International Journal of Computer and Information System (IJCIS)
Peer Reviewed – International Journal
Vol : Vol. 03, Issue 02, June 2022
e-ISSN : 2745-9659
https://ijcis.net/index.php/ijcis/index

ICT4D Research in Developing Countries: A Call for Pragmatism Approach

1st Gabriel Ndung'u Kamau
[1]Murang'a University of Technology
[1]Main Campus (1.5 km from Murang'a Town) Town Campus (located in Aharuka building, Murang'a Town Kenya)
[1]gkamau@mut.ac.ke

Abstract—Today, Information Systems research and in particular in the area of ICT4D in developing nations is dominated by positivism and interpretivism paradigms. Information systems contributions are influenced by historical, cultural, and political contexts in which it is done. Researchers in this area question the appropriateness of positivism and interpretivism philosophical foundations to conduct ICT4D research. This paper explores the use of pragmatism as an alternative research paradigm to that can be employed to understand the state of the ICT4D research. Research drawing explicitly on pragmatism is still relatively rare. The paper reviews the pragmatism in terms of its ontology, epistemology, axiology and methodology and its value in the ICT4D research discipline. As a new paradigm, pragmatism disrupts the assumptions of older approaches based on the philosophy of knowledge, while providing promising new directions for conducting and understanding the nature of research in the area of ICT4D in developing countries. It is anticipated the readers of the article to make a more informed choice for themselves on whether or not to pursue the path of pragmatism their own research.

Keywords— Axiology, epistemology, ICT4D, methodology, ontology, pragmatism, research paradigms

I. INTRODUCTION

The debate concerning the role of Information communication technology (ICT) in development of world economies continues to range on. The discussions have moved from mere reporting to trying to gain an in-depth understanding of the role of ICT for development. Existing literature reveals research that examines the link between information and communication technology and socioeconomic development (ICT4D) is mainly anchored mainly on positivism and interpretivism paradigms to guide the research direction [1]. Positivism advances the idea of objectivity towards confirmation and falsification. Nevertheless, while positivism has attested to be prominent on social science research, its proponents derivative has been censured for lack of robustness in conducting research owing to a constricted definition of "the concept of science" [2]. Positivism ignores that in the process of conducting research lot of human decisions are made [3]. While the interpretive paradigm posits that the world cannot be observed as an objective reality but needs to be comprehended relative to the subjective understanding of human experiences and behavior [4]. Positivists and interpretivists have been criticized for their extreme position on research approaches and methods. In an effort to deal with paradigm-methodology weaknesses link held by two paradigm purists, there has been an increased push for a pragmatic philosophical perspective in information systems research and other social sciences to fill the perceived knowledge lacuna [5], [6]. The purpose of this paper is therefore to explore the relevance of pragmatism as a philosophical paradigm for ICT4D research. The paper outlines the main facets of pragmatism followed by the ontological belief, epistemological concepts and axiological prepositions of pragmatism paradigm. Finally, the paper concludes by providing thoughts about possible actions in the use of pragmatism in ICT4D research. It is anticipated the readers of the article make a more informed choice for themselves on whether or not to pursue the path of pragmatism their own research.

II. LITERATURE REVIEW

2.1 Philosophical Underpinnings of Pragmatism

The Pragmatic paradigm surfaced among philosophers who claimed that it was impossible to access the 'truth' about the real world exclusively by virtue of a single scientific method as put forward by the positivist paradigm and was not possible to determine social reality as construed under the interpretivism paradigm. Pragmatism fathers (John Dewey, Charles Sanders Peirce and Williams James) regard pragmatism as an approach of surpassing the irresolvable, philosophical and metaphysical dilemmas [7]. In essence, the paradigm was developed to deal with the dualism between positivism and interpretivism by creating a middle ground and therefore end what were referred to as 'Paradigm Wars' [8], [9]. As a novel paradigm, pragmatism disrupts the beliefs of older paradigms rooted on the philosophy of knowledge and offering new directions for discerning the nature of information system research [10]. Particularly, pragmatist exemplified as repudiating the forced selection between interpretivism and positivism with respect to epistemology, methods, and logic in research by upholding scientific inquiry may be together subjective and objective in epistemological direction in the process of answering a research problem [11]. Pragmatism embraces the notion of plural and dynamic realities (multiple truths) or that there is no knowledge that is certain and/or universal and recognizes that all inquiry is purposeful and situated [10]. Further, Creswell (2007) postulated pragmatism centers on outcomes not antecedent questions and gives researchers methodological freedom of choice. Pragmatism permits the researcher to employ an array of research methods to appreciate the problem being studied [10]. Pragmatism according to Weber [3] also entails employing

methodology that fit the problem devoid of reference to divisive philosophies. Basically, research located within this paradigm exhibits the following characteristics [9], [12], [13]

- A rejection of the positivist assumption that social science methods can unearth the 'truth' about the real world.
- Stressing of 'workability' in research.
- Employing 'what works' so as to allow the researcher to tackle the questions being studying without worrying the research methods to be used.
- Embracing of a worldview that allows for a research design and methodologies that are best suited to the purpose of the study.
- Making use of lines of action that are best suited to investigate the phenomenon being studied.
- Seeking to employ best approaches to gaining knowledge using every methodology that aids in that knowledge discovery.
- Selecting of research methods based on the purpose of the research.
- A search for useful points of link within the research area that make possible to understand of the situation.

2.2 The Ontology of Pragmatism

Ontology is a branch of philosophy concerned with the assumptions made to believe that something makes sense or is real, or the very nature or essence of the social phenomenon under investigation [14]. Positivists ontology hold that one reality exists and that it is the researcher's task to ascertain that reality [15]. On one hand, according to interpretivism, reality is socially constructed. Hence, multiple mental constructions can be apprehended, some of which may be in conflict with each other, and perceptions of reality may change throughout the process of the research. The essence underling ontology in pragmatism is action and change [16]. Blumer (1969 p 71) claims that "the essence of society lies in an ongoing process of action - not in a posited structure of relations. Without action, any structure of relations between people is meaningless. To be understood, a society must be seen and grasped in terms of the action that comprises it". Hence, action and change are the cornerstone of pragmatism as well as the interplay between knowledge and action. The role of action is an intermediary as action is the way to change existence [12]. Therefore, to perform changes in desired ways, action must be guided by knowledge and purpose. The world is thus changed through reason and action and there is an inseparable link between human knowing and human action. This implies non-singular reality ontology, implying all individuals have their own and unique interpretations of reality [8].

2.3 The Epistemology of Pragmatism

Oxford English Dictionary, Kaboud [17] defines epistemology is the "an established fact, theory, discipline or science of the technique process or foundation of knowledge, facts or information". The Positivists epistemology holds objectivity in conducting research and researchers do not tolerate their personal biases to influence the research outcomes [14]. Hence, the researcher neutrality is paramount to prevent biases or values from influencing the research by following stipulated procedures thoroughly [3]. Interpretivists epistemology presupposes that the inquirer and the inquired-into are interlocked in an interactive process; each influences the other. Intepretivitism hence goes for more personal, interactive research methods [18]. Confirmability in interpretivism paradigm substitutes the concept of objectivity outstanding in the positivist paradigm [15]. Pragmatist epistemology objects to viewing knowledge as a "replication" of reality [12]. According to pragmatism, knowledge is constructed in order to better manage existence and taking part in the world. Dewey [19] wrote: "The function of intelligence is therefore not that of copying the objects of the environment, but rather of taking account of the way in which more effective and more profitable relations with these objects may be established in the future." However, pragmatism does not make a whole denial of a correspondence view of truth, but claims that it is appropriate only for simple statements of small fragments of reality [12].

2.4 The Axiology of Pragmatism

Hesse-Biber [20] conceptualize axiology as a "means being cognizant of our values, attitudes, and biases and acknowledging how these might play out in research praxis in terms of (a) what questions are asked or not asked in our research, (b) what type of data are or are not collected, and (c) the type of methods, measurement, analysis, and interpretation that shape our understanding of the research process)" . (p. 878). Fundamentally, axiology focuses on what roles values play in research choices, in addition to stress more on researcher value judgments' capability. of a researcher [21]. The axiological view of positivism is that propositional knowing about the world is an end in itself, is intrinsically valuable while interpretivism axiology claims propositional, transactional knowing is instrumentally valuable as a means to social emancipation, which is an end in itself, is intrinsically valuable [13]. The interpretivism assumes a balanced view axiology. A balanced axiology posits that the outcome of the research reflects the values of the researcher and try to present a balanced report of the findings [8].

The axiology of pragmatism is value laden, that ins influenced by conducting research that benefits people [8] and to gain knowledge in pursuit of desired ends as influenced by the researcher's values and politics [12].

III. RESEARCH METHODOLOGY

Methodology refers to the research design, methods, approaches and procedures of inquiry used to solve a research problem [22] For example, when conducting research, methods of data collection, sampling methods, instruments used, and data analysis techniques, form part of research methodology. A research methodology approach is guided by a given paradigm. Positivism paradigm advocates quantitative research whereas the interpretivism paradigm advocates qualitative research [8]. Pragmatism paradigm centers on what actually works to achieve certain requirements of the investigator and does not limit the researcher to particular approaches in responding the study question [22]. Therefore, in research field like ICT4D where technology is dynamic and influenced by human actions the researcher can use an array of research methods to investigate the problem being studied [10]. Because pragmatism paradigm advocates the use of an array of research methods according to need, research conducted within this paradigm can use different methodologies drawn from both quantitative and qualitative approaches. Pragmatists believe that the process of acquiring knowledge is a continuum rather that two mutually exclusive and opposing poles of either objective and subjective. This is unlike positivistic researchers, who assert an objective knowledge acquired by examining empirical evidences and hypothesis testing, and interpretivists, who propose that knowledge is relative and reality is too complex. In adopting this stance, the pragmatist researcher is able to select the research design and the methodology that are most appropriate to address the research question. The foremost argument in favor of pragmatist approach in the matter of mixing quantitative and qualitative research is the significance that pragmatism gives to the research question (s) [12]

IV. RESULTS AND DISCUSSION

Here we can in brief explain the field of applications of gas detection. It may be used to locate the awareness of associated toxic gases in the petroleum, chemical, and textile industries in real-time.

4.1 Information and Communication Technology for Development

Even with the general agreement that ICT contribute towards national development and poverty reduction, there exists divergent views on the role of ICT on national development [22], [23]. Deployment of ICT alone cannot realize economic development and must be accompanied by social changes [23]. In addition, there exists an ambiguity in the way ICT is conceptualized leading to only a narrow focus on ICT [24]. ICT should be understood in finer details exploring all its facets attributed to the social economic context of ICT which in part influences the nature and consequence of these technologies. In developing countries issues range from selection of suitable projects to suit the developing economies context to understanding the institutional changes that must accompany ICT implementation [22]. In addition, most ICT projects in developing countries fail either partially or fully [24]. Challenges related to ICT4D can be attributed to difficulties in measuring their success, acceptability and sustainability issues and evaluation of ICTs contribution to economic development both at an economy level and at the global context [25]. As aforementioned currently, the main competing research paradigms in ICT4D are positivism and interpretivism. These paradigms cannot adequately address these challenges as ICT4D is characterized by IT artifacts which require consideration of human actions and social technical view of technology. For successful implementation and evaluation of ICT4D projects, researchers must go beyond pure observation on capturing of empirical data and develop knowledge based on continual interaction between knowing and acting [26]. Consequently, alternative paradigms and theories which provide outmost flexibility such as pragmatism is required to conceptualizing IT artifacts [25].

4.2 Value of Pragmatism Research Approach in ICT4D

The mineral oil industry can benefit from improved mineral oil supply, transportation, processing, distribution, and environmental protection. Research in ICT4D requires an interdisciplinary approach because to understand human knowledge and action we must study a number of disciplines such as anthropology, sociology, economics, communications, education, political science, information technology, and humanitarian operations management in relation to IT artifacts [26]. In developing countries cultural aspects, such as language and the concept of time, are critical to ICT4D a project's success. Consequently, in ICT4D contexts, researchers often need to use a pragmatic approach to fully understand the environment. To align technology to society needs pragmatic approach is important since multiple realities that are open to empirical inquiry can be deployed to research on how to design technology that addresses unpredictable human elements [11]. Research in ICT4D requires more practical and pluralistic approaches that allow an array of research methods to be used in order to shed light on the actual behaviour of IT artifacts and human interaction, and the consequences that are likely to follow from different human actions [10].

Pragmatism approach of research provides an opportunity for understanding the relationship between knowledge and action in terms of functional, referential and methodological [5]. Functional pragmatism means that knowledge should be useful and applicable in action,

referential pragmatism views the research theories in action-oriented ways while methodological requires we learn about the world through action [27]. Since, ICT4D projects are best viewed in terms of their practical uses and successes, pragmatism approach gives the researcher a chance to examine IT artifacts within these three dimensions of understanding knowledge and action for practical uses and successes of ICT projects. To understand the benefits for ICT4D research, research must be conducted by embracing methods that are appropriate and using findings in a positive manner that are in line with the researcher value system and benefit people [28]. Further, using pragmatism approach different measures can be used to evaluate ICT4D projects in order to value their effectiveness.

The essence underling ontology in pragmatism is action and change which has led to the use of theories such as activity theory in conducting ICT4D research. Consequently, this fits the practical objectives of ICT4D research and epistemological approaches [29]. Use of theories which advocate pragmatism in research approach can capture ethnographic, anthropological, and cultural aspects related to the ICT4D projects in developing countries and can be used to conceptualize the transformation dynamics involved in IT artifacts. For instance action research can be used to explore new strategies and tactics in ICT4D projects to evaluate their possible success or failure as just observing them is not adequate to arrive at deeper knowledge of their character. Also, in action research researchers are able to describe social technical view of technology what in terms actions and beliefs.

V. CONCLUSION

The paper outlined the specific features of pragmatism paradigm based upon the ontological, epistemological, axiological and methodological which distinguishes it from positivism and interpretivism paradigms. Although the paper did not discuss in detail all the facets of pragmatism, the content covered was sufficient to provide a springboard to identify the potential value of pragmatism to future ICT4D research.

The discourse in this paper identified specific value of pragmatism as an avenue to tackle concerns of ICT4D research. One distinct consequence of advocating pragmatism as a paradigm in ICT4D research is to disrupt the reliance on a metaphysical version of the philosophy of knowledge as a lens for examining ICT4D. Instead of framing the study of ICT4D research as commitments to an abstract set of philosophical beliefs, pragmatism focuses more on beliefs that are directly connected to actions and change. Pragmatism also posits ICT4D research never occurs in a vacuum but is also influenced by historical, cultural, and political contexts in which it is done. Researchers in ICT4D need to understand how these factors influence the choices they make and the way they interpret the outcomes of those choices. This is the direction that pragmatism.

This research is absolutely a pioneering research into the application of pragmatic paradigm for guiding research focusing on ICT4D. Research in ICT4D using this approach based on ontological belief, epistemological concepts and axiological prepositions could be very significant. However, like any change in paradigms, accepting pragmatism as a basis for ICT4D research requires a substantial change in our thinking in respect to philosophical and theoretical research foundation.

Acknowledgements

The author would like to thank all those who have helped in this research. Specifically, the Richard Heeks and P.J. Wall, this paper adopted almost the similar structure of the Journal Article "Critical Realism and ICT4D Research" authored by the two Researchers.

REFERENCES

[1] R. Heeks and P. J. Wall, "Critical Realism and ICT4D Research," in *International Conference on Social Implications of Computers in Developing Countries*, 2017, pp. 159–170.

[2] R. B. Johnson, A. J. Onwuegbuzie, and L. A. Turner, "Toward a definition of mixed methods research," *J. Mix. Methods Res.*, vol. 1, no. 2, pp. 112–133, 2007.

[3] R. Weber, "The Rhetoric of Positivism Versus Interpretivism: A Personal View 1," *MIS Q.*, vol. 28, no. 1, p. III, 2004.

[4] A. Bryman and E. Bell, *Business research methods*. Oxford University Press, USA, 2015.

[5] G. Goldkuhl, "Meanings of pragmatism: Ways to conduct information systems research," *Action Lang. Organ. Inf. Syst.*, 2004.

[6] F. Popa, M. Guillermin, and T. Dedeurwaerdere, "A pragmatist approach to transdisciplinarity in sustainability research: From complex systems theory to reflexive science," *Futures*, vol. 65, pp. 45–56, 2015.

[7] E. Halton, "In: Encyclopedia of Social Theory. George Ritzer, ed. Thousand Oaks: Sage Publications, 2004," 2004.

[8] C. Kivunja and A. B. Kuyini, "Understanding and Applying Research Paradigms in Educational Contexts.," *Int. J. High. Educ.*, vol. 6, no. 5, pp. 26–41, 2017.

[9] D. L. Morgan, "Pragmatism as a paradigm for social research," *Qual. Inq.*, vol. 20, no. 8, pp. 1045–1053, 2014.

[10] J. Mingers, "The paucity of multimethod

research: a review of the information systems literature," *Inf. Syst. J.*, vol. 13, no. 3, pp. 233–249, 2003.

[11] M. Y. Feilzer, "Doing mixed methods research pragmatically: Implications for the rediscovery of pragmatism as a research paradigm," *J. Mix. Methods Res.*, vol. 4, no. 1, pp. 6–16, 2010.

[12] I. Scheffler, *Four pragmatists: A critical introduction to Peirce, James, Mead, and Dewey*. Routledge, 2013.

[13] P. W. Ihuah and D. Eaton, "The pragmatic research approach: a framework for sustainable management of public housing estates in Nigeria," *J. US-China Public Adm.*, vol. 10, no. 10, pp. 933–944, 2013.

[14] J. Scotland, "Exploring the philosophical underpinnings of research: Relating ontology and epistemology to the methodology and methods of the scientific, interpretive, and critical research paradigms," *English Lang. Teach.*, vol. 5, no. 9, p. 9, 2012.

[15] E. G. Guba and Y. S. Lincoln, "Competing paradigms in qualitative research," *Handb. Qual. Res.*, vol. 2, no. 163–194, p. 105, 1994.

[16] H. Blumer, *Symbolic interactionism: Perspective and method*. Univ of California Press, 1986.

[17] F. Kaboub, "Oxford English Dictionary." 2004.

[18] G. Walsham, "Doing interpretive research," *Eur. J. Inf. Syst.*, vol. 15, no. 3, pp. 320–330, 2006.

[19] J. Dewey, "George Herbert Mead," *J. Philos.*, vol. 28, no. 12, pp. 309–314, 1931.

[20] S. Hesse-Biber, "Feminist approaches to triangulation: Uncovering subjugated knowledge and fostering social change in mixed methods research," *J. Mix. Methods Res.*, vol. 6, no. 2, pp. 137–146, 2012.

[21] M. N. K. Saunders, M. Saunders, P. Lewis, and A. Thornhill, *Research methods for business students, 5/e*. Pearson Education, India, 2011.

[22] J. W. Creswell, "Research design: Qualitative, quantitative, and mixed methods approaches," Sage, 2013.

[23] R. Heeks, "Do information and communication technologies (ICTs) contribute to development?," *J. Int. Dev.*, vol. 22, no. 5, pp. 625–640, 2010.

[24] C. Avgerou, "Discourses on ICT and development," *Inf. Technol. Int. Dev.*, vol. 6, no. 3, pp. 1–18, 2010.

[25] J. Revez and L. C. Borges, "Pragmatic paradigm in information science research: a literature review," *Qual. Quant. Methods Libr.*, vol. 7, pp. 583–593, 2018.

[26] G. Walsham, "ICT4D research: reflections on history and future agenda," *Inf. Technol. Dev.*, vol. 23, no. 1, pp. 18–41, 2017.

[27] G. Goldkuhl, "What kind of pragmatism in information systems research," in *AIS SIG Prag inaugural meeting*, 2008.

[28] J. w Creswell, *Research design: Qualitative, quantitative, and mixed methods approaches*. SAGE Publications, Incorporated, 2009.

[29] S. Karanasios, "Framing ICT4D research using activity theory: a match between the ICT4D field and theory?," *Inf. Technol. \& Int. Dev.*, vol. 10, no. 2, p. pp--1, 2014.