their personal emotion. The consequences are not always harmless.

The indirect harm to counterparts, audiences and followers should take into account. Besides the uncertainty or disadvantages should be mentioned rather than neglected. Phase3.

Options for actions Black-and-white strategy: Using rhetoric to popularize technology or popularizing technology based on empirical facts. Cooperation strategy: Applying rhetoric on some extents to popularize technology. Using rhetoric to describe or introduce technology, after considering the possible uncertainty and take every relevant shareholders into account. Furthermore,

engineers should strike a balance between exaggerating the advantages and covering the disadvantages. Phase4.

Ethical evaluation Formal moral frameworks: Utilitarianism

Cost| Benefit| The other promising technologies have been ignored and marginalization. | The particular technology attracts a lot of investment and attention. | The idea of creativity is restricted in this field. | Scientists and engineers operate a lot of research in this technology. | The technology has been proved fail and lost a lot of time, capital and resource| The technology has been proved successful and promotes the welfare of society| Overinvestment can lead to a disaster| Investing in promising technology can lead to amazing profit| Promising technology has influenced youngsters career choices| Creating new direction for teenagers.

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Informal moral frameworks: Intuitive framework In our opinions, the most acceptable and formulate argument should be that engineers should describe their technologies based on empirical facts and compete with the other engineers based on facts rather than rhetorical methods. Phase5.

Reflection Criticism of utilitarianism: The consequences cannot be foreseen objectively and often are unpredictable, unknown or uncertain. Next to this there is the problem of distribution justice. Distribution justice refers to the value of having a just distribution of certain important goods, like income, happiness and career.

Answer the questions for reflection:

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The ethical theory did not quantitatively give answers to the result. However, the cost applies for all potential technology and the benefit comes from one particular kind of technology, which means egoistic. So on this aspect, the ethical framework provides reasons that support our intuitive opinion—engineers should describe their technologies based on empirical facts and compete with the other engineers based on facts rather than rhetorical methods. Phase 6. Moral acceptable action: engineers should describe their technologies based on empirical facts and compete with the other engineers based on facts rather than rhetorical methods. 6.

Conclusion This paper discussed the 'rhetoric' used in scientific fields.

The seeming advantages of rhetoric strategy will undoubtedly attract large quantities of investment and public attention, leading to further development of the technology. However, the potential ethical problems can be serious and cannot be neglected. Due to the case study and ethical cycle analysis, our view is that the engineers should popularize their technologies based on facts rather than rhetorical strategy, so that the real promising technology can stand out. Reference [1].

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