Chapter II
Understanding Ontology and Epistemology in Information Systems Research

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ABSTRACT

This chapter introduces ontological and epistemological elements in information systems research. It argues that ontology, epistemology, and methodology intertwine in a dynamic way. Ontology, as well as epistemology, is both an antecedent and a consequence of methodology. This complex relationship has an impact on the methodology which will affect the outcome later on. Understanding how these three elements can be related to each other can help researchers develop better methodologies for information systems research.

INTRODUCTION

A thorough understanding of the research process is needed in any study. One approach consists of three hierarchical steps. It involves using a specific framework (theory, ontology), identifying the research questions (epistemology), and determining the research strategy (methodology; Burrell & Morgan, 2005; Denzin & Lincoln, 2005b; Grix, 2002, Hay, 2002; Nelson, Treichler, & Grossberg, 1992).

Researchers should at least have a good grasp of the philosophical assumptions of the complex phenomenon they want to study as well as the methods of investigating it. That discipline mandates explicit articulation of the research process by thoroughly understanding, acknowledging, and defending their ontological, epistemological and

methodological assumptions (Burrell & Morgan, 2005; Grix 2002). It is that explicit articulation that will infuse *quality* into the research process and interpret them in the *context* of the phenomenon under study. Therefore, all research is interpretive, according to Denzin and Lincoln (2005b).

The contextual setting or the natural setting makes the case study a distinct research methodology. The richness of the context generates the particulars and complexities of the experiential knowledge and legitimises the case study (Benbasat, Goldstein, & Mead, 2002; Flyvbjerg, 2001; Franz & Robey, 1984; Patton, 1990; Snow & Anderson, 1991; Stake, 1995, 2005; Yin, 1993, 1994).

The understanding of ontology and epistemology in this chapter will be in the context of a large public sector entity. The complex phenomenon concerns the replacement of enterprise systems.

The research problem theory is the Diffusion of Innovations (DOI) theory of Rogers (2003). Like the philosophical assumptions that is composed of certain basic beliefs, a paradigm is a set of assumptions that can never be absolute true knowledge (Denzin & Lincoln, 2005c, p 183; Guba, 1990). It guides and interprets the study. "Each interpretive paradigm makes particular demands on the researcher, including the questions the researcher asks and the interpretations he or she brings to them," explain Denzin and Lincoln (2005b, p 22). The paradigm provides a means for the theory to meet the practice. Information systems research relies heavily on theories derived from complementary disciplines including Accounting, Computer Science, Economics, Innovation, Management, Marketing, Psychology, Sociology, and Mathematics. Information systems research utilises theories to examine themes like the adoption and implementation of enterprise systems, communications, strategy, and political, economic and environmental, social, and technological (PEST) factors. One of the 56 theories used in the information systems research in www.istheory.yorku.ca is the DOI Theory.

In the DOI, a process model (Rogers, 2003) consists of an initiation phase and an implementation phase. The initiation phase is composed of the awareness stage, the matchmaking stage, and the business case stage. Rogers calls the third stage the decision stage. For a large public sector entity, it is more appropriate to call it the business case stage. Here, the executive sponsor makes a business case to sell the innovation (e.g., the replacement of enterprise systems) to upper management. This ends in an accept-reject decision which takes place after initiation phase and before the implementation phase. If the accept-reject decision is favourable,then the implementation phase will follow this stage.

The literature review shows that the diffusion research has certain realities and research gaps. Any stage is a potential source of unexpected and undesirable consequences. In fact, Rogers (2003, p 198) finds that diffusion studies have a clearer perspective of the evidences at the awareness and decision stages as compared to those found at the matchmaking stage. Because every stage serves as an antecedent to a subsequent stage, the decision stage will lack clarity if the prior matchmaking stage is ambiguous. Unfortunately, the literature review also states that there are only a few studies about the business case stage. In diffusion research, the study on the business case stage does not even exist. If evidences of the decision stage are clear, then Rogers could probably be referring to studies about the decision-making (e.g., strategic investment decision) that occurs immediately after the third stage instead of being the third stage itself. Undeniably, there is a dire need to study both the matchmaking stage and the business case stage.

This chapter contains a good theoretical base that provides a sound evidence of the theoretical and practical arguments of the complex relationship of epistemology, ontology, and methodology. It can be used to instruct PhD students in a "philosophy of science" course or enlighten anyone who is interested in researching ontology,