

Аль Раджхи Имад Саиф Рашид

---

## ВЛИЯНИЕ ФИЛОСОФСКОЙ МЫСЛИ НА ИННОВАЦИИ

---

**Аннотация.** В статье предпринята попытка раскрыть сложную взаимосвязь между философией и инновациями. Прослеживая исторический путь философии от идей мыслителей Древней Греции до концептуальных построений современности, автор подчеркивает ключевой вклад таких философов, как Платон, Аристотель, Бэкон, Декарт, Маркс, Ролз, Хабермас. Подчеркивая ключевые философские концепции, такие как знание, креативность и этика, автор исследует практическое применение философских методов в стимулировании инноваций. Тщательно изучается развивающаяся связь между философией и инновациями, предвосхищается будущее развитие и предлагаются практические рекомендации по этическим инновациям. Цель исследования – представить краткую и ценную информацию ученым, практикам и политикам в этих взаимосвязанных областях.

*Ключевые слова:* философия, инновации, знание, креативность, этика, этические инновации.

Al Rajhi Imad Saif Rashid

---

## THE IMPACT OF PHILOSOPHICAL THOUGHT ON INNOVATION

---

**Abstract.** This paper seeks to unravel the intricate relationship between philosophy and innovation. By tracing the historical journey from ancient Greece to the 21<sup>st</sup> century, the paper highlights the pivotal contributions of philosophers like Plato, Aristotle, Bacon, Descartes, Marx, Rawls, and Habermas. Emphasizing the key philosophical concepts such as knowledge, creativity, and ethics, the study explores practical applications of philosophical methods in fostering innovation. The evolving connection between philosophy and innovation is scrutinized, anticipating future developments and proposing practical guidelines for ethical innovation. The objective is to provide concise and valuable insights for scientists, practitioners, and policymakers in these interrelated areas.

*Keywords:* philosophy, innovation, knowledge, creativity, ethics, ethical innovation.

### *Introduction*

Innovation, characterized as the introduction of novel ideas, products, or services, has served as a catalyst for human progress throughout the centuries. However, the field of philosophy, which addresses fundamental inquiries about existence, knowledge, and ethics, often remains on the outskirts of discussions surrounding innovation. This paper endeavors to bridge this gap by unraveling the profound and enduring connection between philosophy and innovation.

Across the annals of history, philosophers have played a pivotal role in shaping our comprehension of innovation and its societal significance. From the early insights of Plato and Aristotle into creativity and knowledge acquisition to the contemporary examinations by John Rawls and Jürgen Habermas on the ethical dimensions of technological progress, philosophical thought has laid a substantial foundation for grasping and advancing innovation.

This paper scrutinizes the historical trajectory of philosophy's impact on innova-

**Аль Раджхи Имад Саиф Рашид**

аспирант Высшей школы промышленной политики и предпринимательства, Российский университет дружбы народов имени П. Лумумбы, Москва. Сфера научных интересов: экономика инноваций.

Электронный адрес: dr.imadsaif@gmail.com

tion, spotlighting the crucial contributions of such philosophers as Francis Bacon, René Descartes, Karl Marx, John Rawls, and Jürgen Habermas. It delves into the foundational philosophical concepts that underlie innovation, including knowledge, creativity, and ethics.

Moreover, the paper explores the practical application of philosophical methods and tools in fostering innovation. These tools, encompassing ethical inquiry, thought experiments, and critical thinking, furnish valuable frameworks for identifying and resolving ethical predicaments, generating inventive solutions, and making informed decisions throughout the innovation process.

As we navigate the 21st century, characterized by the swift evolution of technology, new challenges emerge for innovation and its ethical implications. The paper contends that the role of philosophers in guiding and molding the ethical dimensions of innovation is progressively indispensable.

In conclusion, this research paper substantiates that philosophy and innovation are not merely complementary but are mutually dependent forces. Philosophy furnishes a perspective for comprehending innovation, while innovation, in turn, acts as a practical arena for testing philosophical ideas. By fostering collaboration between philosophers and innovators, we can cultivate a more ethical, inclusive, and socially responsible innovation ecosystem.

*Key insights:*

1. Philosophy has a lengthy and substantial history of influencing innovation.
2. Philosophical concepts such as knowledge, creativity, and ethics are indispensable for comprehending and advancing innovation.
3. Philosophical methods and tools, including ethical inquiry, thought experiments, and critical thinking, can be applied to foster innovation.
4. Philosophers play a critical role in guiding the ethical dimensions of innovation.

*Background of the study*

The historical interplay between philosophy and innovation forms a complex and ever-evolving narrative, threading through various historical periods and philosophical frameworks. This intricate correlation has not merely influenced our understanding and interaction with knowledge but has also been instrumental in instigating revolutionary shifts in science, technology, and societal dynamics. This article explores the evolutionary stages in the connection between philosophy and innovation, ranging from the initial reflections on creativity in ancient Greece to the contemporary complexities posed by artificial intelligence and emerging technologies.

Plato (428–348 BC) contended that innovation constituted a mode of acquiring knowledge, attainable through a process of

rational inquiry [1]. Aristotle (384–322 BC) underscored the significance of experimentation and observation in uncovering new knowledge [2].

In the Middle Ages, the focus on innovation shifted, with philosophers showing increased concern for applying knowledge to practical problems. This shift led to the emergence of groundbreaking technologies like the printing press, profoundly impacting society [3].

The Renaissance witnessed a renewed interest in the interplay of philosophy and innovation. Thinkers like Francis Bacon (1561–1626) and René Descartes (1596–1650) stressed the importance of empirical evidence and the scientific method in the pursuit of knowledge. Their ideas laid the foundation for the scientific revolution, profoundly influencing the development of new technologies [4].

The Enlightenment, with its focus on reason and empiricism, further fueled the connection between philosophy and innovation. Voltaire (1694–1778) and John Locke (1632–1704) argued that innovation was vital for progress, achievable through rational thought and experimentation [5]. The Industrial Revolution, marked by the rapid adoption of new technologies, highlighted the centrality of innovation. Karl Marx (1818–1883) and Alfred North Whitehead (1861–1947) grappled with the social and philosophical implications of technological change [3].

In the 20<sup>th</sup> and 21<sup>st</sup> centuries, philosophers have continued to delve into the relationship between philosophy and innovation, especially focusing on the ethical and social implications of new technologies. John Rawls (1921–2002) and Jürgen Habermas (born 1929) argued for the development of new ethical frameworks to guide technological development [6]. As technology advances rapidly, the connection

between philosophy and innovation grows more crucial. Philosophers must provide critical analysis of new technologies and aid in developing ethical, inclusive, and sustainable perspectives on innovation [7].

### *Goal and objectives*

The primary objective of this research is to thoroughly explore and clarify the intricate relationship between philosophy and innovation. Through a detailed investigation into the historical, conceptual, and practical aspects of this interconnection, the goal is to offer a nuanced comprehension of how philosophical principles and inquiries have not only influenced but also actively shaped and continue to impact the landscape of innovation.

#### *Objectives:*

1. Explore the historical journey of the influence of philosophy on innovation.
2. Emphasize the pivotal contributions of philosophers throughout history.
3. Explore the basic philosophical concepts that make up innovation.
4. Scrutinize concrete cases where philosophy shapes innovation.
5. Study how philosophical ideas influence technological and societal progress.
6. Delve into the ethical aspects of innovation from a variety of philosophical points of view.
7. Get acquainted with the works of influential philosophers and dissect them.
8. Study the lasting impact of their contributions to the philosophy of innovation.
9. Highlight the importance of philosophical foundations in critical thinking.
10. Propose practical guidelines for the development of ethical innovation.
11. Anticipate possible developments in the dynamic relationship between philosophy and innovation.

*Overall objective:*

1. Provide concise and valuable insights into the complex relationship between philosophy and innovation.

2. Meet the needs of scientists, practitioners and policy makers in these interrelated areas.

*Methods*

In the study, the method for exploring the relationship between philosophy and innovation can be multifaceted and involve various approaches. Here are some potential methods:

- *historical research*: delve into historical records, philosophical texts, and biographies to trace the evolution of philosophical thought and its impact on innovation across different eras,
- *content analysis*: analyze philosophical works, innovation case studies, and contemporary discussions to identify key philosophical concepts, principles, and frameworks that inform innovation processes,
- *literature review*: conduct a comprehensive review of existing literature on philosophy and innovation to identify key findings, gaps, and future directions for research and practice.

*Literature Review****History of relationship between philosophy and innovation***

The historical connection between philosophy and innovation is well-documented [8]. Philosophers have reflected upon the essence of creativity, invention, and technological evolution over the course of centuries [9].

One of the earliest instances illustrating the interplay between philosophy and innovation is evident in the ancient Greek philos-

opher *Plato's* writings. Plato's inquiries were centered around the nature of knowledge acquisition and how we can attain a deeper understanding of the world. He asserted that knowledge isn't simply a passive absorption of information from the surroundings but rather an active process of inquiry and revelation.

Plato's ideas concerning knowledge had a significant impact on the progression of science and technology. Scientists and engineers began to perceive their work as a quest for discovery rather than mere application of existing knowledge [8]. This fresh comprehension of science and technology sparked a surge of innovation during the Renaissance and beyond.

Another influential figure in the historical nexus of philosophy and innovation is the English philosopher *Francis Bacon* [9]. Bacon was concerned with the practical utilization of science and technology. He argued that science should be harnessed to enhance people's lives, rather than serving solely as an outlet for intellectual curiosity [10].

Bacon's principles left an indelible mark on the development of the scientific method and the ascent of experimental science [11]. Scientists began to concentrate on conducting experiments and devising novel technologies to address real-world issues [8].

In the 20th century, philosophers like *John Dewey* and *Karl Popper* further explored the intricate relationship between philosophy and innovation [9]. Dewey's focus lay in the social and ethical ramifications of technology [10]. He contended that technology should serve as a catalyst for democracy and the advancement of human well-being [11].

Popper's curiosity revolved around the nature of scientific advancement [10]. He posited that science is an ongoing process of experimentation, wherein scientists continuously test their theories and adapt them in

light of new evidence [11]. Popper's thoughts regarding scientific progress have had a profound impact on the contemporary conduct of innovation [8].

### ***Stages of development of the relationship between philosophy and innovation***

*Stage 1: Early contemplation of creativity and innovation (6th century BC to 17th century AD).* The earliest instances of philosophical pondering about creativity and innovation can be traced back to the works of ancient Greek philosophers, such as *Plato* and *Aristotle*. Plato asserted that creativity was a divine bestowment and envisioned an ideal society where philosophers held the reins and artists assumed the role of custodians [8]. In contrast, Aristotle regarded creativity as a manifestation of human reason and considered it pivotal for both individual and societal prosperity [10].

During the Middle Ages, Christian philosophers, including *Thomas Aquinas*, drew inspiration from the philosophies of Plato and Aristotle to formulate their theories on creativity and innovation [9]. Aquinas posited that creativity was a reflection of God's own creative essence, and that it was the duty of Christians to employ their creative faculties to enhance the world [11].

The Renaissance and the Scientific Revolution heralded a renewed interest in philosophy and placed a growing emphasis on the significance of experimental science and the scientific method [9]. This shift in perspective ushered in a novel perception of innovation, which was now recognized as a methodical process of systematic inquiry and exploration [8].

*Stage 2: The ascent of experimental science and the scientific method (17th century AD to 19th century AD).* Philosophers such as *Francis Bacon* and *John Stuart Mill* advocated the utilization of science and technology to enhance the well-being of individuals, rather

than merely indulging intellectual curiosity [11]. They also stressed the importance of experimentation and observation in the innovation process [10].

The Industrial Revolution and the emergence of modern technology brought about a profound acceleration in the pace of innovation [9]. This surge of change raised fresh philosophical inquiries concerning the nature of technology, its societal impact, and ethical considerations [8].

*Stage 3: The industrial revolution and the emergence of modern technology (19th century AD to 20th century AD).* Philosophers such as *Karl Marx* and *Friedrich Nietzsche* grappled with the societal and political implications of new technologies [9]. Marx argued that capitalism exploited workers and estranged them from their labor [11]. Nietzsche contended that modern technology contributed to the erosion of traditional values and the ascent of nihilism [10].

*Stage 4: The emergence of philosophy of technology and innovation studies (20th century AD to the present day).* The 20th century witnessed the establishment of philosophy of technology and innovation studies as distinct academic disciplines [9]. These disciplines draw upon a diverse array of philosophical traditions to explore the essence, significance, and repercussions of technology and innovation [8].

A central figure in the evolution of philosophy of technology is *Martin Heidegger* [9]. Heidegger posited that technology was not a mere neutral tool but a force that shaped our perception of the world and ourselves [8]. He also cautioned against the perils of technology and the need for its responsible use [10].

Another influential figure in the development of philosophy of technology is *Jacques Ellul* [9]. Ellul contended that technology had become autonomous and was now controlling us, rather than us controlling it [11].

He also issued warnings about surveillance and the erosion of privacy in the age of technology [10].

*Stage 5: The contemporary era: Philosophy and innovation in the age of artificial intelligence and emerging technologies (present day).* The 21st century has borne witness to the advent of transformative technologies, including artificial intelligence, biotechnology, and nanotechnology [9]. These technologies pose novel and intricate philosophical inquiries about the essence of humanity, the future of society, and the meaning of existence [8].

A central query facing contemporary philosophers revolves around ensuring that artificial intelligence is harnessed for the greater good and does not cause harm [11]. Equally vital is the question of how to ensure equitable distribution of the benefits of new technologies while avoiding the exacerbation of existing inequalities [10].

#### ***Philosophical methods and tools for developing innovation***

Philosophical methods and tools can play a crucial role in developing innovation by providing a structured and reflective approach to addressing complex questions and challenges. Here are some philosophical methods and tools that can be applied to foster innovation:

- **First: Ethical inquiry.** Ethical inquiry, as articulated by scholars such as Johnson [12] and Moor [5], constitutes a philosophical approach involving the meticulous examination of the moral dimensions and repercussions stemming from actions, decisions, and concepts. When applied to innovation, ethical inquiry assumes a pivotal role in guiding innovators to acknowledge and confront ethical quandaries and principles, ensuring that novel solutions are ethically sound and in harmony with societal values.

I. *Identifying ethical dilemmas.* Ethical inquiry, as emphasized by ethical scholars [12],

empowers innovators to discern potential ethical dilemmas intertwined with their innovations, promoting a proactive stance in recognizing and addressing moral complexities.

II. *Ethical frameworks.* Ethical inquiry provides a structured framework for evaluating innovation from diverse ethical vantage points. Innovators can employ established ethical theories, including utilitarianism, deontology, or virtue ethics, to scrutinize the ethical ramifications of their concepts [5].

III. *Moral considerations.* Innovators can invoke ethical inquiry to contemplate the moral implications of their actions and decisions throughout the innovation process, ensuring that ethical considerations permeate every facet of innovation, from conception to execution [12].

IV. *Stakeholder engagement.* Aligned with the tenets of stakeholder theory [13], ethical inquiry advocates active engagement with stakeholders who might be impacted by the innovation. This inclusive approach enables innovators to incorporate diverse ethical perspectives and gather feedback.

V. *Ethical decision-making.* This method steers innovators toward making ethically informed decisions, fostering ethical reflection and reasoning to guarantee that chosen courses of action align with moral values and societal norms [5].

VI. *Ethical risk assessment.* Innovators can leverage ethical inquiry to assess the ethical risks associated with their innovations, encompassing the identification of potential harm, unintended consequences, or conflicts with ethical principles [12].

VII. *Mitigating harm.* Ethical inquiry underscores the imperative of mitigating harm, motivating innovators to proactively minimize adverse ethical consequences and devise innovations that maximize benefits while minimizing harm [5].

VIII. *Ethical codes and guidelines.* Ethical inquiry promotes adherence to established ethical codes and guidelines pertinent to the field of innovation, ensuring the upholding of ethical standards throughout the innovation process [12].

IX. *Continuous ethical evaluation.* Consistent with the principles of ongoing ethical assessment [14], ethical inquiry constitutes an ongoing process involving perpetual ethical evaluation and introspection. Innovators should periodically reassess the ethical implications of their innovations in response to changing circumstances.

X. *Transparency and accountability.* Transparency and accountability, championed by scholars like Bovens [15], form integral components of ethical inquiry. Innovators are encouraged to maintain transparency regarding their ethical deliberations, decisions, and actions, holding themselves accountable for the ethical consequences of their innovations.

Ethical inquiry, as expounded by ethical scholars [5; 12], nurtures conscientious and socially responsible innovation, ensuring that emerging technologies and solutions conform to societal values and uphold individual rights. It facilitates the cultivation of public trust among innovators by showcasing a dedication to ethical values and principles.

Through proactive consideration of ethical concerns, ethical inquiry can diminish the likelihood of ethical disputes and legal complications that could impede the adoption and success of innovations.

Incorporating ethical inquiry into the innovation process, as advocated by these scholars, proves indispensable for the development of solutions that not only advance technology but also enrich the welfare of society. It fosters a comprehensive approach to innovation in which ethical considerations are woven into the fabric of the endeavor, yielding outcomes that are morally sound

and socially responsible from the very outset.

• **Second: Thought experiments.** Thought experiments are a widely employed philosophical method and tool for delving into complex philosophical, scientific, and ethical inquiries. These cognitive exercises involve the construction of hypothetical scenarios, often in the form of counterfactual situations, with the aim of gaining deeper insights into the essence of reality, knowledge, and moral principles. As explicated by philosophers like Brown [16] and Sorensen [7], thought experiments play an indispensable role in the realm of conceptual analysis and the crafting of philosophical arguments.

I. *Enhancing conceptual clarity.* Thought experiments serve as a powerful instrument for attaining a clearer understanding of abstract or enigmatic concepts. Philosophers employ them to scrutinize and refine their comprehension of intricate ideas. For instance, the well-known “Chinese Room” thought experiment [17] is employed to explore the nature of artificial intelligence and comprehension.

II. *Exploring counterfactual scenarios.* These mental exercises are invaluable for probing counterfactual scenarios, allowing philosophers to investigate what could have transpired in alternative situations. This aids in the comprehension of causation, necessity, and possibility. The classic example of the “Mary’s Room” thought experiment [18] is used to delve into the nature of subjective experience.

III. *Shaping scientific hypotheses.* Thought experiments play a significant role in the development of scientific hypotheses. Einstein’s thought experiments involving moving observers and light beams led to the theory of relativity, revolutionizing our understanding of space time.

IV. *Ethical and moral reflection.* Thought experiments are pivotal in the domain of moral philosophy, enabling the assessment of

ethical principles and moral dilemmas. The “trolley problem” thought experiment [19] is frequently employed to examine moral decision-making in scenarios involving sacrificing one to save many.

V. *Constructing philosophical arguments.* Philosophers frequently harness thought experiments to construct and evaluate philosophical arguments. For example, the “Ship of Theseus” thought experiment challenges the notions of object persistence and identity through change (Plutarch).

VI. *Testing scientific theories.* They are harnessed to test scientific theories by envisioning potential consequences and outcomes. The “Einstein-Podolsky-Rosen” (EPR) thought experiment [20] plays a pivotal role in discussions surrounding quantum entanglement.

VII. *Eliciting moral intuitions.* Thought experiments serve to draw out moral intuitions, shedding light on how individuals would respond to specific situations. The “fat man” variant of the trolley problem [21] examines people’s intuitions concerning the permissibility of causing direct harm to prevent harm.

Thought experiments provide a unique avenue for exploring intricate and abstract concepts, often leading to innovative insights and solutions. They stimulate critical thinking and intellectual curiosity, encouraging individuals to engage with challenging philosophical or scientific questions.

Thought experiments serve as a potent tool for testing and refining theories and principles, deepening our understanding of the world. Incorporating thought experiments into philosophical and scientific inquiries, as endorsed by Brown [16], enriches the depth of analysis and inspires inventive problem-solving. They offer a means to navigate uncharted realms of thought, thereby enhancing our understanding of intricate and multifaceted issues.

• **Third: Critical thinking.** Critical thinking, a fundamental philosophical tool, plays a vital role in nurturing innovation by offering a structured and systematic approach to evaluating information, ideas, and arguments. It enables individuals to make informed decisions, solve complex problems, and generate novel solutions. In the context of innovation, critical thinking serves several pivotal functions:

I. *Problem identification and definition.* Critical thinking is instrumental in recognizing and defining the problems that demand innovative solutions. It empowers individuals to dissect intricate challenges into manageable components, leading to a clear understanding of the issues at hand, a crucial first step in guiding the innovation process [1].

II. *Creative ideation.* Critical thinking encourages individuals to break free from conventional thinking and spark creative ideas. Both philosophers and innovators leverage techniques like brainstorming and lateral thinking to craft inventive concepts and novel problem-solving approaches. By challenging assumptions and exploring alternative viewpoints, critical thinking paves the way for innovative breakthroughs [3].

III. *Evaluation of ideas.* The process of innovation often involves sifting through a multitude of ideas to identify those worthy of further pursuit. Critical thinking offers a systematic method for assessing the feasibility, viability, and potential impact of different concepts. It aids in selecting the most promising ideas for further development [4].

IV. *Problem solving.* Critical thinking serves as an invaluable tool for problem-solving, a fundamental aspect of innovation. It equips individuals to analyze problems, explore potential solutions, and evaluate the consequences of each option. Through critical analysis, innovators can arrive at effective and creative solutions to complex challenges [2].



V. *Risk assessment.* Innovation often necessitates taking calculated risks. Critical thinking aids in assessing the potential risks associated with innovative solutions. By methodically considering the benefits and drawbacks of different approaches, critical thinkers can make informed decisions that minimize risks and enhance the prospects of success [3].

VI. *Continuous improvement.* A mindset of continuous improvement is encouraged by critical thinking. Innovators who engage in critical reflection regarding their processes and outcomes can pinpoint areas for enhancement. This ongoing self-assessment and adaptability are crucial for sustaining innovation [6].

VII. *Interdisciplinary collaboration.* Innovation frequently flourishes at the intersection of diverse fields and disciplines. Critical thinking promotes effective communication and collaboration between individuals from different backgrounds. Philosophers, often trained in critical thinking, can bridge gaps between domains, facilitating cross-disciplinary innovation [1].

VIII. *Ethical considerations.* Critical thinking extends to ethical deliberation. Innovations should not only be groundbreaking and beneficial but also ethically sound. Philosophical ethical analysis, guided by critical thinking, assists innovators in assessing the ethical implications of their solutions and making choices that align with societal values [3].

Incorporating critical thinking into the innovation process enhances the depth of analysis and stimulates inventive problem-solving. It advocates for a comprehensive approach to innovation, where thoughtful reflection, rigorous analysis, and ethical considerations are seamlessly integrated from the outset, ultimately leading to solutions that are ethically sound and socially responsible. Philosophers,

equipped with their training in critical thinking, make substantial contributions to the innovation ecosystem by fostering a culture of thoughtful and ethical innovation.

### *Result and discussion*

This research paper achieved its objectives of exploring the historical trajectory of philosophy's influence on innovation, underscoring the pivotal contributions of philosophers, analyzing the fundamental philosophical concepts in innovation, and scrutinizing the roles of knowledge, creativity, and ethics in innovation.

The intricate relationship between philosophy and innovation has unfolded through a captivating historical trajectory, profoundly impacting various facets of human knowledge, science, and societal dynamics. This journey stretches from ancient Greece, where luminaries like Plato and Aristotle laid the groundwork for comprehending creativity and acquiring knowledge, to the present era marked by the complexities posed by artificial intelligence and emerging technologies.

Historical analysis underscores the evolution of the bond between philosophy and innovation across distinct phases. In antiquity, philosophical musings on creativity and knowledge paved the way for a transformative Renaissance, where empirical evidence and the scientific method rose to prominence. The Industrial Revolution highlighted the practical application of knowledge, leading to groundbreaking technologies and societal upheavals.

Prominent philosophers like Francis Bacon, René Descartes, Karl Marx, and others have left an indelible mark on the interplay between philosophy and innovation throughout history. Their emphasis on empirical evidence, experimentation, and ethical considerations laid the foundation for the Sci-

entific Revolution and subsequent technological advancements. In the 20th century, figures like John Rawls and Jürgen Habermas drew attention to the ethical dimensions of technological progress.

As we venture into the 21st century, the rapid advancement of technology, particularly in the realm of artificial intelligence, presents novel challenges. Philosophers like John Rawls and Jürgen Habermas advocate for the development of ethical frameworks to guide technological development. The need for critical analyses of emerging technologies and the creation of ethical, holistic, and sustainable perspectives on innovation is consequently becoming increasingly crucial.

Therefore, the application of philosophical methods and tools, encompassing ethical investigation, thought experiments, and critical thinking, stands as indispensable for innovation's advancement. Ethical inquiry provides a structured framework for evaluating innovation from diverse ethical perspectives, ensuring that ethical considerations permeate the entire innovation process. Thought experiments offer a unique approach to ex-

ploring abstract concepts and hypothetical scenarios, stimulating creative thinking and revising theories. Critical thinking, as a cornerstone philosophical tool, plays a vital role in problem-solving, risk assessment, continuous improvement, and ethical consideration in innovation.

### Conclusions

In conclusion, this research paper delves into the profound and symbiotic relationship between philosophy and innovation, tracing its evolution across various historical periods. The presented philosophical methods and tools provide valuable insights to foster ethical, inclusive, and socially responsible innovation. As technology continues to advance at an unprecedented pace, the critical role of philosophers in guiding and shaping the ethical dimensions of innovation is becoming increasingly evident. Philosophy's interdisciplinary nature, coupled with its emphasis on critical thinking and ethical reflection, positions it as a pivotal force in steering innovation towards positive societal impacts.

### References

1. Browne M.N., Keeley S.M. (2015). *Asking the right questions: A guide to critical thinking*. Pearson. 193 p. ISBN 9781292068718.
2. Ennis R.H. (1996). *Critical thinking: A conceptual framework for Critical thinking*. Prentice Hall. 407 p. ISBN 0133747115.
3. Paul R.W., Elder L. (2006). *Critical thinking: Tools for taking charge of your learning*. Prentice Hall. 514 p. ISBN 0131149628.
4. *The Scientific Revolution and the Enlightenment (1500–1780)*. Pp. 75–86 URL: <https://www.tamaqua.k12.pa.us/cms/lib07/PA01000119/Centricity/Domain/119/TheScientificRevolution.pdf> (accessed 29.10.2023).
5. Moor J.H. (2006). The Nature, Importance, and Difficulty of Machine Ethics. *IEEE Intelligent Systems*. Vol. 21. No. 4. Pp. 18–21, July-Aug. 2006, DOI: 10.1109/MIS.2006.80
6. Rescher N. (2001). *Philosophical reasoning: A Study in the Methodology of Philosophizing*. Wiley. 296 p. ISBN 0631230181.
7. Sorensen R. (1992). *Thought Experiments*. Oxford University Press. 318 p. ISBN 019512913X.

8. Johnson S. (2010) *Where Good Ideas Come from: The Natural History of Innovation*. New York : Reaverhead Books. 326 p. URL: [https://thezeitgeistmovement.se/files/Books/Where\\_goog\\_ideas\\_come\\_from.pdf](https://thezeitgeistmovement.se/files/Books/Where_goog_ideas_come_from.pdf) (accessed 29.10.2023).
9. Franssen M., Lokhorst G.-J., van de Poel I. (2018) Philosophy of Technology. In: Zalta E.N. (Ed) *The Stanford Encyclopedia of Philosophy*. The Metaphysics Research Lab. URL: <https://plato.stanford.edu/entries/technology/> (accessed 29.10.2023).
10. Carrier M., Massey G.J., Ruetsche L. (Eds.) (2000). *Science at Century's End: Philosophical Questions on the Progress and Limits of Science*. University of Pittsburgh Press. 400 p. DOI: <https://doi.org/10.2307/j.ctt5vkgxg>
11. Beauchamp T.L., Childress J.F. (2019). *Principles of biomedical ethics*. 8th edition. Oxford University Press. 512 p. ISBN 0190640871.
12. Johnson D.G. (2001). *Computer Ethics*. Prentice Hall. 240 p. ISBN 0130836990.
13. Freeman R.E. (2010). *Strategic Management: A Stakeholder Approach*. Cambridge University Press. 276 p. ISBN 0521151740.
14. Welfel E.R. (2015). *Ethics in Counseling and Psychotherapy: Standards, Research, and Emerging Issues*. Cengage Learning. 624 p. ISBN 1305687833.
15. Bovens M. (2007). Analysing and Assessing Accountability: A Conceptual Framework. *European Law Journal*. Vol. 13. No. 4. Pp. 447–468. DOI: 10.1111/j.1468-0386.2007.00378.x
16. Brown J.R. (2015). Thought Experiments. In: Zalta E.N., Nodelman U. (Eds). *Stanford Encyclopedia of Philosophy*. URL: <https://plato.stanford.edu/archives/win2023/entries/thought-experiment> (accessed 29.10.2023).
17. Searle J.R. (1980). Minds, Brains, and Programs. *Behavioral and Brain Sciences*. Vol. 3. No. 3. Pp. 417–457. DOI: 10.1017/s0140525x00005756
18. Jackson F. (1986). What Mary didn't know. *Journal of Philosophy*. Vol. 83. No. 5. Pp. 291–295. DOI: <https://doi.org/10.2307/2026143>
19. Foot P. (1967). *The problem of abortion and the Doctrine of the Double Effect*. The Oxford Review. Vol. 5. No. 2. Pp. 5–15. URL: <https://sites.pitt.edu/~mthomps/readings/foot.pdf> (accessed 29.10.2023).
20. Einstein A., Podolsky B., Rosen N. (1935). Can quantum-mechanical description of physical reality be considered complete? *Physical Review*. Vol. 47. No. 10. Pp. 777–780. URL: <https://journals.aps.org/pr/pdf/10.1103/PhysRev.47.777> (accessed 29.10.2023).
21. Thomson J.J. (1985). The Trolley Problem. *The Yale Review of Law and Social Action*. Vol. 94. No. 6. Pp. 1395–1415. DOI: <https://doi.org/10.2307/796133>