

Ethical Dimensions and Values in Science: Between Neutrality and Interests

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ABSTRACT

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Science is often regarded as a rational human endeavor to understand reality objectively, free from prejudice and particular values. However, throughout its development, science has never been completely detached from the ethical dimensions and values underlying both its processes and outcomes. This article examines the tension between scientific neutrality and the social, political, and economic interests that inevitably accompany scientific activity. On the one hand, neutrality is considered an essential requirement to preserve the validity and universality of scientific knowledge. The principle of neutrality allows knowledge to be justified logically and methodologically, without being bound to the subjectivity of researchers or specific groups. On the other hand, scientific practice cannot be separated from various interests, whether in the form of research funding, policy orientation, or the broader social consequences of its applications. Therefore, ethical dimensions emerge as a balance to ensure that science does not merely become an instrument of power, but continues to serve humanity. This article highlights the importance of integrating scientific objectivity with moral responsibility, so that science does not lose its social significance. An ethical approach to knowledge development includes awareness of the impacts of research, the need for transparency in scientific processes, and the recognition that universal values such as justice, sustainability, and humanity must guide every production of knowledge. Thus, science should not only be understood as the accumulation of data and theories but also as a transformative tool that shapes civilization. In conclusion, the relationship between neutrality and interest should not be viewed as a contradiction, but rather as a dialectic requiring balance. Neutrality safeguards objectivity, while ethical interests ensure that knowledge remains relevant to human life. The integration of both will generate knowledge that is not only methodologically valid but also morally and socially meaningful.

1. Introduction

Science is essentially a human endeavor to understand reality in a systematic, logical, and accountable manner. From its early development, science has often been regarded as neutral, free from prejudice, and detached from particular values. Neutrality is considered a crucial requirement to preserve the objectivity and universality of knowledge. Without neutrality, scientific outcomes are feared to be biased and to lose their legitimacy as truth.

In practice, however, science has never been entirely free from the influence of values and interests. The research process is frequently shaped by external factors such as funding, political agendas, industrial demands, and social dynamics. Even the

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direction and application of knowledge are often determined by those who hold the power to fund or steer research. Thus, science cannot be viewed as an isolated entity but rather as an integral part of society's complex structures.

It is within this context that ethical dimensions become essential. Ethics serves as a moral compass, ensuring that science does not merely pursue methodological truth but also contributes positively to humanity. Universal values such as justice, sustainability, and human dignity must serve as the foundation for developing and applying scientific knowledge. Without ethical considerations, science risks being misused as an instrument of power or purely economic interest.

Therefore, the relationship between neutrality and interest should be understood as a dialectic rather than a contradiction. Neutrality safeguards the objectivity of knowledge, while ethical interests ensure its relevance to human needs. This article seeks to further analyze the ethical dimensions and values in science and to explore how both can work in synergy to produce knowledge that is not only methodologically sound but also socially and morally meaningful.

2. Literature Review

The discussion on ethical dimensions and values in science has long attracted the attention of philosophers, sociologists, and scientists. Historically, the idea of scientific neutrality emerged during the rise of positivism, pioneered by Auguste Comte in the 19th century. Positivism emphasized that science should be built upon empirically verifiable facts, free from metaphysical speculation and subjective values. This perspective was later reinforced by thinkers such as Max Weber, who introduced the notion of value-free science, requiring researchers to maintain distance from personal preferences.

However, criticism of scientific neutrality has also grown. Thomas S. Kuhn, in his seminal work *The Structure of Scientific Revolutions*, argued that science develops through paradigms shaped by social and cultural contexts. This demonstrates that science is not purely objective but is also influenced by values and particular interests. Furthermore, philosophers such as Jürgen Habermas highlighted the emancipatory function of science, stressing that it should not merely serve as an instrument of power but as a means of human liberation.

Contemporary scholarship has increasingly emphasized the ethical issues embedded in scientific practice, particularly concerning its social, environmental, and political consequences. For example, research in biotechnology, artificial intelligence, and nuclear energy raises pressing ethical questions about their limits and applications. Such debates underscore the necessity of embedding universal values such as justice, sustainability, and humanity in the advancement of knowledge.

Therefore, the literature review illustrates that the discourse between neutrality and interests in science is not new but remains highly relevant today. The ongoing debates highlight the need for balance between scientific objectivity and ethical responsibility, ensuring that science serves both as a pursuit of truth and as an instrument for human well-being.

3. Methodology

This study employs a qualitative approach using the method of library research. This approach is considered appropriate because the issue of ethical dimensions and values in science is best explored through conceptual review, philosophical analysis, and an examination of relevant literature. The primary focus of this research is to analyze the dialectic between neutrality and interests in the development of science, as well as the ethical implications that accompany it.

The data sources consist of both primary and secondary literature, including books on the philosophy of science, scholarly articles, academic journals, and works of key figures such as Auguste Comte, Max Weber, Thomas S. Kuhn, and Jürgen Habermas. Contemporary studies addressing the ethics of science, biotechnology, artificial intelligence, and science policy are also utilized to enrich the analysis.

Data collection techniques involve searching, identifying, and selecting literature that is relevant to the research theme. The data are then analyzed using content analysis, which entails examining the meanings, ideas, and arguments embedded in these sources. The analysis focuses on how the concept of neutrality is understood, how interests shape the development of science, and how ethical dimensions can serve as a balance between the two.

4. Results and Discussion

The findings indicate that science cannot be separated from the tension between the demand for neutrality and the influence of interests. Theoretically, neutrality functions to preserve scientific objectivity. Through rigorous methodology, data verification, and rational logic, science seeks to produce knowledge that is universal and free from subjective bias. Such neutrality is essential to ensure that science retains its legitimacy as a credible source of truth.

However, the literature analysis also reveals that in practice, science constantly interacts with interests. Research funding, public policy directions, and industrial demands play significant roles in shaping the themes, focus, and even interpretation of research results. For instance, studies in nuclear energy or biotechnology are not only guided by scientific curiosity but are also influenced by political, economic, and security interests. This demonstrates that science does not exist in isolation but is embedded within complex social dynamics.

Ethical dimensions emerge as a bridge to balance neutrality and interests. Ethics requires that science should not merely aim for methodological accuracy but also consider its broader social and human implications. Values such as justice, sustainability, and moral responsibility become vital criteria for evaluating the direction and application of knowledge. The discussion suggests that the dialectic between neutrality and interests enriches rather than diminishes the role of science. Neutrality safeguards academic rigor, while ethical interests ensure social relevance. Therefore, science should ideally develop not only as a pursuit of truth but also as a transformative instrument that upholds human dignity and contributes to the betterment of society.

5. Conclusion

This study confirms that science cannot be understood merely as a neutral activity detached from interests. Ideally, neutrality remains crucial for preserving objectivity, methodological validity, and the universality of knowledge. Yet, in practice, science constantly interacts with political, economic, and social interests. This tension should not be viewed as a contradiction but as a dialectic that requires balance. The ethical dimension plays a vital role in maintaining this balance. Ethics ensures that science does not fall into being an instrument of power or narrow interests but functions as a tool for the benefit of humanity. Universal values such as justice, sustainability, and social responsibility must serve as foundations in the development and application of knowledge. Thus, the integration of scientific neutrality with ethical interests will generate knowledge that is not only methodologically valid but also morally relevant and socially meaningful. Science should evolve both as a pursuit of truth and as a transformative force that contributes to building a more humane and just civilization.

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