# IT Philosophy: Philosophical Paradigms in Information Technology Research

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## ABSTRACT

This study examines three major philosophical perspectives in information technology (IT) research: Positivism, Interpretivism, and Pragmatism. It investigates their various points of view, strengths, shortcomings, and most appropriate study methodologies. In addition, the report digs further into three more philosophical frameworks in IT research: postmodernism, Critical Realism, and postpositivism. Understanding these diverse philosophical foundations enables researchers to make informed decisions regarding research design and execution while navigating the rapidly evolving IT landscape.

The paper emphasizes the importance of considering the broader social, cultural, and ethical implications of IT systems and their applications. By adopting a more inclusive, responsive, and responsible approach to IT research, this work aims to contribute to the development of technologies that genuinely benefit and empower users, organizations, and societies. The diversity of philosophical paradigms underscores the complexity and richness of the IT research landscape, offering different lenses to examine the multifaceted nature of technology and its societal implications.

At the end of the study, researchers are encouraged to be aware of the philosophical underpinnings of their chosen paradigms and remain open to exploring alternative perspectives. This openness and reflexivity can enhance the quality, rigor, and relevance of IT research, fostering innovation, collaboration, and progress within the field.

By using the information in this article, researchers may be able to make better decisions about their research design and carry out their studies, which will improve IT research and its use in a wide range of settings.

## INTRODUCTION

The evolution of information technology research has been tremendous in recent years, emphasizing the significance of incorporating potent and comprehensive research methodologies.

The methodologies employed in conducting research are influenced by underlying philosophical principles that shape the selection of subject matter, methodologies employed, and proposed interpretations when it comes to investigating information technology. Moreover, with the provision of a procedural structure that elucidates the intricacies inherent in our global landscape, these instruments grant scholars a viable avenue for attaining valuable comprehension regarding the occurrences within their field of research. Notwithstanding the significant progress made in information technology research, there is still a scarcity of understanding about the underlying philosophical frameworks employed in this field, their individual strengths and weaknesses, as well as their applicability to different research methodologies. Therefore, this study aims to narrow the current divide by conducting a thorough investigation of philosophical frameworks employed in IT research, thus furnishing a more comprehensive outlook.

### Research Paradigms

Research entails a comprehensive examination and assessment in order to discover solutions to problems. (Chege and Otieno, 2020). A paradigm consists of fundamental belief systems and a theoretical structure that

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includes assumptions regarding ontology, epistemology, methodology, and techniques. It represents a means of comprehending and examining reality. (Chege & Otieno, 2020; Abdulrehman & Alharthi, 2016).

Each paradigm is founded on its unique ontological and epistemological premises. Given that all premises are speculative, the philosophical foundations of every paradigm can never be definitively verified or refuted through empirical means. Distinct paradigms inherently possess diverse ontological and epistemological perspectives; as a result, they maintain varying assumptions about reality and knowledge that support their specific research approach. This is manifested in their methodology and, consequently, the methods employed. Methodology refers to the strategic plan outlining how the researcher should conduct their study to achieve optimal results. Lastly, methods encompass the instruments that the researcher utilizes to gather and analyze data, such as interviews and questionnaires. (Abdulrehman & Alharthi, 2016)

**Philosophical Paradigms in Information Technology Research**

Within the realm of IT research, numerous philosophical frameworks are commonly employed. Out of these research philosophies, three are considered as the primary approaches, and extensive research has been conducted on them: Positivism, interpretivism, and pragmatism. In addition to these primary frameworks, this paper will also concentrate on other philosophies, specifically postmodernism, critical realism, and post-positivism.

Each of these paradigms possesses unique ontological, epistemological, and methodological foundations that guide the research procedure. The application of these paradigms in research may differ from one researcher to another, contingent upon their preference and the characteristics of the subject matter being examined. Furthermore, the significance of selecting an appropriate paradigm for a research study is rooted in its ability to provide the foundation for the adoption of suitable research designs and methodologies. While a paradigm looks into the way knowledge is interpreted and studied, it clearly defines the purpose, motivation, and desired outcomes of the study. (Kankam, 2019)

Therefore, in order for one to decide what paradigm to use for IT research then it is important to understand the Reserarch Paradigms; weigh their strenghths against their weaknesses.

**Three main Philosophical Paradigms in Information Technology Research**

**Positivism**

Positivism represents a philosophical framework centered on the conviction that an objective reality exists and can be examined and quantified through empirical methods. (Ryan, 2018; Gamlen & McIntyre, 2018, Rahi 2017). This paradigm presumes that the social realm functions based on unchanging principles and patterns. Researchers can uncover these principles by carrying out methodical, quantitative research. Additionally, numerous researchers have determined that Positivism relies on the notion that information is built upon facts, and that no abstract concepts or subjective statuses of individuals should be taken into account. (Hashil 2014, Cumming 2012). They further emphasize the significance of objectivity and evidence in the learning process. Within the positivist approach, facts and values are separate, thereby enabling the pursuit of unbiased and value-independent knowledge acquisition. Cumming,2012).

Advocates of this framework assert that genuine understanding can be achieved through examination and experimentation. As a result, positivists typically opt for the scientific approach to generate knowledge. Positivism is therefore also known as Causal Research, Scientific Method, Empirical Science, Post Positivism and Quantitative Research. (Rahi, 2017) Within Positivism, reality remains constant and can be observed or depicted through an objective standpoint. Thus many researchers refers to this as “singular reality”. (Owoche, 2022; Rahi, 2017). A significant debate exists regarding the suitability of the positivist paradigm for application in social sciences. (Rahi, 2017)

In order for one to decide what paradigm to use for IT research then it is important to understand the strengths and the weaknesses for each paradigm. Below are the strengths and weaknesses for Positivism.

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**Strengths**

i) Positivism provides clear guidelines for the research process, emphasizing the importance of objectivity, reliability, and validity.

ii) The use of quantitative methods and statistical analyses allows for generalizability and the identification of patterns and causal relationships.

iii) The rigour and transparency of the research process make the findings more easily replicable and open to scrutiny.

iv) In positivism, the study is independent of the researcher; thus this makes it free from biasness unlike with Interpretivism where the researcher is part of the study. (Owoche, 2022)

v) Positivist typically considers the researcher as the exclusive holder of knowledge that will trigger action and the sole initiator of action to be executed on a fundamentally inert world. (Chege and Otieno, 2020).

**Weaknesses:**

i) Positivism fails to consider the impact of individual experiences and the influence of societal and cultural aspects in defining reality.

ii) The emphasis on quantitative methods may limit the depth and richness of the data collected, providing only a superficial understanding of complex phenomena.

iii) Positivism may enforce a simplistic outlook on research, neglecting the complexity and interrelated nature of various elements.

iv) While Positivism is suitable IT research as a natural science, it neglects the other dimension of IT that encompasses social science.

**Best research methods:**

It can be concluded from the above information that Positivism is highly appropriate for research techniques that depend on quantitative data, including structured questionnaires, experiments, surveys, and structured interviews. These methods enable researchers to assess and scrutinize the connections between variables in a controlled and systematic way. As a result, Positivism can be beneficial for IT research as it is a natural science; however, its limitations should be acknowledged since it overlooks the aspect of IT that encompasses social science.

**Interpretivism**

Interpretivism is a philosophical paradigm that acknowledges the subjective nature of reality and the importance of understanding human experiences and social settings. This paradigm emphasizes the need for in-depth, qualitative research to uncover the meanings and interpretations individuals assign to their experiences and actions. (Rahi, 2017) Interpretivists believe that reality is socially constructed and that it cannot be understood independently of the observer. (Creswell,2014) This paradigm is also referred to as Constructivism, Social Constructivism or Qualitative Research paradigm. Interpretivists believe that true knowledge can only be acquired through deep examination and interpretation of the subject. (Rahi, 2017)

Advocates of the interpretive paradigm emphasize the importance of understanding a concept profoundly and delving into the understanding of the world they inhabit. They develop subjective interpretations of their experiences and perceptions of specific objects or situations. As Krishna (2020) points out, interpretivism permits a design to progressively evolve, rather than requiring a fully-formed design at the onset of a study. This is because predicting the results of interactions is challenging, if not unattainable, due to the diverse

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viewpoints and value systems held by both the researcher and participants, as well as their impact on the interpretation of reality and the study's outcome.

As a result, interpretivism emphasizes on the use of open-ended inquiries and minimizes the reliance on structured questionnaires. These subjective interpretations are often shaped through social and historical negotiation, rather than being merely imposed on individuals. They develop through interactions with others, adhering to social constructivism principles, and are influenced by the historical and cultural standards present in individuals' lives. Consequently, constructivist researchers frequently focus on the dynamics of interaction among individuals (Creswel, 2014).

According to nominalists, there is no inherent reality to the social world other than what individuals (social actors) assign to it. Since each person experiences and perceives reality in unique ways, it is more appropriate to discuss multiple realities instead of a singular reality that is identical for everyone (Saunders, Lewis and Thornhill, 2016).

**Strengths**

i) Interpretivism recognizes the complexity and context-dependency of human behaviour and social phenomena, providing a richer understanding of these issues.

ii) The use of qualitative methods enables researchers to capture the nuances, emotions, and contradictions that characterize human experiences.

iii) Interpretivism encourages reflexivity and critical thinking, allowing researchers to question their assumptions and acknowledge the role of their own beliefs and values in shaping the research process.

iv) Interpretivism fosters self-reflection and analytical thought, enabling researchers to question their assumptions and recognize the influence of their personal beliefs and values in shaping the research process.

v) Interpretivism can be applied to examine the societal aspects of IT.

**Weaknesses**

i) Interpretivism may lack objectivity and rigour, as it is heavily reliant on the researcher's interpretation and understanding of the data.

ii) The emphasis on context and individual experiences may limit the generalizability of the findings, making it difficult to draw broad conclusions or develop universally applicable theories.

iii) The use of qualitative methods may be time-consuming and labour-intensive, posing challenges to the practical implementation of interpretive research.

**Best research methods**

Interpretivism is best suited for research methods that focus on exploring human experiences and understanding the social world from the participants' perspectives. As a result, it is mostly preferred for qualitative reserarch where data is collected through in-depth interviews, observation, document analysis or case studies.

**Pragmatism**

Pragmatism is a philosophical paradigm that prioritizes practical outcomes and problem-solving over adherence to specific ontological or epistemological positions. Pragmatists argue that the value of research lies in its ability to address real-world problems and generate actionable knowledge.

In the realm of IT research, a pragmatic perspective concentrates on the creation and implementation of technology to resolve real-world challenges, giving precedence to the practical usefulness and efficacy of solutions instead of strictly adhering to theoretical or methodological structures.

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The primary objective of this framework is to identify the shortcomings within a study and enhance it through the application of a mixed-methods approach. Advocates of this paradigm maintain that genuine understanding can be achieved by utilizing a mixed-methods strategy. (Panya & Nyarwath, 2022).Rather than focusing on the method's significance, the issue at hand is of utmost importance, and researchers ought to employ various approaches to comprehend the problem statement (Rahi 2017). Pragmatism does not adhere to any particular system or philosophy. Researchers have the liberty to utilize both quantitative and qualitative methodologies; the crux lies in discovering the most effective techniques and research procedures to address the problem statement. (Panya & Nyarwath, 2022; Rahi 2017)

**Strengths:**

i) Pragmatism promotes a problem-solving and action-oriented approach to IT research, contributing to the development of practical and effective solutions for real-world challenges.

ii) This paradigm encourages researchers to utilize a wide range of theories, methods, and perspectives, promoting increased innovation and adaptability in IT research and practice.

iii) Pragmatism's emphasis on practical utility and effectiveness can contribute to more responsive and adaptive IT systems, better aligned with the needs and demands of users and stakeholders.

iv) Action researchers possessing theoretical concepts and extensive practical expertise may assist clients in better understanding their practical knowledge and experience in circumstances where they aim to address their specific problems (Chege and Otieno, 2020).

v) Pragmatism encourages cooperation between researchers and stakeholders, facilitating the joint creation of knowledge and the incorporation of diverse outlooks.

**Weaknesses:**

i) One potential critique of pragmatism is its emphasis on practical outcomes and usefulness, which could potentially undermine the significance of theoretical development and fundamental understanding.

ii) The paradigm's flexible approach to theories and methods may result in a lack of consistency and coherence within the IT research community, hindering the accumulation of shared knowledge and progress. It also may undermine the credibility and validity of the findungs.

iii) Pragmatism may be seen as overly pragmatic or instrumental, potentially overlooking the broader social, cultural, and ethical implications of IT systems and their applications.

**Best research methods:**

Pragmatism is compatible with a wide range of research methods that prioritize the practical value and effectiveness of IT solutions, such as action research, mixed-methods approaches, and applied research projects. (Panya & Nyarwath, 2022). It will thus enable researcher study both the natural and social science part of IT.

**Other Philosophical Paradigms in Information Technology Research**

**Postmodernism**

According to Farhan, R. (2019), Postmodernism is a way of thinking that emerged in the late 20th century. It emphasizes individual freedom and the right to define truth for oneself. Unlike past generations, which relied on established authorities like parents, churches, or governments, postmodern individuals base their beliefs on personal experiences, research, and relationships. This doesn't mean they reject truth entirely, but rather that they find it through their own unique lens.

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Postmodernism emerged as a philosophical reaction to modernism, questioning the Enlightenment's emphasis on reason, science, and the pursuit of universal. Unlike modernism, which seeks absolute truths through scientific inquiry, postmodernism challenges the very concept of objective truth. Postmodernism challenges modernist ideals by questioning universal truths and promoting subjectivity. While fostering diversity, it faces criticisms for potentially undermining objective standards and contributing to societal instability (Nguyen, 2010).

Postmodernism challenges grand narratives, such as Marxism and liberalism, viewing them as oversimplifications; it emphasizes the role of media and simulations in shaping perceptions of reality, highlights the influence of power on knowledge, and advocates for the recognition of multiple truths, valuing diverse, subjective perspectives over a singular objective reality (Nguyen, 2010).

| **Aspect** | **Modernism** | **Postmodernism** |
|---|---|---|
| Truth | Seeks universal truth via reason and science. | Embraces multiple, subjective truths. |
| Certainty | Believes in absolute certainty, especially through science. | Rejects certainty, emphasizing context and subjectivity. |
| Metanarratives | Embraces grand narratives to explain society. | Critiques grand narratives as oversimplifications. |
| Power Dynamics | Tends to overlook power's role in shaping knowledge. | Highlights power's influence on truth and knowledge. |

Postmodernism is a philosophical approach that critiques the overarching theories of modernity, focusing on the diversity of perspectives, the significance of context, and the instability of meaning (Owoche, 2022; Wilson, 1997). In IT research, it challenges the assumptions of technological determinism and progress by recognizing that technology is experienced, interpreted, and valued in multiple, often conflicting ways, and emphasizes the inclusion of diverse voices and interpretations rather than relying on a single, authoritative perspective (Owoche, 2022).

**Strengths:**

i) Postmodernism encourages a critical and reflexive approach to IT research, challenging taken-for-granted assumptions about technology and its role in society.

ii) The paradigm promotes a greater appreciation of the diversity and plurality of perspectives on technology, fostering a more inclusive and democratic approach to IT research and practice.

iii) Postmodernism's emphasis on context and the instability of meaning can contribute to a more nuanced and sensitive understanding of the complexities of technology use and its social implications.

**Weaknesses:**

i) Postmodernism may be criticized for its relativistic and skeptical stance, which may undermine the pursuit of objective knowledge and the development of shared standards and criteria for evaluating research.

ii) The paradigm's emphasis on language and discourse may lead to a neglect of material, structural, and historical factors that influence social phenomena.

iii) Postmodernism's critique of grand narratives and universal theories may be criticized for its potential lack of coherence and focus, making it difficult to apply in empirical research or to develop actionable recommendations.

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iv) The paradigm's emphasis on the plurality of perspectives and the instability of meaning may lead to challenges in establishing the reliability and validity of research findings, particularly when attempting to generalize results.

v) Postmodernism may be seen as overly relativistic or pessimistic in its outlook, potentially discouraging the pursuit of innovation and progress within the IT research community.

**Best research methods:**

Postmodernism is well-suited for research methods that focus on questioning established truths and examining the complexity of human experiences. This includes qualitative approaches like case studies, narrative analysis, and discourse analysis, which explore how language, power, and context shape our understanding of the world. These methods are ideal for uncovering multiple perspectives and challenging dominant ideologies.

**Critical Realism**

Critical realism is a philosophical approach that seeks to bridge the divide between positivism and interpretivism, offering a nuanced perspective on understanding reality. Originally developed by Roy Bhaskar and later expanded by scholars such as Margaret Archer and Tony Lawson, it posits the existence of an objective reality that operates independently of human perception. However, it also acknowledges that our understanding of this reality is shaped by cultural, historical, and social contexts (Mingers, Mutch & Willcocks, 2013; Zhang, 2022).

Critical realism is a way of understanding the world that focuses on both the visible and hidden aspects of reality. It bridges two approaches: one that studies only what can be measured (positivism) and another that interprets the meaning behind things (interpretivism). Critical realism says that while there is a real world that exists independently of us—like the roots of a tree beneath the soil—our understanding of it is shaped by who we are and the tools we use to study it.

Imagine studying a tree. The leaves, trunk, and branches are what we see. However, the roots and the nutrients in the soil, though hidden, are essential for the tree's growth. Critical realism asks us to go beyond the surface and uncover these deeper elements, which are often invisible but critical to understanding the whole picture.

Critical realism is founded on three key principles: ontological realism, which asserts that reality exists independently of human perception and includes unseen structures (Zhang, 2022); epistemological relativism, recognizing that our understanding of this reality is subjective and context-dependent (Zhang, 2022); and an emphasis on causality, which seeks to uncover real underlying causes rather than merely observing surface-level correlations (Maxwell, 2012).

Therefore, Critical realism is defined by three key ideas: reality exists independently of our perceptions, our understanding is shaped by context and is inherently limited, and to understand phenomena, we must explore underlying causes and mechanisms beyond surface-level observations.

This approach is particularly useful for studying complex systems like technology or society. For example, in analyzing why a new app succeeds or fails, critical realism doesn't just look at user feedback (the visible "leaves") but also examines hidden factors like company policies, market trends, or social norms (the "roots").

Despite its strengths, critical realism can be challenging because it requires looking at both what is seen and what is hidden, which makes research more complex. However, it is a powerful tool for uncovering deeper truths and understanding how the world really works. In essence, critical realism encourages us to dig beneath the surface and ask, "What's really going on here?"

**Strengths**

i. Balanced Perspective: Critical realism combines the objectivity of positivism with the subjectivity of interpretivism, offering a holistic view of phenomena (Archer et al., 2016).

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ii. Focus on Causal Mechanisms: It goes beyond surface-level observations to highlight underlying causes of phenomena, enhancing explanatory depth (Maxwell, 2012).

iii. Promotes Reflexivity: The framework encourages researchers to critically evaluate assumptions and explore alternative explanations, fostering deeper insights (Zhang, 2022).

**Weaknesses**

i. Complexity: The philosophical foundations of critical realism can be challenging to grasp and apply effectively in research (Zhang, 2022).

ii. Empirical Challenges: Its focus on unobservable mechanisms complicates the validation and reliability of research findings (Zhang, 2022).

iii. Limited Attention to Agency: Critics argue that critical realism may underemphasize individual actions and contextual factors in shaping phenomena (Owoche, 2022).

**Conclusion**

Critical realism offers a robust framework for exploring complex phenomena by integrating ontological realism with epistemological relativism. Despite its challenges—such as philosophical complexity and difficulties in empirical application—it remains a powerful tool for fostering reflexivity and uncovering deeper causal mechanisms. Its balanced approach to understanding social and technological realities makes it a valuable paradigm for advancing research across disciplines.

**Best research methods:**

Critical Realism is well-suited for research methods that prioritize the exploration of underlying causal mechanisms and structures, such as case studies, comparative analysis, and mixed-methods approaches that combine qualitative and quantitative data.

In the realm of IT, critical realism provides a lens to uncover the deep and often hidden mechanisms shaping technological and social systems. By focusing on causality and underlying structures, it allows researchers to analyze and improve the design, implementation, and impact of IT systems. This perspective is particularly valuable in understanding the interplay between technological innovations and the social contexts in which they operate (Owoche, 2022).

Therefore, Critical Realism may also be another Research Paradigm that can be suited for IT research as it combines both the natural science and social science.

**Post-positivism**

Post-positivism is a philosophical paradigm that recognizes the limitations of positivism and seeks to address them by incorporating elements of interpretive and critical approaches. Post-positivists acknowledge the influence of context and subjectivity on the research process, while still valuing empirical evidence and scientific rigour.

Similar to positivism it also seeks to understand causal relationships. Its main different with positivism is that post-postivism includes the researcher as part of the study; which is not acceptable in positivism. (Scotland 2012).

**Strengths:**

i) Post-positivism allows for a more refined understanding of complex phenomena, through merging the rigour of positivist approaches with the depth of interpretive and critical perspectives.

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ii) The paradigm recognizes the influence of context and subjectivity in shaping reality, while continuing to emphasize the significance of empirical research and generalizable findings. (Scotland, 2012)

iii) Post-positivism encourages methodological pluralism and triangulation, promoting the use of multiple methods and data sources to enhance the credibility and trustworthiness of research findings. (Scotland, 2012)

**Weaknesses:**

i) Post-positivism may struggle to achieve a clear and coherent philosophical stance, as it tries to integrate elements from opposing paradigms.

ii) The emphasis on methodological pluralism and triangulation may lead to challenges in designing and implementing research projects, due to increased complexity and resource demands.

iii)Post-positivism's openness to diverse methodologies and epistemological perspectives may result in a lack of consensus and shared standards within the research community.

**Best research methods:**

Post-positivism is compatible with a variety of research methods, both quantitative and qualitative, that recognize the complexity of the social world and the need for context-sensitive yet empirically grounded research. Examples of such methods include mixed-methods research, quasi-experimental designs, and multiple case studies.

**Summary of which Research Paradigm to Apply in IT Research?**

Human behaviour research often demands the use of a research paradigm aimed at improving the study's reliability and generalizability. The use of research paradigms in the area of information technology research has been shown to vary across researchers, depending on the investigator's taste and the nature of the topic under investigation. The usage of research paradigms in information research varies not just because of philosophical assumptions, but also because of the pragmatic consequences of the study and the interpretation of the findings.

The trinity of research techniques, namely Positivism, interpretivism, and pragmatism, have undergone exhaustive exploration regarding their applicability to information research. The findings conclusively indicate that the amalgamation of disparate research methodologies to constitute IT research materializes as a fruitful proposition. The outcomes obtained reveal that every approach is not without its imperfections. It is imperative for information technology researchers to take into consideration potential pitfalls that may arise from the paradigm they employ in their investigation. Thus, pondering the negative outcomes that could materialize as they embark on their quest for knowledge becomes necessary. (Kankam, 2019)

**Conclusion:**

In this article, an in-depth exploration of three primary philosophical frameworks in Information Technology research has been conducted—Positivism, Interpretivism, and Pragmatism. Additionally, the study delved into three further research frameworks: postmodernism, critical realism, and postpositivism. By scrutinizing the distinct viewpoints, merits, drawbacks, and most appropriate research techniques of each paradigm, researchers can gain a more profound comprehension of the IT domain, thereby guiding their research design and implementation decisions.

The variety of philosophical frameworks showcased in this article highlights the intricacy and abundance of the IT research environment. These paradigms provide various angles for researchers to investigate the many-sided aspects of technology and its impact on society. Furthermore, these philosophical underpinnings can assist researchers in addressing the obstacles that emerge in the fast-paced IT sector.

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Furthermore, this article emphasizes the significance of taking into account the wider social, cultural, and ethical consequences of IT systems and their usage. By embracing a more comprehensive, adaptive, and accountable method in IT research, investigators can aid in the creation of technologies that truly serve and strengthen users, organizations, and communities. In essence, it is vital for researchers to comprehend the philosophical foundations of their selected paradigms and maintain a willingness to investigate different viewpoints. This receptiveness and self-awareness can improve the caliber, precision, and applicability of IT research, fostering innovation, cooperation, and advancement within the discipline. Utilizing the knowledge provided by this article, researchers can make well-informed choices regarding their research design and implementation, thus promoting Information Technology research and its applications in various settings.

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