

The Urgency of Philosophy of Science in the Context of Human Civilization: An Epistemological Analysis

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Abstract

This research aims to find out how the urgency of philosophy of science in the context of human civilization with epistemological analysis. An important part in creating and advancing human civilization is played by the philosophy of science. A thorough understanding of epistemology, the field of philosophy that deals with theory, offers a critical perspective on how people learn and develop science. With a focus on the epistemological viewpoint that serves as the foundation of scientific thinking, this article examines the importance of philosophy of science in relation to the advancement of human civilization. To gain a comprehensive understanding, this research uses descriptive qualitative research with a literature review. This study shows how the philosophy of science can guide human civilization towards more sustainable, knowledge-based and equitable growth. Philosophy of science plays a very important role in shaping human understanding of knowledge and the development of scientific methodology. Through critical analysis of basic concepts and epistemological approaches, philosophy of science helps us evaluate the validity of knowledge and the methods used in research. With the growing complexity of challenges facing humanity, such as climate change and social injustice, the critical thinking taught by philosophy of science is becoming increasingly relevant. In addition, philosophy of science contributes to innovation by encouraging reflective and interdisciplinary approaches in research. Therefore, the urgency of philosophy of science in the context of human civilization lies in its ability to facilitate ethical dialogue, encourage sustainable innovation, and ensure that the knowledge produced is relevant and beneficial to the whole of society.

Keywords: Philosophy of science; Human civilization; Epistemological analysis

Abstrak

Penelitian ini bertujuan untuk mengetahui bagaimana urgensi filsafat ilmu dalam kontelasi peradaban umat manusia dengan analisis epistemologis. Bagian penting dalam menciptakan dan memajukan peradaban manusia dimainkan oleh filsafat ilmu pengetahuan. Pemahaman yang menyeluruh tentang epistemologi, bidang filsafat yang berhubungan dengan teori, menawarkan perspektif kritis tentang bagaimana orang belajar dan mengembangkan ilmu pengetahuan. Dengan fokus pada sudut pandang epistemologi yang berfungsi sebagai dasar pemikiran ilmiah, artikel ini mengkaji tentang pentingnya filsafat ilmu dalam kaitannya dengan kemajuan peradaban manusia. Untuk mendapat pemahaman komprehensif, penelitian ini menggunakan jenis penelitian kualitatif deskriptif dengan studi literatur kepustakaan. Kajian ini menunjukkan bagaimana filsafat ilmu dapat memandu peradaban manusia menuju pertumbuhan yang lebih berkelanjutan, berbasis pengetahuan, dan berkeadilan. Filsafat ilmu memainkan peran yang sangat penting dalam membentuk pemahaman manusia tentang pengetahuan dan pengembangan metodologi ilmiah. Melalui analisis kritis terhadap konsep-konsep dasar dan pendekatan epistemologis, filsafat ilmu membantu kita mengevaluasi keabsahan pengetahuan dan metode yang digunakan dalam penelitian. Dengan semakin kompleksnya tantangan yang dihadapi umat manusia, seperti perubahan iklim dan ketidakadilan sosial, pemikiran kritis yang diajarkan oleh filsafat ilmu menjadi semakin relevan. Selain itu, filsafat ilmu berkontribusi pada inovasi dengan

mendorong pendekatan reflektif dan interdisipliner dalam penelitian. Oleh karena itu, urgensi filsafat ilmu dalam konteks peradaban umat manusia terletak pada kemampuannya untuk memfasilitasi dialog etis, mendorong inovasi yang berkelanjutan, dan memastikan bahwa pengetahuan yang dihasilkan relevan serta bermanfaat bagi seluruh masyarakat.

Kata Kunci: Filsafat ilmu; Peradaban manusia; Analisis Epistemologi

Introduction

Philosophy of science is knowledge that studies basic issues about the nature of knowledge and the scientific method. In the modern era, where technological and information developments are taking place at a rapid pace, a deep understanding of the philosophy of science is becoming increasingly important. Science is not just an accumulation of data, but a process that involves critical reflection on the assumptions, methods and impact of the knowledge produced.¹ The importance of philosophy of science in modern human civilization lies not only in its ability to explain and evaluate the scientific method, but also in helping humans deal with ethical, social, and philosophical dilemmas arising from technological and information advances. An epistemological perspective provides a foundation for exploring how science develops and how we can ensure that this knowledge is used for the common good.²

The study conducted by Rudy Budiarmaja, et al with the title "Correlation of Philosophy and Science in the Development of Technology and the Life of Human Civilization Today" this study discusses the correlation between philosophy and science in the context of technological development and its impact on the life of human civilization. The results of this article show that there is a correlation between philosophy and science, including the relevance of technological acceleration for all people as winners in minimizing the challenges of the current era of disruption. The end of the current article concludes that humans are fully aware of the use of thinking power, reason is the solution to every problem that often occurs in line with the rapid technology that enters life and daily activities in the progress of human civilization in the field of technology.³

Ryan Saputra Alam with the title "Dimensions of Epistemology in the Philosophy of Science and its Urgency" this study discusses the importance of epistemology in the philosophy of science and how schools such as rationalism, empiricism, criticalism, and intuitionism play a role in the formation of scientific knowledge. This study emphasizes that understanding epistemology is very important in human life and the development of science.⁴

¹ Nabila, N., Berutu, A. T., & Tambunan, N. F. A. Filsafat Ilmu di Era Globalisasi. *Hibrul Ulama*, 5(1), (2023), h. 11-20.

² Nugraha, M. V. A., Putra, I., Salmon, H. C. J., Muhammadong, M., & Lubis, A. F. Peran Nilai-Nilai Filsafat Hukum dalam Membentuk Landasan Etika Hukum Pada Era Transformasi Digital di Indonesia. *Innovative: Journal Of Social Science Research*, 4(6), (2024), h. 440-452.

³ Budiarmaja, R., Lamsir, S., Sugianto, S., Ishakputro, M., & Sianipar, R. P. Korelasi Filsafat dan Ilmu Pengetahuan pada Perkembangan Teknologi dan Kehidupan Peradaban Manusia Masa Kini. In *Proceedings of The National Conference on Indonesian Philosophy and Theology*. Vol. 2, No. 2, (2024), h. 408-422.

⁴ Alam, R. S. Dimensi Epistemologi dalam Filsafat Ilmu dan Urgensinya. *Philosophy and Paradigm Review*, 1(1), (2022), h. 23-28.

Furthermore, the study conducted by Berlian Ocsis and Sofyan Sauri with the title "Science in Philosophy Review Related to Epistemology" this article examines how science develops based on human curiosity and how epistemology plays a role in determining the methods, sources, and values of this knowledge. This article also highlights the importance of understanding epistemology in producing new knowledge and relevance to the times.⁵

The challenges faced by humanity today such as climate change, the global health crisis, and social injustice demand a more holistic and interdisciplinary approach. Philosophy of science helps us to question the validity of existing knowledge and evaluate the validity of the scientific methods used. By utilizing the critical thinking generated by philosophy of science, we can foster innovation and find more effective solutions to these complex problems.⁶ Philosophy of science helps consider the ethical risks of new technologies and integrate moral values into decision-making, thus strengthening humanity's ability to face and overcome global challenges.⁷

In addition, globalization has accelerated the exchange of ideas and information around the world, but it has also brought new challenges, such as the dominance of certain perspectives and the marginalization of voices from other groups. In this context, philosophy of science not only plays a role in producing knowledge, but also in establishing an ethical dialog that takes into account diverse social and cultural values. Thus, it is important to understand how philosophy of science can contribute to the development of more inclusive and equitable knowledge.⁸

This writing is a type of descriptive qualitative research that aims to examine the urgency of the philosophy of science in the context of human civilization. Using library research with data analysis techniques in the form of content analysis. This technique involves data collection, data reduction, and data interpretation from various relevant literature sources, such as books, journals, and other scientific documents, to gain a deep understanding of the urgency of the philosophy of science in the context of human civilization. By understanding the contribution of philosophy of science to innovation, critical thinking, and the impact of globalization, we hope to find new ways to overcome the challenges faced by society, and build a better future through an ethical and inclusive scientific approach.

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⁵ Ocsis, B., & Sauri, S. Science in a Review of Philosophy Related to Epistemology. *al-Afkar, Journal For Islamic Studies*, 7(4), (2024), h. 1261-1274.

⁶ Susanto, A. *Filsafat ilmu: Suatu kajian dalam dimensi ontologis, epistemologis, dan aksiologis*. Bumi Aksara. (2021), h. 32.

⁷ Wahono, F. Kritik terhadap Positivisme dalam Filsafat Ilmu Pemikiran Rekonstruktif terhadap Metode Penelitian. *literacy notes*, 1(2), (2023), h. 17.

⁸ Ramli, A., Putri, R., Trimadona, E., Abadi, A., Ramadani, Y., Saputra, A. M. A., ... & Mahmudah, K. *LANDASAN PENDIDIKAN: Teori Dan Konsep Dasar Landasan Pendidikan Era Industri 4.0 Dan Society 5.0 Di Indonesia*. PT. Sonpedia Publishing Indonesia. (2023), h. 45.

perspectives and the marginalization of voices from other groups. In this context, philosophy of science not only plays a role in producing knowledge, but also in establishing an ethical dialog that takes into account diverse social and cultural values. Thus, it is important to understand how philosophy of science can contribute to the development of more inclusive and equitable knowledge.⁹

Results and Discussion

Definition Pattern and Scope of Philosophy of Science

Philosophy of science is a branch of philosophy that focuses on fundamental questions regarding science. It covers various aspects, including the origin of knowledge, the methodologies used in research, as well as the limits that exist in the development of science. With a deep understanding of the philosophy of science, we can understand how scientific knowledge is formed, tested, and accepted by society at large.¹⁰

Karl Popper, an influential philosopher in thinking about the scientific method, introduced the concept of falsifiability in his book "*The Logic of Scientific Discovery*." According to Popper, to be categorized as science, a theory must be testable and have the possibility of being refuted. This reflects his view that science cannot be considered an absolute truth; rather, it is a continuous process, always open to revision and improvement. By prioritizing criticism and testing, Popper emphasizes that the development of science occurs through iteration and critical reflection.¹¹

Philosophy of science seeks to explain what science is and how it differs from other fields. It involves analyzing key concepts such as "theory," "hypothesis," and "method." It provides a foundation for distinguishing scientific knowledge from other knowledge, such as intuitive or traditional knowledge.¹² The main goal of philosophy of science is to explore and understand how scientific knowledge is constructed and evaluated. Through this understanding, we can question the assumptions underlying research and evaluate scientific claims more critically. By exploring the limitations of the methods used, philosophy of science helps us recognize potential biases and errors in research.¹³

Epistemology serves as a tool to question how knowledge is obtained and what the criteria of truth are. In this context, epistemology helps us to understand the limits of science

⁹ Ramli, A., Putri, R., Trimadona, E., Abadi, A., Ramadani, Y., Saputra, A. M. A., ... & Mahmudah, K. *LANDASAN PENDIDIKAN: Teori Dan Konsep Dasar Landasan Pendidikan Era Industri 4.0 Dan Society 5.0 Di Indonesia*. PT. Sonpedia Publishing Indonesia. (2023), h. 64.

¹⁰ Hidayat, R. Harmonisasi Pengetahuan: Menelusuri Interaksi Islam Dan Filsafat Dalam Pengembangan Ilmu Pengetahuan: Menelusuri Interaksi Islam Dan Filsafat Dalam Pengembangan Ilmu Pengetahuan. *EL-FIKR: Jurnal Aqidah Dan Filsafat Islam*, 5(1), (2024), h. 37-53.

¹¹ Saepullah, A. Epistemologi Falsifikasionisme Karl R. Popper: Relevansinya Bagi Teologi dan Pemikiran Keislaman. *Journal of Islamic Civilization*, 2(2), (2020), h. 60-71.

¹² Lubis, R. D. G. I., Latief, I. S., & Nurhayati, T. Peran Filsafat Ilmu Dalam Pendekatan Ilmiah. *Intellektika: Jurnal Ilmiah Mahasiswa*, 2(1), (2024), h. 192-202.

¹³ Rahman, M. T. *Filsafat ilmu pengetahuan*. Prodi S2 Studi Agama-Agama UIN Sunan Gunung Djati Bandung. (2020), h. 20.

and the challenges faced in the search for truth.¹⁴ Immanuel Kant developed an epistemological view that knowledge is the result of the interaction between sensory experience and categories that already exist in the human mind. He argued that humans cannot fully understand the world solely with sensory data, as reason also plays a role in shaping our experience. Human cognitive structures give shape to knowledge gained from experience, creating a framework for how we understand reality. This view leads to the understanding that knowledge is intersubjective and influenced by cultural and social context.¹⁵

Impact of Globalization on Knowledge

Globalization has brought about significant changes in the way knowledge is disseminated and understood. With rapid information exchange and wider access, different knowledge traditions now interact with each other. This creates new challenges and opportunities in the development of knowledge.¹⁶ Globalization accelerates the dissemination and development of knowledge through broad access to information, global collaboration, and diversification of perspectives. However, challenges such as the digital divide, homogenization of knowledge, and information ethics need to be addressed. With the right approach, globalization can foster a more inclusive, innovative and knowledgeable society.¹⁷

Edward Said, in his book "Orientalism," explores how knowledge is often affected by power relations. He points out that Western perspectives often dominate narratives about the East, resulting in stereotypes and biases in the knowledge produced. In the context of globalization, it is important to be aware of how power relations affect the way we produce and consume knowledge. This requires us to be more critical in considering existing sources of knowledge and representations.¹⁸

Idea Exchange

Globalization enables faster exchange of ideas and information, enriching collective knowledge. For example, international collaboration in scientific research can lead to more effective solutions to global problems such as climate change and infectious diseases. This exchange of ideas also creates space for innovations that arise from the combination of

¹⁴ Pajriani, T. R., Nirwani, S., Rizki, M., Mulyani, N., Ariska, T. O., & Harahap, S. S. A. Epistemologi Filsafat. *PRIMER: Jurnal Ilmiah Multidisiplin*, 1(3), (2023), h. 282-289.

¹⁵ Rahman, M. T. *Filsafat ilmu pengetahuan*. Prodi S2 Studi Agama-Agama UIN Sunan Gunung Djati Bandung. (2020), h. 27.

¹⁶ Salim, K., Sari, M. P., Islam, J. M. P., & Riau, S. A. K. Pengaruh Globalisasi Terhadap Dunia Pendidikan. *Makalah Jurusan Manajemen Pendidikan Islam, STAI Abdurrahman Kepulauan Riau*. Page, (2014), h. 1-11.

¹⁷ Kusnanto, S. P., Gudiato, C., Kom, M., Usman, S. E., Blasius Manggu, S. E., & Sumarni, M. L. *Transformasi Era Digitalisasi Masyarakat Kontemporer*. Uwais Inspirasi Indonesia. (2024), h. 10.

¹⁸ Sari, Y., Pujawati, P., & Bahtiar, M. U. Orientalism: Edward Said's Postcolonial Thoughts and Theories Against the Eastern World and Islam. In *Gunung Djati Conference Series*. Vol. 23, (2023), h. 145-164).

different cultural and scientific perspectives, strengthening the potential for more holistic solutions.¹⁹

With the interaction between different knowledge traditions, innovation can occur more effectively. For example, international cooperation in medical research can lead to better solutions to global health problems, such as the development of vaccines for highly infectious diseases. These interactions also help bridge the knowledge gap between countries, enabling wider access to technology and information.²⁰

Epistemological Challenges

In an increasingly connected world, it is important to be aware of the biases that exist in knowledge production. This includes considerations of who has voice and control over the knowledge produced. For example, research conducted by scientists from developed countries may not consider the context and needs of people in developing countries, resulting in irrelevant or even harmful knowledge.²¹

Inclusivity in the development of science is essential. This means that different perspectives and traditions must be integrated in the way we produce and understand knowledge, so that no voice is marginalized. Ensuring that all groups of people, especially the marginalized, have access and opportunities to contribute to knowledge production is an important step towards creating science that is more equitable and relevant for all. The involvement of local communities in research, for example, can lead to more accurate data and more appropriate solutions to the challenges faced by them.²²

With this comprehensive approach, the paper can illustrate the urgency of philosophy of science in the context of human civilization, while referring to the views of relevant prominent figures. A deep understanding of the philosophy of science not only provides a critical perspective on existing knowledge, but also encourages us to commit to the development of a more ethical and inclusive science, in accordance with the needs of this increasingly complex global society.²³

The Role of Philosophy of Science in Civilization

Philosophy of science plays an important role in the development of civilization. By providing a framework for understanding how science interacts with social, cultural, and ethical aspects, philosophy of science helps shape the way we see the world and make

¹⁹ Cahyadi, D. HAKIKAT ILMU: SEBUAH PENGANTAR. (2023), h. 82.

²⁰ Jompa, J., Dartanto, T., Burhani, A. N., Koropitan, A. F., Tjoa, A. B., Utami, P., ... & Brodjonegoro, S. *SAINS45: Agenda Ilmu Pengetahuan Indonesia Menyongsong Satu Abad Kemerdekaan (Edisi Final)*. Indonesian Academy of Sciences. (2016), h. 22.

²¹ Sulianta, F. *Literasi digital, riset dan perkembangannya dalam perspektif social studies*. Feri Sulianta. (2020), h. 32.

²² Iswahyudi, M. S., Irianto, I., Salong, A., Nurhasanah, N., Leuwol, F. S., Januaripin, M., & Harefa, E. *Kebijakan Dan Inovasi Pendidikan: Arab Pendidikan di Masa Depan*. PT. Sonpedia Publishing Indonesia. (2023), h. 51.

²³ Husaini, A. *Filsafat Ilmu: Perspektif Barat & Islam*. Gema Insani. (2020), h. 52.

decisions that impact society.²⁴ Jürgen Habermas is a social philosopher who contributed greatly to thinking about communication and rationality. In his book *"The Theory of Communicative Action,"* Habermas emphasizes the importance of rational communication in building social consensus. He argues that open dialogue between scientists, policymakers, and society is important to ensure that science is not only a tool of power, but also a tool for achieving the common good. In his view, an inclusive communication process can help reduce injustice and create fairer decisions.²⁵

Innovation Drivers

Philosophy of science encourages us to think critically and not passively accept knowledge. This reflective thinking leads to deep questions and the search for innovative solutions. Without this critical approach, knowledge can stagnate, and the innovations needed to address contemporary challenges will not emerge.²⁶ Critical thinking in philosophy of science involves the ability to evaluate assumptions, identify biases, and explore alternative perspectives that may be missed in conventional frameworks. This process not only opens up opportunities to develop new concepts, but also helps create theories and approaches that can drive scientific and technological progress.²⁷

Philosophy of science contributes to social innovation, as many solutions to social problems are rooted in deep scientific understanding. For example, the understanding of climate change that results from scientific research can drive better policies for environmental sustainability. In addition, innovations in public health, such as new vaccines and medical technologies, also stem from research guided by critical scientific thinking.²⁸

Ethical Dialogue

Philosophy of science reminds us that science is inseparable from ethical values. This is especially important in making decisions that can affect society at large, such as in health and technology. When scientists develop new technologies, they must consider how they will affect people's lives and the environment.²⁹

Scientists have a responsibility to consider the social impact of their research. For example, in the development of new technologies, it is important to evaluate the potential risks and benefits to society at large. In addition, scientists also need to communicate with

²⁴ Hidayat, R. Harmonisasi Pengetahuan: Menelusuri Interaksi Islam Dan Filsafat Dalam Pengembangan Ilmu Pengetahuan: Menelusuri Interaksi Islam Dan Filsafat Dalam Pengembangan Ilmu Pengetahuan. *EL-FIKR: Jurnal Aqidah Dan Filsafat Islam*, 5(1), (2024), h. 37-53.

²⁵ Tobing, M. M. Pemikiran Tokoh Filsafat Komunikasi "Jürgen Habermas dan Ruang Publik di Indonesia". (2017), h. 36.

²⁶ Pratama, R. A. *JALUR PEMIKIRAN: Menyelami Kompleksitas Pemikiran Manusia*. Guepedia. (2024), h. 24.

²⁷ Hertina, D., Nurhidaya, M., Gaspersz, V., Nainggolan, E. T. A., Rosmiati, R., Sanulita, H., ... & Ferdinan, F. *Metode Pembelajaran Inovatif Era Digital: Teori dan Penerapan*. PT. Green Pustaka Indonesia. (2024), h. 8.

²⁸ Tukiran, M. *Filsafat manajemen pendidikan*. PT Kanisius. (2020), h. 43.

²⁹ Sya'roni, M. Etika keilmuan: Sebuah kajian filsafat ilmu. *Jurnal Theologia*, 25(1), (2014), h. 245-270.

society about the results of their research and its implications, so that the public can understand and provide input on the urgency of philosophy of science in the context of human civilization.³⁰

In this context, the urgency of philosophy of science has significant implications for human civilization. It helps scientists and society to understand the epistemological underpinnings of science, including the validity of the scientific method, ethical boundaries, and moral responsibility in the application of research results. By considering the philosophy of science, scientists can direct their research not only to technical advances, but also to ensure that such innovations support human well-being in a sustainable manner. In addition, philosophy of science strengthens the dialogue between science and cultural values, thus promoting harmony between the development of science and the needs of people in various civilizations.³¹

Conclusion

Philosophy of science plays a very important role in shaping our understanding of knowledge and the development of scientific methodologies. Through critical analysis of basic concepts and epistemological approaches, philosophy of science helps us evaluate the validity of knowledge and the methods used in research. With the growing complexity of challenges facing humanity, such as climate change and social injustice, the critical thinking taught by philosophy of science is becoming increasingly relevant. In addition, philosophy of science contributes to innovation by encouraging reflective and interdisciplinary approaches in research. In the context of globalization, epistemological challenges arise when voices and perspectives from different knowledge traditions interact with each other. Inclusivity in the development of science is crucial to ensure that all groups of society are recognized and represented in the production of knowledge. Therefore, the urgency of philosophy of science in the context of human civilization lies in its ability to facilitate ethical dialogue, encourage sustainable innovation, and ensure that the knowledge produced is relevant and beneficial to the whole society. Suggestions for future writers could relate philosophy of science arguments to world events or the latest technological trends to demonstrate its urgency in everyday life.

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³⁰ Kriyantono, R. *Pengantar Lengkap Ilmu Komunikasi Filsafat dan Etika Ilmunya Serta Perspektif Islam*. Prenada Media. (2019), h. 55.

³¹ Ulfa, D. M., Oktaviani, F. N., & Winarno, A. (2024). Peran Filsafat Keilmuan Dalam Perkembangan Ilmu Pengetahuan. *JURNAL ILMIAH NUSANTARA*, 1(6), 399-405.

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