



State of the Art Review

The use of paradigms in information research

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A B S T R A C T

Studies of human behaviour usually require the adoption of a research paradigm with the objective of improving the credibility and generalisability of the study. Applying research paradigms in information research is noted to vary from one researcher to another based on the investigator's choice as well as the character of the issue under investigation. The differences in the application of research paradigms in information research do not rely on philosophical assumptions alone, but also on the practical consequences of the inquiry and the interpretation of the findings. The four most broadly applied paradigms in research - pragmatism, interpretivism, positivism, and post-positivism and how the adoption of these paradigms fit into information research was examined. Findings indicate that application of research paradigms in information research is beneficial. However, information researchers are advised to be cautious of the weaknesses of the paradigm they would adopt for a study.

1. Introduction

According to Göktürk (2004), etymological analysis depicts that the word paradigm “comes from the Latin word ‘paradigma’ and appears in Greek as ‘paradeigma’” (p. 2–4). He further argues that “Michel Foucault and Thomas Kuhn appear to be the two prominent figures in the 20th century that caused an ever-since increasing attention to the word ‘paradigm’”. Dash (2005) also opined that Thomas Kuhn is known for the term ‘paradigm’. To corroborate, Schensul (2012) maintained that the concept of ‘paradigm’ was first used by Thomas Kuhn when analysing the structure of scientific revolutions in his study in 1962 (p. 76).

The idea of a paradigm as a “framework which put in order our entire approach to being in the globe has become usual since Kuhn published *The Structure of Scientific Revolutions* in 1962” (Aliyu, Bello, Kasim, & Martin, 2014, p. 79). Kuhn (1962) asserted that a paradigm is an integrated group of concepts, variables, as well as problems substantively ascribed with agreeing methodological approaches and tools. Nevertheless, Babbie (2014) is of the view that “paradigms don't explain anything, but they provide logical frameworks within which theories are created” (p. 31).

Conducting research into human behaviour usually requires the adoption of a research paradigm with the aim of improving the credibility and generalisability of the study. Application of paradigms in research varies from one investigator to another depending on the researcher's choice and the nature of the phenomenon being studied. Moreover, the importance of selecting a paradigm for a research study lies in the fact that it establishes the basis on which research designs and methodologies are adopted for the study (Easterby-Smith, Thorpe, & Lowe, 2002, p. 33). While a paradigm looks into the way knowledge is interpreted and studied, it clearly defines the purpose, motivation,

and desired outcomes of the study (Mackenzie & Knipe, 2006, p. 4).

Theories are employed to offer explanations, while paradigms on the other hand, provide ways of looking for explanations (Babbie, 2014, p. 31). Research paradigms represent the “mental window through which the researcher views the world” (Bailey, 1982, p. 24). This attests to the fact that the right application of research paradigm in information research offers the enabling direction for researchers to investigate a phenomenon of interest clearly. Thus, it provides the mental and thoughtful casement for information research to be carried out.

2. Problem statement

It is evident from literature that researchers, especially early-career researchers and students are sometimes confused when it comes to the application of research paradigms. It has also been observed that, “at the broader level, this confusion stems from the use of the term paradigm in everyday discourses in contrast to its use in the educational research” (Kivunja & Kuyini, 2017, p. 29). This clearly depicts a lack of agreement on the establishment of paradigm in relation to its descriptions, outlines, and applications. Thus, the conceptualization and explanations of ‘paradigm’ is diversely applied within the context of academic research.

Many scholars have examined the explanations and use of research paradigms with the view of expanding researchers' understanding on the right application of research paradigms. However, most of the works on research paradigms look broadly into educational research with very little or no emphasis on discipline or subject. The diversity in how research paradigm is applied in research contexts necessitates the need for a discipline-specific approach on the discussion of paradigms to guide researchers on the application of paradigm in their chosen field

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of study or career. The paucity of discipline-specific discussions on paradigms motivated this study to situate a discussion on paradigm within the information science discipline. The study therefore outlines and offers discursive analysis on the application of paradigms within the information research context.

3. Literature review

3.1. Conceptualisation of research paradigm

Using the word “paradigm” by Kuhn, coupled with the conceptualisation of the word by different authors to some extent determined its current meaning (Göktürk, 2004, p. 4). Kuhn (1962) maintained that “paradigm” relates closely to science and he thus chose the term to propose some putative practices that are scientific. Babbie's (2014, p. 33) assertion that paradigms play a basic role in science, as they do in daily life clearly supports Jackson's (2003) definition of paradigm as a “set of ideas, assumptions and beliefs that shaped and guided the activity of a particular scientific community” (p. 37). These arguments imply that research paradigm “is a set of assumptions and concepts, practices and values” that establishes a way of considering reality for the group that shares them (McGregor & Murnane, 2010, p. 419).

Babbie (2011) strongly upheld that “social scientists have developed several paradigms for understanding social behaviour” (p. 32). To make matters clearer, Babbie and Mouton's (1998) definition of research paradigms as “models or frameworks for observation and understanding, which shape both what we see and how we understand it” (p. 645) has been advanced for a number of studies. This definition shows that a research paradigm can therefore be said to be an inclusive belief system or world view, as well as “framework that influences research and practice in a field” (Willis, 2007, p. 8).

Furthermore, Babbie (2014) is of the view that “paradigms are often difficult to recognise as such because they are so implicit, assumed, taken for granted” (p. 32). On the other hand, Blaikie (2010), in an attempt to outline the history of paradigms, maintained that research paradigms were referred to as traditions or assumptions to some extent during the early 1990s (p. 20). These philosophical assumptions as opined by Creswell (2007) “consist of a stance towards the nature of reality (ontology), how the researcher knows what he or she knows (epistemology) and the methods used in the process (methodology)” (p. 16–17). Research paradigms can therefore be philosophical beliefs which are used to study and interpret knowledge (Mertens, 2005) in three perspectives: namely epistemology, ontology, and methodology (Taylor & Mertens, 2013). Thus, it is worth noting a paradigm serves as a basic model which reflects in-depth knowledge of what researchers observe coupled with the manner that they understand the model of a study (Babbie, 2011, p. 32).

This study was mindful of the fact that there exist conflict and interactionist paradigms, while “the conflict paradigm causes us to see social behaviour one way, the interactionist paradigm causes us to see it differently” (Babbie, 2014, p. 31). As indicated by Creswell and Plano Clark (2011), the four main paradigms that researchers use when conducting social science research are post-positivism, social constructivism, participatory, and pragmatism (p. 40–41). Kuhn (1970) explained that paradigms are interchangeable with what they exemplify (p. 23). The four most extensively used paradigms in research – pragmatism, interpretivism, positivism, and post-positivism (Crossan, 2003; Kim, 2003) – are discussed below.

3.2. Pragmatism

According to Scott (2016), pragmatism is “a philosophical school of thought that developed in America during the late nineteenth and early twentieth centuries” (p. 255). Thinkers of this paradigm as indicated by Saunders, Lewis, and Thornhill (2012), note that research question(s) is

the most important epistemological, ontological and axiological element that one adopts for a study.

Pragmatism accentuates strongly on shared meanings as well as joint actions (Morgan, 2007, p. 67). It therefore relies upon the belief that “theories can be both contextual and generalised by analysing their transferability to another situation” (Creswell, 2009, p. 4). Tran (2016) opined that pragmatism has the ability to “convert observations into theories and then assess those theories through action” (p. 10).

Pragmatism is much about meaning and it is based on the belief that “the meaning of ideas lies in their consequences rather than in the ideas themselves” (Scott, 2016, p. 255). This reflects Morgan's (2007) position that this paradigm relies “on a version of abductive reasoning that move back and forth between induction and deduction” to link data and theory (p. 71). This shows that pragmatism to some extent “allows the potential and possibility to work back and forth between qualitative data and quantitative data” (Tran, 2016, p. 10), which are often viewed as incompatible.

To advance this argument, Guthrie (2010) concluded that the pragmatic paradigm enables researchers to “combine methodologies even within the same project as it enables us to use those research techniques which suit the research problem at hand” (p. 45). Pragmatism is, therefore, “not faithful to any one system of philosophy or reality” since included in its approach is “willingness to change and a readiness to respond to particular circumstances in which human beings are inevitably placed” (Scott, 2016, p. 255). Pragmatic research paradigm “offers researchers the opportunity to search for useful points of connection between” qualitative and quantitative data (Tran, 2016, p. 10).

Johnson and Onwuegbuzie (2004) advocated consideration on the “pragmatic method of the classical pragmatists...as a way for researchers to think about the traditional dualisms that have been debated by the purists” (p. 16). Pragmatists argue that “there is impossibility of ‘complete objectivity’ or ‘complete subjectivity’ in conducting research” (Tran, 2016, p. 10). According to Scott (2016), “pragmatists attempt to emphasise the importance of trying different methods and then evaluating” them about their effectiveness (p. 255). Particularly, pragmatism “focuses on knowledge as the fallible and constantly revised product of experience” (Biddle & Schafft, 2015, p. 323).

3.3. Interpretivism

Mertens (2005) opined that the interpretivist research paradigm emerged from the philosophy of Edmund Husserl's phenomenology as well as “Wilhelm Dilthey's and other German philosopher's study of interpretive understanding called ‘hermeneutics’” (p. 12). Interpretivism, according to Aliyu et al. (2014), “is a word that is quite new, however, simultaneously everywhere in the midst of non-positivist researchers and scholars” (p. 84). Bryman (2008) defines interpretivism research paradigm as “an epistemological position that requires the social scientist to grasp the subjective meaning of social action” (p. 13).

Interpretivist investigators argue that there is neither universal truth nor worldview. They comprehend, interpret, and understand from their own orientation reference and outline because they hold “the view that uncommitted and indifferent impartiality is impracticable, and realism or practicality of framework and background is imperative” (Aliyu et al., 2014, p. 82).

Cohen and Manion (1994) maintained that appreciating the world of human occurrence is the main role of the interpretivist paradigm in research (p. 36). This position points to the fact that, interpretivism seems to be the most significant replacement for positivism (Aliyu et al., 2014, p. 84) since it deals with social truth or reality (Creswell, 2007). The underlying philosophical assumptions underpinning the interpretivist research paradigm as opined by Cohen and Crabtree (2006) is that reality or truth is socially constructed and fluid. According to Cronje (2011), “interpretivists believe that the human experience of the

world is subjective, and they have a concern to understand it as it is” (p. 3); hence their purpose is to describe situations.

The spirit of the interpretivists viewpoint to advance their position as a paradigm lies in the fact that interpretivism is an “ontological point of view which looks at reality or truth as a social formation or construct of the mind's inner feeling” (Aliyu et al., 2014, p. 84). The interpretivist researchers, therefore, generally rely heavily on the views of participants of the subject being investigated (Creswell, 2003a, 2003b, p. 8).

3.4. Positivism

As opined by Kaboub (2008), the thought of positivist paradigm was developed as a truth-seeking paradigm during the latter part of the 19th century by Auguste Comte's criticism of metaphysics. To corroborate, Babbie (2014) opined that “Comte's view came to form the foundation for subsequent development of the social sciences” (p. 34) by coining the word “positivism” to explain this scientific approach. In an attempt to provide a historical background of this paradigm, Aliyu et al. (2014) asserted that positivism was recognised as “the leading scientific and technical approach in the beginning of the 20th century by constituents of the Vienna Circle, with Karl Menger et al” (p. 81). However, the term “positivism” is argued to have been coined over two centuries ago (McGregor & Murnane, 2010, p. 423).

Positivism can be defined as “self-governing, independent and objective existence of truth”, since it is a research paradigm that is established “on the ontological principle and doctrine that truth and reality is free and independent of the viewer and observer” (Aliyu et al., 2014, p. 81). Patton (2002) maintained that positivists hold the view that knowledge is not absolute but relative (p. 93). Legal positivists argue that a law's validity rests upon its production through “legally stipulated procedures” (Habermas, 1972, p. 202). Within the positivistic research paradigm, “it is assumed that the only way people can be positive that the knowledge is true is if it was created using the scientific method” (McGregor & Murnane, 2010, p. 423).

These arguments indicate that positivism is rooted in the belief that statements that possess status of truth but are not assessed by reference to sense data should be seen as “meaningless” (Ayer, 1946, p. 9). According to Aliyu et al. (2014),

A positivist investigator has an idea or notion that the universe or world conforms to permanent and unchanging laws and rules of causation and happenings; that there exist an intricacy and complexity that could be overcome by reductionism; and with the intention of asserting an importance and emphasis on impartiality, measurement, objectivity and repeatability.”(p. 81–82).

The idea of the positivism paradigm generally looks into the process of gathering data, observing regularities, and extracting laws (Turner, 1992, p. 157). Aliyu et al. further (2014) asserted that the methodologies frequently employed by positivist researchers include:

- confirmatory analysis,
- nomothetic experiments,
- quantitative analysis,
- laboratory experiments, and
- deduction. (p. 82)

Positivists also argue that “all phenomena can be reduced to empirical indicators which represent the truth” (Sale & Brazil, 2004, p. 353). Particularly, this study recognised the fact that, positivists' belief that “scientific truths could be positively verified through empirical observations, and the logical analysis of what was observed” (Babbie, 2014, p. 34). The positivist paradigm therefore emphasises that factual, genuine, and real happenings can be observed and studied “scientifically and empirically and could as well be elucidated by way of lucid and rational investigation and analysis” (Aliyu et al., 2014, p. 83).

It is important to note that, in some instances, researchers that

employ positivism typically tend to determine forecasts of human occurrences so as to gain deeper understanding of what constitutes truth (Grix & Watkins, 2010, p. 146). Positivism can therefore be described in the social science discipline as “the view that the natural sciences should provide the model for proper research” (Ryan, 2015, p. 418).

3.5. Post-positivism

The history of the post-positivistic research paradigm points to the fact that it is “a term coined in the mid-1960s” (McGregor & Murnane, 2010, p. 423). This is corroborated by Scotland (2012), who opined that “post-positivism emerged from positivism” during the twentieth century (p. 10). Post-positivism is believed to provide an alternative to the traditional positivism approach for conducting disciplined research. Post-positivism research paradigm is therefore a “revised form of positivism that addresses several of the more widely known criticisms of quantitative orientation and yet maintains an emphasis on quantitative methods” (Wang, Duffy, & Haffey, 2007, p. 2). This implies that post-positivism is an alternative paradigm that moves “positivism from a narrow perspective into a more encompassing way to examine real world problems” (Henderson, 2011, p. 342). It has been argued that “the birth of post-positivism began with the rejection of and dissatisfaction with positivist epistemological and methodological assumptions” (Eun, 2016, p. 7).

According to Scotland (2012), “post-positivism has similar ontological and epistemological beliefs as positivism; however, it differs in several ways” (p. 10). The ideas of positivism remain the gold standard of modernism and post-positivism does not negate these ideas but rather, “suggests that knowledge is not neutral and that all knowledge is socially constructed” (Henderson, 2011, p. 342). This study was mindful of the fact that post-positivism does not suggest that positivism is no longer valid or irrelevant “but rather offers that something exists subsequent to positivism that also is worth considering” (Henderson, 2011, p. 342).

Post-positivism to some extent fits the definition of pragmatism that “an ideology or approach is true if it works” (Henderson, 2011, p. 342). This implies that “the post-positivism paradigm is a suitable approach specially to investigate the behaviour of individuals” (Creswell, 2009, p. 7). To advance the position of post-positivism, post-positivists argue that truth is formed by dialogue, thus knowledge claims that are valid “emerge as conflicting interpretations and action possibilities are discussed and negotiated” among members of a given society (Wolcott, 1990, p. 19). This framework of post-positivists describes reality as “multiple, subjective, and mentally constructed by individuals” (Crossan, 2003, p. 54).

Post-positivists therefore assume “there are many ways of knowing aside from using the scientific method” (McGregor & Murnane, 2010, p. 423). In this regard, post-positivism research paradigm provides another research framework that reflects much of the research undertaken in social science disciplines such as information research “regardless of whether quantitative or qualitative data, or a mix of the two, are used” (Henderson, 2011, p. 342). According to Guthrie (2010), the advantages of post-positivism as a research paradigm are that it:

- regards knowledge as subjective and value-laden;
- views data on the relationship between the knower and the known;
- favours naturalistic, non-experimental research where the researcher does not manipulate the research setting or subjects or put data in predefined categories; and
- view knowledge as subjective, holistic and not based on cause and effect, and considers that scientific methods are social constructs. (p. 43)

Post-positivists are also of the view that “all observation is fallible and has error, and all theory is revisable” (Wang et al., 2007, p. 2). This makes post-positivism paradigm broad and brings together theory and

practice which allows, acknowledges, and encourages the researchers' motivations and commitment to the topic (Ryan, 2006). Creswell (2009) noted that the two main advantages post-positivism paradigm provides to research are that it appropriately allows data collection to be done in a short period of time and helps analysis of statistical data to be applied accurately (p. 7). According to Fischer (1998), "the post-positivism paradigm is a useful approach that facilitates accurate interpretation and in-depth analysis of empirical research" (p. 136–137) and this was considered important for a number of information researchers.

Post-positivists again "view human beings as being unable to know true reality with certainty" and for them, research is "soft" and should generally employ small samples "for more in-depth investigations" (Wang et al., 2007, p. 2). The post-positivist paradigm, therefore, "assumes that research should not be value-free and unbiased but be value-laden, subjective and inter-subjective, even value-driven within the critical paradigm" (McGregor & Murnane, 2010, p. 424). Henderson (2011) asserted that post-positivism paradigm:

- emphasises meanings and seeks to explicate social concerns,
- acknowledges that fixing meaning(s) is not a neutral act, and
- acknowledges that the questions raised reflect particular interests. (p. 342–343)

Moreover, post-positivism research paradigm allows the application of many correct techniques to data collection and analysis (Ryan, 2006). Although McGregor and Murnane (2010, p. 424) equate qualitative with post-positivism, many scholars equate it with mixed-method (Creswell, 2009; Eun, 2016; Henderson, 2011; Nieuwenhuis, 2010; Ryan, 2006).

4. Methodology

The study investigated how the four most widely used research paradigms – pragmatism, interpretivism, positivism, and post-positivism – could be applied in information research. The four paradigms were used because it was clear from the literature that all paradigms could be grouped into these four. For example, Candy (1989) and Tashakkori and Teddlie (2003) maintained that research paradigms used in educational research are of these four paradigms.

The study outlines epistemological and methodological qualities of each of the four paradigms. These qualities are very integral to academic research so this study further situates a discussion and analysis of them within the information research context. A departure of this study from other studies on paradigms within the information science field is that this study outlines and analyzes the four major research paradigms within information research. For example, while Ellis' work as he indicated "is not intended to enumerate here the different paradigms which might be said to be operating in the multi-disciplinary field of information science" (1992, p. 49), this study enumerates the four major paradigms used in information research.

5. Discussion on the application of paradigms in information research

The differences in the application of paradigms do not rely on philosophy alone, but also on the practical consequences of the inquiry and the understanding of the results of the research (Guba & Lincoln, 1994). Clearly, paradigm "determines the researchers' starting points and approaches to the field under investigation" (Vorster, 2012, p. 192). As indicated by Krauss (2005), application of a paradigm in a study impacts the nature of questions that would describe what to be studied and the manner in which the study will be conducted (p. 758). Research paradigms outline philosophical assumptions and awareness of these assumptions within the context of information research and positively influence the quality of the study (Easterby-Smith et al.,

2002, p. 33).

5.1. Applying pragmatism in information research

The pragmatism research paradigm focuses on what works without much emphasis on methodology and this provides the flexibility for information researchers who apply this paradigm the opportunity to apply more than one method to a single study (Teddlie & Tashakkori, 2009, p. 99). As indicated by Badley (2003), pragmatism in an educational research setting such as information research may not provide results of a study as actual descriptions of reality, but rather, possible connections between actions and consequences (p. 307). Thus, the nature of research study's questions and choice of research methodology influences the selection of the research paradigm. Applying pragmatism in his study, Belshaw (2011) noted that:

I would argue that Pragmatism is well suited to the 21st century world, particularly suited to research in the digital sphere, and especially suited to research on digital and new literacies. The reasons for this suitability are threefold. First, Pragmatism is what John Dewey calls a 'practical fallibilism' (Belshaw (2011), p.13). This uncertainty is not because of a gap between mind and matter but 'stems from the fact that we can never be certain that the patterns of action that we have developed in the past will be appropriate for the problems that we will encounter in the future'... Given that the central question of this thesis is 'What are digital literacies?' it seems particularly appropriate to explicitly analyse the boundaries of literacy practices as well as question dichotomies, assumptions and traditional practices. (p. 128).

By this, Belshaw (2011) was employing the pragmatist research paradigm to analyse the "what" and "how" of digital literacy. It is therefore clear that when applying pragmatism in information research, the researcher should be mindful of the fact that "pragmatism is not fixed on any system of reality or philosophy" and this allows the researcher "to focus on the 'what' and 'how' of the research problem" (Creswell, 2003a, 2003b, p. 11). Belshaw (2011) benefited from this element of pragmatism when he employed it in an information research on digital literacy.

Pragmatist paradigm views all forms of inquiry as methods that enable humans to cope with aspects of the world and this emphasises on the fact that no one approach to research is superior to the other (Badley, 2003, p. 300). Pragmatists therefore assert that research is contextual and that historical, social, and political aspects must have key considerations in research (Creswell, 2009, p. 11). This shows that employing the pragmatic paradigm in information research must emphasise the research problem and allow the information researcher to use available methods that would enable the study to address the problem (Creswell, 2009, p. 10).

Thus, the "pluralistic" and "problem-centred" nature of pragmatism must offer information researchers the opportunity to employ the mixed methods approach (Creswell & Plano Clark, 2011, p. 41). As outlined by Belshaw (2011), the application of pragmatism in information research offered his study to combine theory and practice:

Pragmatism as a methodology is interested in the 'cash-value' of propositions and theories and does not see theory and practice as separate spheres. Instead, as Dewey indicated, it is the choice between intelligent practice and uninformed practice. (p. 129).

In conducting information research, the weaknesses and strengths of a research paradigm should be considered before its adoption. For example, it has been noted that pragmatism is mostly concerned with applying whatever works best within whichever situation and this clearly falls short of the basic beliefs of mixed method research (Ngulube, Mokwatlo, & Ndwandwe, 2009). As the name suggests, information researchers must be mindful of the fact that pragmatism focuses "on those ideas that apply practically, refusing philosophy's

reputation of being excessively idealistic and abstract” (Scott, 2016, p. 255).

Clearly, pragmatism does not view truth as absolute, but provisional that focuses on any possible means a study can meet its intended purpose (Badley, 2003, p. 307). This is clearly evident in Belshaw's work (2011) that employed pragmatism. The pragmatic basis of Belshaw's work (2011) is seemingly shown through the study's methodological focus on knowledge and truth as provisional:

I have suggested that Pragmatism is a *philosophy* particularly suited to the digital world, and especially suitable for research into Digital and New Literacies. This is due to its focus on the provisionality of knowledge and truth, as well as the communitarian and democratic values upon which it is based. (p. 129).

A number of information researchers have successfully employed pragmatism in their studies. For example, Belshaw (2011) used pragmatist paradigm when investigating the concept of digital literacy (p. 206); Hjørland (2004), when looking into the information seeking, retrieval, and knowledge organization in the US combined pragmatism with realism; Pawley (2003) employed pragmatism when examining the language librarians used to define and discuss information literacy; in studying nurses' information strategies as related to their jobs, Sundin (2002) employed pragmatism; and Johannisson and Sundin (2007) also applied the pragmatist paradigm in studying nurses' information seeking behaviour in Sweden.

A weakness of the pragmatism research paradigm that should not be taken for granted when employing it in an information research is that “pragmatist thinking has influenced IS research to a great extent, although the paradigmatic foundations have not been fully acknowledged” (Goldkuhl, 2012, p. 136).

5.2. Applying positivism in information research

Employing a research paradigm in a study cannot explicitly be associated with a specific discipline of study or researchers but lies on the basis of shared beliefs or values of researchers. This depicts that understanding the philosophical positions in doing research goes a long way in arriving at the selection of a paradigm (Durrheim, 2006, p. 37). For example, if the philosophical position of an information research study emphasises the importance of observable facts, then positivism is the right paradigm to adopt (Brink, Van der Walt, & Van Rensburg, 2012, p. 25) because positivists opine that knowledge is supported by experience of the senses.

Moreover, the way to investigate and obtain knowledge as argued by positivists is through observation and experiment (Antwi & Hamza, 2015). Particularly, the research design can influence the use of positivism. In using the positivism paradigm for a case study in an information research, Shanks (2002) noted that:

Case study research has been used within both the positivist and the interpretivist philosophical traditions Shanks (2002). Case study research within the positivist tradition is designed and evaluated according to the criteria of the natural science model of research: controlled observations, controlled deductions, replicability, and generalisability. (p. 9).

Importantly, Shanks seems to suggest through this assertion that an information researcher that has the focus of testing hypothesis can suitably apply positivism. To corroborate, it has been observed that application of positivism paradigm in a study usually begins with a hypothesis with the aim of testing and verifying the hypothesis through the use of statistical mechanism to prove their reality (Antwi & Hamza, 2015; Durrheim, 2006; Pashaeizad, 2009). Clearly, the use of positivism in information research is shaped by positivists views that depict that objective realities are based on variables that can be measured and propositions that are provable (Maykut & Morehouse, 2005, p. 4).

The positivist paradigm is therefore consistent with quantitative

methodology which is based on measurable variables and the use of statistical mechanisms (Pashaeizad, 2009, p. 9). Thus, quantitative information research can suitably adopt positivism. Whiles applying positivism in a case study, Shanks (2002) advised that:

Although manipulation of variables in the experimental sense is not possible in case study research, theoretical constructs can be defined and empirically evaluated and measured, and naturally occurring controls can be identified. Validity and reliability in positivist case study research involves using clearly defined methodological guidelines for ensuring construct validity, internal validity, reliability and external validity. (p. 78–79).

Information researchers are also advised to appreciate that employing positivism in information research may pose a challenge based on how it is applied. While providing a guideline for the applicability of positivism in an information research, Shanks (2002) outlined that:

A deep understanding of the positivist paradigm and its underlying ontological, epistemological and methodological positions is crucial in conducting positivist case study research. The key concepts of theory (including units, laws of interaction and boundary), proposition, hypothesis and hypothesis testing need to be clearly defined and understood. (P. 82).

The positivist research paradigm by Shanks' assertion provides “a very sound and systematic approach for conducting research and may be used in conjunction with other approaches to provide richer and more reliable research results” (2002, p. 84). Applying positivism research paradigm in this manner within a study enables information researchers to view one problem as being like another. This could be likened to Kuhn's “exemplar” element of the “relative cohesiveness of scientific groups...referred to as a ‘disciplinary matrix’” (Ellis, 1992 p. 47) and Masterman's artefact or construct. As indicated by Ellis (1992):

the ‘exemplar’ appears to be identical to Masterman's description of the artefact or construct paradigm, literally so in two key respects. Firstly, as with Masterman's artefact or construct paradigm the exemplar is concrete [2, p. 187]. Secondly, the exemplar provides a crude analogy, a way of seeing one problem as being like another. (p. 48).

It is also important to note, however, that “the idea of positivism has come under serious challenge” in recent decades (Babbie, 2014, p. 34). For example, Morçöl (2002) challenges positivists' belief that facts are “immediately observable” (p. 69). Again, a limitation of positivism is that it “fails to recognise that an erroneous theory can generate correct predictions” (Hawkesworth, 1992, p. 320).

5.3. Applying post-positivism in information research

The post-positivist paradigm is known to be situated between interpretative and positivism paradigms and when employed in information research it enables the researcher to apply both approaches in a single study (Wiewiora, 2013). Within the post-positivist perspective, researchers usually see themselves as research participants since they conduct the study among people or participants by studying with them, rather than managing a study on them (Wolcott, 1990, p. 19). The nature of much information research investigates complex and evolving issues that require interactive engagements or dialogues with participants in order to establish deeper appreciation of the problem under investigation (Wolcott, 1990).

Such research requires the capturing of direct as well as lived experiences of participants and the best way to capture and understand these experiences is through the use of post-positivism (Stewart & Floyd, 2004). This attests to the fact that the use of post-positivism paradigm is influenced by the nature of the problem under investigation. While employing the post-positivism paradigm in information research, Majyambere (2014) noted that the key research questions

defined the suitability of post-positivism paradigm for his study (p. 142). This attests to the fact that Majyambere used the post-positivism paradigm as a model to address the problems he investigated. Clearly, this is the application of Ellis' assertion that:

In order to function as an analogy a paradigm has to have the property of concreteness, or crudeness, and to have this it must either be a model, a picture, an analogy-drawing sequence of words in natural language, or some combination of these. (1992, p. 50).

As asserted by Wolcott (1990), truth is built through dialogue when applying the post-positivistic paradigm in research and since valid knowledge claims occur as conflicting interpretations, the post-positivism is the suitable paradigm that will allow action possibilities to be discussed and negotiated among people when conducting information research (p. 19). This attests to the fact that post-positivism enables researchers to discuss participants' reactions and interpret the interwoven ideas and issues they gather (Ritchie & Rigano, 2001, p. 752). Moreover, information research that adopts the mixed-method approach can suitably apply the post-positivism paradigm. The reason is that the framework of post-positivism allows the combination of both qualitative and quantitative methodologies.

It has been observed that no single paradigm can best explain reality to perfection and this has given rise to the use of the post-positivism paradigm (Turyasingura, 2011). The use of the post-positivist research paradigm in information research is noted to provide the researcher with a thinking structure that influences the attitudes of the researcher in the course of study and this enables the researcher to see the problem under study within a specific set of established expectations, methodologies, and research approaches (Burke, 2007). This function of post-positivism in information research is the meaning Masterman (1970) assigned to paradigm when she posited that:

If a paradigm has got to have the property of concreteness, or 'crudeness', this means that it must either be, literally, a model; or, literally, a picture; or, literally, an analogy-drawing sequence of word uses in natural language; or some combination of these. (p. 79).

The post-positivism paradigm when employed in information research serves as a clearer way to "acknowledge the problems with the traditional scientific method" and as an epistemology, it provides "another way of thinking and knowing" (Henderson, 2011, p. 345). Post-positivism claims that "post-positivistic knowledge is more certain and objective than knowledge which originated from other paradigms" (Scotland, 2012, p. 10). Again, the post-positivism research paradigm is noted to strive for trustworthiness criteria instead of unbiased criteria (McGregor & Murnane, 2010, p. 424).

A number of information researchers adopt the post-positivism paradigm because of its ability to allow the combination of methodologies which enables methodologies to complement individual limitations by exploiting respective benefits (Shenton, 2004). As indicated by Nieuwenhuis (2010), the post-positivism paradigm enables the combinations of both qualitative and quantitative research approaches for a study (p. 65). This attests to the fact that it "legitimises the potential for using mixed methods" and allowing for this reflexive methodology also "enables the possibilities for examining data in more expansive ways" (Henderson, 2011, p. 343). Clearly, the use of post-positivism in Majyambere's study (2014) was influenced by the paradigm's ability to allow triangulation of methods:

The post-positivism paradigm can apply combinations of both quantitative and qualitative approaches for the purpose of a study [Nieuwenhuis, 2010: 65], as this study does. A combination of quantitative and qualitative approaches provides more value to the outcomes of the study... The study adopted a postpositivism paradigm and it then combined quantitative and qualitative methodologies. (p. 143).

Although, applying post-positivism in information research has benefits, it has been criticised as a research paradigm. For example, Kurki and Wight (2013) indicated that frequent criticism of post-positivism is that "although alternatives to positivism are commonly grouped together under the heading of post-positivism, in many respects, all they have in common is 'a rejection of positivism'" (p. 23). Eun (2016) also posited that "post-positivist scholarship has failed to establish a 'coherent' epistemological ground" and he further, however, maintained that "post-positivist research, despite its shortcomings, needs to be accepted as a 'normal' and a different kind of 'scientific' approach" (p. 8).

Several information researchers have derived the benefits of the post-positivism research paradigm by employing this paradigm in their studies (Fullwood, 2014; Majyambere, 2014). For example, Wiewiora (2013) employed post-positivism in the study that investigated the role of organizational culture on knowledge sharing; Van Vuuren (2011) also adopted this paradigm in the study that looked into "inter-organizational knowledge sharing in public sector: the role of social capital and information and communication technology." In his study, Kankam (2018) adopted the post-positivism paradigm.

5.4. Applying interpretivism in information research

Unlike positivism that seeks to predict human behaviour or affirm laws, interpretivism's goal is to uncover the meanings by which people understand their behaviours and experiences (Daymon & Holloway, 2011, p. 103). The adoption of interpretivism for information research should therefore emphasise understanding people's experience of information, individually or collectively, such as how they use, feel, think, and communicate information among themselves (Easterby-Smith et al., 2002, p. 30). The rationale lies in the fact that the interpretive paradigm approaches knowledge by placing emphasis on the importance of insiders' viewpoints to understanding social reality (Brink et al., 2012, p. 25).

Hence, Goldkuhl (2012), when applying interpretivism in information research, revealed the importance of appreciating subjective reasoning of people:

The aim of understanding the subjective meanings of persons in studied domains is essential in the interpretive paradigm. This was a central claim in the Verstehen sociology of Max Weber [1978]: the postulate of subjective interpretation. Alfred Schutz [1970] brought the Verstehen sociology further with inspiration from phenomenology. He claimed that scientific knowledge (concerning social life) was of second-order character. It must be based on the meanings and knowledge of the studied actors. (p. 138).

By this assertion, Goldkuhl (2012) was negotiating an opinion that application of the interpretivist research paradigm in information research should therefore be based upon the perception that "reality is socially constructed" (Alvesson & Sköldböck, 2009, p. 15). Hence, a major strength of the interpretivist paradigm is its ability to understand how people make meaning of their world through the provision of a natural way for data collection (Easterby-Smith et al., 2002, p. 32).

Clearly, the relationship between the researcher and the participants influences the success of interpretive research and as indicated by Goldkuhl (2012):

One of the interpretive principles (from Klein & Myers) is concerned with the relation between researcher and practitioner: "the principle of interaction between the researchers and subjects". It is notable that this principle is concerned with the interaction between researcher and researched subjects during data generation. It is emphasised that the researched subjects ("the participants") are interpreters and co-producers of meaningful data. (p. 140).

To corroborate, Creswell (2007) asserted that interpretivists construct meaning socially through interactions, experiences, or views and

these are mostly subjective, leading to multiple meanings in a study (p. 20–21). Information researchers who would like to use this paradigm in their research are therefore advised to appreciate that interpretivism usually occurs within a tradition, space, time, and specific situation (Chilisa & Preece, 2005, p. 28). It is also vital for information researchers to note that the views of participants on the phenomenon being studied under interpretivism are always considered critical (Creswell, 2003a, 2003b, p. 8).

Information researchers are encouraged also to note that, unlike the positivism that begins with theory, interpretivists “inductively develop or generate a theory or pattern of meanings” (Creswell, 2003a, 2003b, p. 9). Appreciating subjective meanings then becomes the building blocks for establishing theories. Goldkuhl (2012) therefore puts it this way:

The core idea of interpretivism is to work with these subjective meanings already there in the social world; i.e. to acknowledge their existence, to reconstruct them, to understand them, to avoid distorting them, to use them as building blocks in theorizing. (p. 139).

Goldkuhl's assertion particularly highlights that applying interpretivism within the context of information research is not out of place since the interpretive paradigm seeks to expose understandings of human behaviour and actions and a number of information research studies especially research on information behaviour seek to achieve that (Chilisa & Preece, 2005, p. 29). Interpretivism is commonly associated with the qualitative research approach (Creswell & Clark, 2007, p. 22). In doing so,

It can be assumed that several contemporary interpretive IS researchers do not conceive themselves as detached and disinterested observers and thus object to this as an unfair characterisation. This is one example of the diversity in views within interpretivism. (Goldkuhl, 2012, p. 141).

In considering the use of the interpretivist paradigm for information research, the researcher must take into consideration the fact that interpretivism heavily relies upon methods such as interview and observation and, as noted by Bryman (2004), qualitative research has strong links with interpretivism, since it is “concerned with words rather than numbers” (p. 266). Thus, information research that employs quantitative and mixed-methods approaches may have difficulties employing interpretivism effectively.

6. Conclusions

Paradigms are noted to impact on the nature of a study by describing what is being studied as well as the manner in which the study is conducted (Krauss, 2005, p. 758). Observing it as a worldview, paradigm refers to an all-encompassing method that guides researchers to experience and think about the world (Creswell & Plano Clark, 2011, p. 39). It provides lenses through which the world is viewed (Morgan, 2007, p. 50). This study has discussed the application of research paradigms in information research with the view of expanding information researchers' understanding on the right application of research paradigms in information research. Particularly, it has been found that applying a research paradigm in information research provides a mind-set that underlines a research approach with power relations and action implications (Kinash, 2006, p. 1).

Situating the discussion of research paradigm within the information science discipline has brought to light that paradigms are beneficial to information research since it is noted to be a view of reality that “determines the researchers' starting points and approaches to the field under investigation” (Vorster, 2012, p. 192). It has also been revealed through this study that applying a research paradigm in information research could be regarded as one of the virtues of true scholarship because it plays an important role in building a “researcher identity” (Lukka, 2010). Notwithstanding, the study has made it clear for

information researchers to appreciate that there are scholars who are doubtful of the whole notion of research paradigms (Clough & Nutbrown, 2007).

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