
Understanding Research Paradigms: A Scientific Guide

Wooi Keong Yong¹, Maizaitulaidawati Md Husin² and Suzilawati Kamarudin³

¹Center for American Education, Sunway University

^{1,2}Azman Hashim International Business School, Universiti Teknologi Malaysia

^{2,3}University of Business and Technology, Jeddah, Saudi Arabia

Author Note

Wooi Keong Yong <https://orcid.org/0000-0001-8342-8464>

Maizaitulaidawati Md Husin <https://orcid.org/0000-0002-2789-8274>

Suzilawati Kamarudin <https://orcid.org/0000-0003-4850-0170>

Correspondence concerning this article should be addressed to Yong Wooi Keong, Sunway University, 5, Jalan Universiti, Bandar Sunway, 47500 Subang Jaya, Selangor. Email: wooikeongy@sunway.edu.my

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Abstract

Knowledge of research paradigms is crucial as they guide scientific research and discoveries through their assumptions and principles. Besides, different disciplines utilise different research approaches. There are four different research paradigms available - positivism, realism, critical theory, and interpretivism. Knowledge of the various research paradigms will reduce research method bias and allow for better research instruments. This paper aims to highlight to budding researchers the research paradigms available and their employment in scientific research.

Keywords: Paradigm, Research Methods, Interpretivism, Positivism, Critical Theory, Realism, Qualitative, Quantitative, Ontology, Epistemology, Methodology

Understanding research paradigms are crucial as they guide scientific discoveries through their assumptions and principles (Park, Konge, and Artino, 2020). Fitzgerald and Howcroft (1998) noted several dichotomies and paradigms had been used in the study of social sciences, such as positivism versus interpretivism, quantitative versus qualitative, induction versus deduction and explanatory versus confirmatory. There are four different research paradigms - positivism, realism, critical theory, and interpretivism (Healy and Perry, 2000). Deshpande (1983) and Mertens (2012) mentioned that a paradigm is a set of assumptions that provides a conceptual framework or a philosophical one for a world view, which enable researchers to construct organised studies around the world.

Mertens (2012) also noted that this paradigm contrasted with the earlier ideas that there were three “paradigms” of qualitative, quantitative, and mixed methods. These earlier “paradigms”, which used terms like “Quantitative” and “Qualitative”, merely denoted types of data, and not the epistemologies, methodologies, designs, and ontological assumptions that are associated with different research frameworks (Biesta, 2010). Following Deshpande (1983), a paradigm serves several purposes for a researcher. First, it guides researchers as it indicates important issues challenging any discipline. Second, it allows for the development of models and theories that enable researchers to solve these issues. Third, it establishes the criteria for the research tools required – for example, the methodology, type of instruments, and data collection that would allow for the issues to be solved. Forth, it provides the principles, procedures, and methods to be considered when similar problems reappear.

Scotland (2012) and Alharahsheh and Pius (2020) also stated that a paradigm includes several components categorised as Ontology, Epistemology, Methodology and Methods. Accordingly, Alharahsheh and Pius (2020) outlined the critical inter-relationships between these components and asserts that the paradigms of positivism and interpretivism both consists of ontology, epistemology, methodology and methods. Ontology is mainly concerned with the phenomenon in terms of its nature of existence or the study of reality since researchers need to know what is and what exists to research it (Weber, 2004). Epistemology refers to the knowledge or the theory of knowledge or how reality is being known by the researcher (Carson, Gilmore, Perry, and Gronhaug, 2001). The methodology is concerned with the general research strategy followed in conducting the research and would identify the data collection methods to be used with the outlined research strategy (Alharahsheh and Pius, 2020). Also, this is where methodology begins to differ between the paradigms of positivism and interpretivism significantly. The positivist methodology is about the design process for conducting research; it provides the theoretical underpinning for understanding which method or sets of methods to be used for particular research and not about the instruments or methods for doing research (Igwenagu, 2016).

However, for the interpretivist paradigm, there is a connection between the researcher and detailed elements of the research process (Irshaidat, 2019). The researcher’s subjective interpretation is key to the research contribution (Saunders, Lewis and Thornhill, 2012). Research methods are concerned with data collection and analysis techniques used to produce and develop knowledge. Accordingly, two types of research methods can be adopted, quantitative and qualitative research, although mixed methods can also be used if appropriate (Alharahsheh and Pius, 2020).

Quantitative research is about measuring quantity to apply to a specific phenomenon and is expressed in mathematical and statistical quantities. It is also used to test existing theories (Fitzgerald and Howcroft, 1998; Alharahsheh and Pius, 2020). On the other hand, qualitative research is concerned with discovering patterns in the research data, understanding and explaining them. Qualitative research emphasises processes and meanings and uses techniques that include in-depth interviews, focus groups, and participant observation

(Fitzgerald and Howcroft, 1998). These inter-relationships are illustrated in Figure 1 (Appendix).

The Nature of Paradigms

It was noted by Healy and Perry (2000) that there are four types of paradigms of research - positivism, critical theory, realism and interpretivism. Positivism is used for quantitative research, while the other three are used in qualitative research (Healy and Perry, 2000). The second paradigm, critical theory, emphasises social realities incorporating historically situated structures. Critical theory researchers aim at critiquing and transforming social, political, cultural, economic, ethnic and gender values. Therefore, research inquiries are often long-term ethnographic and historical studies of organisational processes and structures (Healy and Perry, 2000). On the other hand, realism believes that there is a “real” world to discover even though it is only imperfectly apprehensible, i.e. an objective reality that is independent of an individual’s perception of reality and focuses on causality (Wynn and Williams, 2012). Lastly, interpretivism holds that truth is a particular belief system contained in one specific context. Similar to critical theory, interpretivism enquires about the ideologies and values that lie behind a finding so that reality consists of “multiple realities” that people have in their minds. Researching this constructed reality depends on interactions between interviewer and respondent, which means the researcher has to be a “passionate participant” during their fieldwork (Healy and Perry, 2000).

The term “positivism” is used to express the scientific approach to the world (Pawlikowski, Rico and Van Sell, 2018). Positivism research philosophy revolves around the researcher working with observable reality within society, leading to generalisations (Alharahshah and Pius, 2020). It has a strict focus on pure data and facts without being influenced by the human mind’s interpretation bias (Scotland, 2012; Saunders et al., 2012). There are three basic principles of positivism. First, science is the only valid knowledge, and only facts are counted as objects of knowledge. Second, philosophy and science possess the same method. Third, philosophy’s task was to find the general principles that are common to all the sciences. A characteristic of positivism is the elimination of metaphysics from philosophy (Pawlikowski et al., 2018). Positivist thinking dominates modern research in the sciences, as evidenced by international scientific standards in leading journals and professional organisations (Hoyle, Harris and Judd, 2009; Park et al., 2020).

On the other hand, the term “interpretivism” (also known as “constructivism” or “naturalism” – Tashakkori and Teddlie, 2003) was developed as a critique of positivism. Interpretivism considers human beings different from physical phenomena and works with the assumption that human beings cannot be explored similarly as a physical phenomenon. Interpretivism is different from positivism as it prioritises the richness of the research context (Alharahshah and Pius, 2020).

Following Littlejohn and Foss (2009), interpretivism research may include hermeneutics, phenomenology and symbolic interactionism. Hermeneutics is the interpretation and understanding of philosophy and is mainly used in biblical and other similarly related literature. Phenomenology is the understanding of the world by experiencing the phenomena directly, while symbolic interactionism is where symbols are considered social objects that provided shared meanings and help support the construction of reality.

Methodologically, respondents in a positivist paradigm are considered objects to be investigated in a fixed enquiry mode. The researcher is a detached investigator who is not emotionally or personally involved in the research process (Irshaidat, 2019). Due to the belief in the research process's uniformity, the methodology in a positivist paradigm advocates standardisation in the investigation and interpretation process instead of relying on situational analysis.

Positivism uses a hypothesis to accept or reject the causality between variables (Bailey, 2011) and uses mainly quantitative methods to verify its hypothesis (Healy and Perry, 2000). This paradigm's trustworthiness is reflected in reduced error margins, and replicable findings indicated its reliability (Healy and Perry, 2000; Hjørland, 2005). In contrast, the interpretive methodology believes that collective ideas, such as norms, governs action and that there is a connection between the researcher and the detailed elements of the research process, as to understand a specific phenomenon properly, the researcher cannot play a detached role from the matter that is being examined (Irshaidat, 2019). The researcher must be a "passionate participant" within the world being investigated (Healy and Perry, 2000). Also, the interpretive researcher aims to highlight subjectivity in their conclusions. It is a method of establishing a deep understanding of meaning by paying attention to minor details (Irshaidat, 2019).

Deciding Research Methods

Next, the researcher must consider whether the qualitative or quantitative approach is appropriate for achieving their study objectives. Following Varpio, Paradis, Uijtdehaage, and Young (2020), the choice is made by looking at how the researcher uses theory, theoretical and conceptual frameworks. Varpio et al. (2020) classified researchers into two basic categories, the "objectivist deductive researcher" and the "subjectivist inductive researcher". As seen in Figure 1, the paradigm that typically uses a deductive, quantitative and confirmatory approach is positivism, and the paradigm that typically uses an inductive, qualitative and exploratory approach is interpretivism, realism, and critical theory (Varpio et al. 2020; Alharahshah and Pius, 2020; Park et al. 2020; Saunders 2012). An objectivist deductive researcher would generally use a theory as a starting point. This gives several advantages – theory allows testable components to test cause and effect relationships, identifies concepts that can be operationalised and the relevant variables to control. The testable components are used to generate a specific hypothesis which are the foundations for

a study. New studies add new knowledge by building evidence to support, refine or challenge a theory. In a pure objectivist deductive approach, a researcher would rarely combine two or more theories in the same study, as it makes the formulation of hypothesis difficult and makes it hard to identify the specific causal nature of the relationship that is being studied, as it disrupts the progressive testing and refinement of a theory. This research method builds knowledge incrementally and allows more refined understanding, enabling better future predictions and more robust theory. In this approach, there is a linear progression from theory to hypothesis development, data collection, the interpretation of findings, then the refinement of theory and the generation of new causal explanations (Varpio et al., 2020).

On the other hand, a subjectivist inductive researcher begins with a desire to understand or explain a particular phenomenon and does not begin with a hypothesis. Following Varpio et al. (2020), the three main ways of theory usage by such researchers. First is fully inductive theory development study design, where theory is not used to guide the study design. Instead, a theory is the primary output of the research project and is developed using a systematic inductive approach to data analysis. The second way that a subjectivist inductive researcher uses theory is by fully theory-informed inductive study design, where one or more theories can shape every stage of the research process, and this includes the development of a research question, methodological choices, data collection, data analysis, as well as the study's conclusions (Varpio et al., 2020). This qualitative approach is taken when the objective is to formulate a theory that is supposed to explain a phenomenon that is currently being observed or experienced in the past by either observing or describing reality. This type of qualitative research is about a researcher's observation, and the result of qualitative research is a narrative report that provides very detailed descriptions of the phenomenon being observed. When a researcher starts with a theory as well as a set of observed tentative relationships (hypothesis), then the quantitative approach is applied to test and confirm (or disconfirm) such relationships (Newman and Benz, 1998). The refinement of these existing theories or the development of a new theory might be the significant output of the research project (Varpio et al., 2020). The third way a subjectivist inductive researcher may use theory is by using it as an interpretive tool. This is known as the theory informing inductive data analysis study design (Varpio et al., 2020). Here, the researcher keeps many theories in mind when designing a study and collecting data. The researcher only starts to determine which theory or theories should shape the final study interpretations and conclusions during the data analysis process. This may cause the researcher to modify the study design partway during the data analysis when the researcher realises that a particular theory is relevant (Varpio et al., 2020).

The role of Frameworks

In choosing the study's preferred research method, the researcher also needs to consider a guiding framework, otherwise known as a theoretical framework and conceptual framework. The objectivist deductive researcher starts by identifying the theory to use to build the study's theoretical framework. In the objectivist deductive tradition, a theoretical framework is typically constructed before data collection and will remain unchanged throughout the

research process. This theoretical framework allows the researcher to put the theory into action, identify gaps in current research, shape constructs, operationalise variables, and articulate the specific language and assumptions of research questions (Varpio et al., 2020). The theoretical framework also allows peer reviewers explicit information on how the current research contributes to the field of knowledge related to the theory. Finally, in the objectivist deductive research method, the researcher constructs the conceptual framework using the relevant literature review to explain why a particular theory could be informative to describe a context, the rationale for the research methodology adopted and constructs hypothesis, as well as identifying a series of outcomes or variables of interest.

A conceptual framework is finalised before the study begins and rarely modified once data collection begins (Varpio et al., 2020). Wiersma (2001) discussed some characteristics pertinent to quantitative research that ensured good research design, including a degree of freedom from bias, freedom from confounding, control in extraneous variables, statistical precision for testing hypothesis and managing the variances to uphold goodness of research designs.

A subjectivist inductive researcher approaches the issue of theoretical frameworks differently from an objectivist deductive researcher, depending on which of the three research designs (described above) they will be using. The “Fully inductive theory development study design” will not require a Theoretical framework since there is no theory to use to build one. Such research methods rely heavily on a robust conceptual framework instead.

Suppose the “Fully theory-informed inductive study design” is used. In that case, the researcher must decide which theory or theories to use to transform the relevant theory into a theoretical framework to explain how the theory shaped the research questions, the way the research context is approached, explaining concepts that underpin the research design, choice of methodology, data collection, how interactions with respondents occur, its analysis process as well as the conclusions that are made. In the “Theory informing inductive data analysis study design”, the researcher will wait until the data analysis process is being performed before deciding which theory or theories can be used. Therefore, this kind of study’s theoretical framework is developed during the data analysis process (Varpio et al., 2020).

A subjectivist inductive researcher also approaches the issue of conceptual frameworks differently from an objectivist deductive researcher. The conceptual framework will likely evolve during a study as new ideas, insights and knowledge is developed. Therefore, a subjectivist inductive researcher will likely construct a tentative conceptual framework when the study starts, adjusting it as the data gathered transforms the researcher’s understanding of the phenomenon studied. The framework will include a literature review relevant to the area studied, a summary of pertinent theory (if not using the “Fully inductive theory development study design”), an explanation of why the research should be carried out in the selected

context, research questions, and justification of the research methodology chosen for the study (Varpio et al., 2020).

Conclusion – Which paradigm?

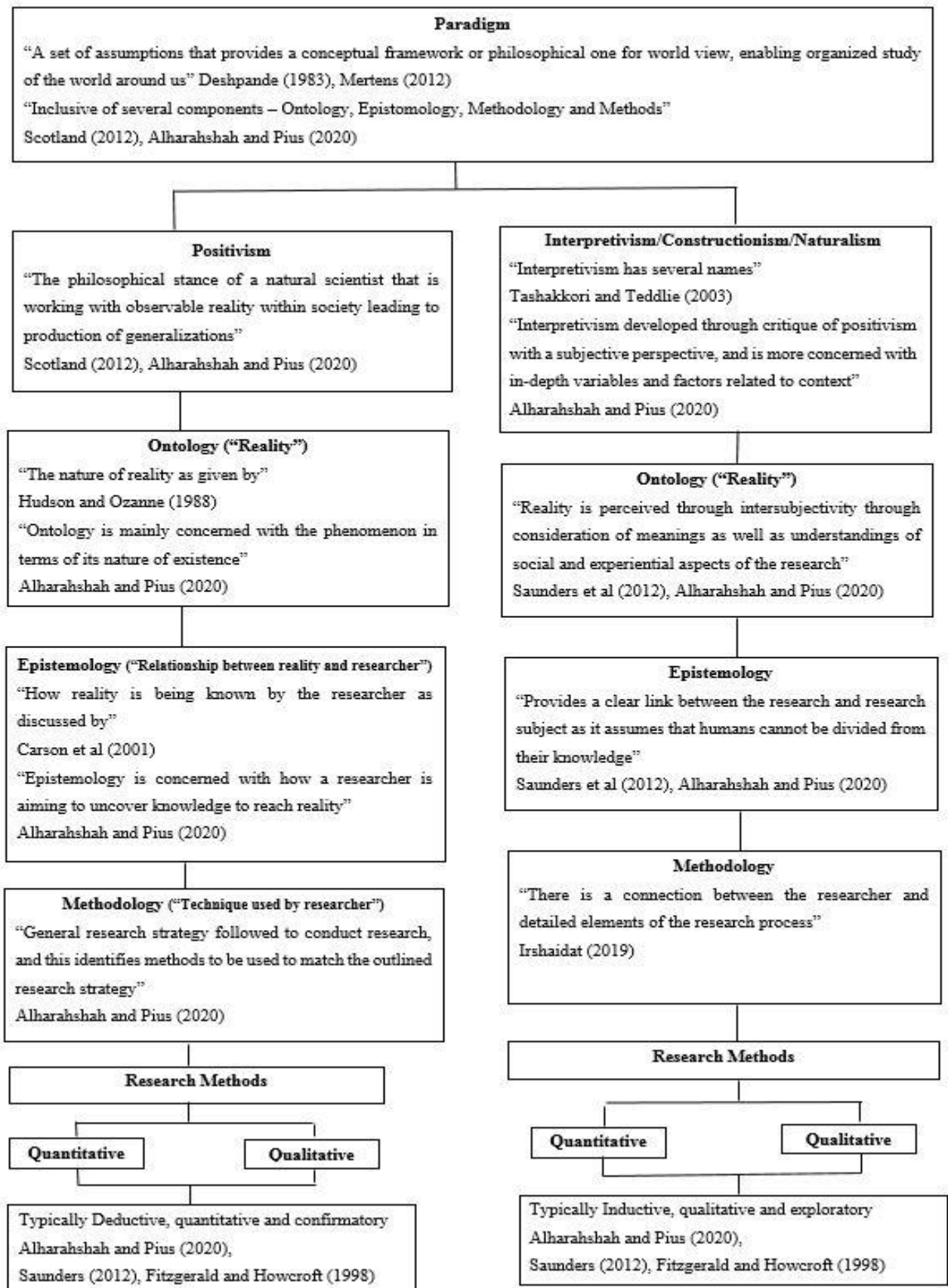
Based on the information presented above, several points can be considered to help point to an approach to any study. For example, is there a large body of research on a particular topic using a specific theory? Does the previous research have a dominant Positivist research paradigm or Interpretivist/ Critical Theory/ Realism research paradigm? Secondly, following Varpio et al. (2020), Alharahshah and Pius (2020), Park et al. (2020) and Saunders (2012), a study should be clear on the aims of the research and choose a paradigm that is suitable for the study's purpose. Thirdly, is the research project deductive and confirmatory? Does it involve testing hypothesis or intends to use the Partial Least Squares-Structural Equation Modelling (PLS-SEM) technique to analyse those relationships (for example), as PLS-SEM only utilises statistical packages. Finally, following Weber (2004), the final choice of research methods chosen by the researcher may well be due to the type of training provided to the researcher, the social pressures associated with research advisors and colleagues, as well as the preferences for a specific type of data gathering methods of the researcher themselves. Knowledge of the different research paradigms can only minimise research method bias and benefit the quality of research.

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Figure 1



Note: Summary of the dichotomies