

Modern Science and Ethics: Scientific Humanism Based on Responsibility

Farrukh Usmonov

Acting associate Professor of the University of Economics and Pedagogy

Abstract: *This article explores the concept of scientific ethics as a foundational paradigm in the development of modern knowledge systems. It analyzes the moral responsibilities of researchers, the role of ethical standards in academic inquiry, and how ethical principles contribute to the integrity and social relevance of science. The paper also discusses the impact of globalization and technological progress on the ethical challenges faced by scientific communities today. By emphasizing the integration of ethics into scientific methodology and education, the study highlights the importance of cultivating a culture of responsibility and accountability among scholars. Ultimately, it proposes that scientific ethics is not just a set of norms, but a dynamic and essential component of modern knowledge production.*

Keywords: *Scientific ethics, knowledge paradigm, research integrity, academic responsibility, ethical standards, modern science.*

Introduction. Today, the increasing diversity of scientific activities around the world is turning issues of social and cultural status and moral standards into a central focus of humanitarian research. Science, from a practical perspective, demands an optimal combination of transcendental achievements and new knowledge, placing a responsibility on scientists for the effectiveness of the results they achieve.

The moral norms and conceptual frameworks that place responsibility on scientists correspond to what Karl Jaspers termed the "Axial Age" phenomenon. Referring to human history, Jaspers emphasized that philosophical concepts emerged simultaneously in different regions of the world—China, India, the Persian Gulf, Palestine, and Ancient Greece—between 800 and 200 BCE. During this period, the mythological perception of reality gave way to knowledge and reflection, and humanity began to build a foundation for clear reasoning, critical thinking, and philosophical contemplation.

Jaspers described this period as the "Axial Age" (Axenzeit), suggesting that fundamental questions about existence and transcendence—what he called the "ultimate questions" (auserste Fragen)—formed the spiritual unity of different peoples and laid the foundation for a shared human history. Engaging with such questions fosters genuine connections between peoples and cultures.

A new form of ethics—centered on responsibility and unity—is emerging as a historical response to the complex problems facing humanity amidst the crisis-driven development of civilization. This new morality must incorporate simple and comprehensible principles that synthesize the vast positive moral, scientific, and practical potential accumulated over millennia by the peoples of the planet and preserved within their cultural traditions.

Modern science, in all its fields, has reached a stage where the interconnectedness and interdependence of all elements of the universe are clearly visible. It is time to resolve the major contradictions in science and traditional religious beliefs by acknowledging the unquestionable presence of a spiritual dimension for the benefit of a holistic worldview. We must understand this factor as a fundamental principle of the universe's existence.

It is necessary to learn to comprehend the laws of moral unity and interconnection based on scientific methods of cognition. Neglecting these laws and misunderstanding them in human activity leads to the disintegration of value systems and, ultimately, to a self-destructive trajectory for the development of civilization. The foundation of new moral standards must be built on the principle of responsibility and must prioritize constructing a relationship framework between the Human, Society, and the Universe within their united responsibility.

The establishment of a new system of values in human consciousness, shaped by the demands of responsibility and ethics, can guide the transformation of human activity and provide a path out of various crises. The 20th century witnessed an intense debate between scientism and anti-scientism, yet neither side succeeded in convincingly affirming the correctness of their stance or initiating a new phase of scientific modernization in the interest of all humanity.

According to anti-scientists, the deep penetration of science into all spheres of human life deprives it of soul and immeasurable higher meanings. This, in turn, erodes the authenticity of human emotions and interpersonal relationships, ultimately destroying the living world of the individual. As a result, an uncertain world emerges—one driven by the ever-growing demands of materialistic production needs.

In such a scenario, the rich diversity of human qualities is reduced to a single technocratic parameter. The increasing burden of scientific and technological progress leads not only to signs of societal illness—caused by overload and overstress—but also to the partial formation of a “one-dimensional person” (K. Marx) suffering from “professional cretinism” (H. Marcuse).

On the other hand, scientists view science as embodying the rational core of all aspects of human life. They emphasize that, with scientific guidance, the life of the individual and society can be organized, governed, and made successful.

Science, as the productive force of society, possesses an infinite capacity for knowledge and a significant potential to transform the unsatisfactory conditions of human life and the surrounding world. The global rise in standards of quality of life demonstrates that science is capable of addressing all pressing issues related to the development of human civilization. Consequently, the scientism–anti-scientism dilemma emerges as an eternal problem of cultural and social choice.

However, modern philosophical thought strives to overcome polarized worldviews and proposes, as a principle, the thesis of the dual nature of science. On the one hand, science functions as a result of the activities of scientists. Therefore, without understanding the laws governing this activity, it is impossible to fully comprehend the laws of scientific development. On the other hand, scientists themselves are also shaped—professionally and intellectually—by science, its conditions, and its demands. Thus, it can be argued that the behavior of scientists cannot be understood without understanding the laws that govern how science functions.

Specific forms of activity and the actions of scientists are both the condition for science to operate as a social institution and, at the same time, its outcome.

Therefore, science should not be understood merely as a set of actions performed by individual scientists or scientific communities legitimized within a particular version of tradition in the system of social relations, but rather as a result of their mutual interaction carried out in the interest of the entire society. This very approach forms the foundation of philosophical concepts related to scientific activity.

The phenomenological concept proposed by Edmund Husserl interprets science as a form of consciousness rooted in sensory experience. Access to meaning is ensured through the analysis of consciousness, which is structured as a unity of combinations of distinct experiential invariants—understood through intentional and intellectual intuition. Based on this path, science uncovers the meaning of objective reality.

In a world perceived by consciousness shaped by daily experience and defined by the features of human life, “universal inductivity can be radically implemented.” If this premise is denied, then it becomes impossible to explain either the potential of scientific statements or the method for substantiating their reliability.

Scientific activity involves not only a world of objectively ideal subjects but also the ways to attain them and science’s ability to respond to the demands of the life-world. Neglecting the latter leads to the abstraction of science through mathematization, formalization, and technologization. However, such science becomes unreliable and weak in the face of temporal challenges.

According to Heidegger, science did not exist in Antiquity or the Middle Ages, as people accepted being in its full openness and contradictions and were unable to form a scientific worldview. Modern science, which emerged in the modern era and has become a significant force in the contemporary world, acts crudely and simplistically. It fails to understand the unique and the exceptional, being satisfied only with the simple and average. It impoverishes the world, reducing being to objectivity and weakening itself in the face of reality as a singular entity.

M. Heidegger sees a way out of this unfortunate condition through the creative comprehension of the future of scientific activity by each of its participants—by filling scientific work with vital meaning. “Although sciences, in following their own paths, can never penetrate the essence of science itself, every researcher and teacher, everyone engaged in a particular science, as a thinking being, can operate at various levels of understanding and support.”

From the perspective of the hermeneutic concept, scientific activity cannot be considered effective if it does not include a hermeneutic component. Emphasizing human communication conducted within a linguistic environment, movement within the hermeneutic circle can be seen as a dialogue in the form of interpretation—questions and answers carried out in dialectical form—which allows for an expansion of the horizons of understanding. It can be viewed as the unity of comprehension and its application in practice.

The result of any scientific activity is a type of text that requires interpretation and understanding. Every science is created by people and for people; that is, understanding is an inevitable moment of scientific activity. By utilizing the hermeneutic potential of interpretation, a dialogue can be established between scientists and non-scientists. As a result, the horizons of science expand, and critical engagement becomes possible—not as a destructive call to abandon science, but as a way to avoid absolutizing its claims to knowledge.

The critical concept of the Frankfurt School sees the main problem behind the negative attitude toward science in modern society as rooted in the scientific community’s desire to liberate science from values and, ultimately, to break the connection between science itself and everything beyond it. As a result, science abandons its most important task—strengthening social development through the public use of reason.

Science is intended to free humanity from all forms of totalitarianism—whether political, technological, informational, or otherwise. It laid the foundations for the competence of communicative rationality.

For representatives of the Frankfurt School, scientific activity is the capacity to learn from experience, to relate critically to truth, and to form an ideal communicative community that solves its problems through well-organized communicative reflection and gradually approaches truth.

As we can see, the fundamental philosophical concepts of scientific activity reveal the core contradiction of its current state. This contradiction is manifested in the lack of a criterion for evaluating the scientific significance of research in terms of the individual and collective responsibility of scientists for the consequences of introducing scientific developments into the environment, social structures, and the

physical and spiritual spheres of human life. Scientists are often unable to self-criticize, relying too much on the power of science and the effectiveness of its methods, thereby reducing the entire world to a repeatable and predictable object according to scientific models. This relation to the world—as merely an object—leads to unforeseen consequences, resulting in the unchecked arbitrariness of endless experiments, the so-called “terrorism of laboratories.” All of this compels us to ask a fundamental question about the future development of scientific activity based on an ethics of responsibility.

Justifying the necessity of the relationship between science and ethics, and clarifying the essence of this relationship, has a long-standing tradition. A scientist engaged in scientific research cannot renounce their universal human virtues, evaluative abilities, or moral attitudes. As a result, ethical issues inevitably enter into scientific activity. At the same time, resolving the ethical problems that arise during the scientific process depends, on the one hand, on the scientist's personal human virtues, which do not cease during their engagement with science, and on the other hand, on a set of moral norms historically established within the scientific community.

These norms are expressed in the form of permissions, prohibitions, prescriptions, privileges, and so on. Delivered through guidance and example, and reinforced by sanctions, these imperatives form the foundation of “scientific ethics”—the professional ethics of scientists.

Scientific belief, first and foremost, defines the conditions under which reliable knowledge is methodically and faultlessly obtained, while at the same time compelling the scientist to act in a certain way. This is not only because such behavior is effective in scientific procedures, but also because the rules of conduct are considered and recognized as morally obligatory.

R. Merton's ideas provided a new perspective on the problem of scientific ethics, allowing attention to be directed not only to the results of scientific activity but also to the conditions that influence the achievement of those results. However, R. Merton's concept did not go beyond the interests of science itself. Moral norms were meant to ensure the acquisition of scientific knowledge and to create conditions for its continuous growth. That is, the scientist is responsible for the results of their scientific activity.

This, in turn, transforms science into an endless process of accumulating scientific products—created increasingly by scientists themselves—according to norms that are solely determined by scientific activity itself. Considering the traditions of science to be extremely stable due to their absolute rationality, R. Merton did not see the need for the norms of scientific activity to be under constant review in light of contemporary issues. He did not foresee the necessity of introducing the wholeness of being and the spiritual unity of the universe into the domain of scientific interests, nor did he anticipate the importance of granting science the adaptability and capacity for self-renewal based on these elements.

At a time when science has ceased to satisfy its own claims in successfully resolving the problems of civilization, the gap between the power of scientific knowledge and humanity's ability to use this knowledge for the benefit of life reaches a critical point—marked by the ongoing ecological and technogenic disasters of the modern age. The search for other ethical regulators of scientific activity continues. These aims are based on the principle that pure scientific progress, by itself, cannot contribute to establishing harmony among people, and that, under such conditions, achieving even minimal stability and prosperity in social relations is impossible. Thus, we arrive at the conclusion that science must go beyond the boundaries of our era and that scientists themselves must participate in substantiating and affirming a new ethics of responsibility.

The renowned humanist of the 20th century, Albert Schweitzer, proposed an “ethics of reverence for life,” in which every true piece of knowledge becomes an experience, leading the individual to contemplate and marvel at the beauty of life in all its diverse forms. “Today, it is not common to treat even the lowest forms of living beings with care, as a rational ethical requirement. Yet one day, people will be surprised at how long it took to recognize that causing senseless harm to life is incompatible

with ethical norms. Ethics is boundless responsibility for all that lives.” At the same time, in moral dilemmas, only the individual can make an independent decision. “No one can tell them exactly where the ultimate boundary of determination lies in preserving and advancing life. Only if they are guided by the highest sense of responsibility for the fate of other lives can they make such a judgment.”

Conclusions. The ethics of responsibility becomes an urgent necessity from the perspective of achieving a better future. The nature of scientific activity compels scientists to adopt a certain moral position. Its foundation lies in the well-being, health, and safety of people. The primary task of improving the entire complex of vital human relations cannot be resolved without scientists and without using the powerful force of science, which can be utilized for personal development and the improvement of the quality of social organization.

The ethics of responsibility becomes the foundation of scientific humanism, governing values that are critical to all of society. However, it also gives scientists the opportunity to develop well-reasoned theoretical foundations for refining existing value orientations of scientific research and for promoting humanistic guidelines in new scientific activities. This is confirmed by the emergence, at the end of the 20th century, of an entire range of applied ethics fields that are based on scientific programs and formulate ethical requirements for exact sciences.

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