

# Critical Realist Information Systems Research

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## INTRODUCTION

The information systems (IS) field is dominated by positivistic research approaches and theories (Chen & Hirschheim, 2004). IS scholars have pointed out weaknesses in these approaches and theories and in response different strands of post-modern theories and constructivism have gained popularity—see, Lee, Liebenau, and DeGross (1997) and Trauth (2001). The approaches argued for include ethnography, constructivism, grounded theory, and theories like Giddens' structuration theory and Latour's actor-network theory. (We refer to these different research approaches and theories as "post-approaches" and "post-theories" when distinction is not required).

## BACKGROUND

Although post-approaches and post-theories overcome some of the problems noted with positivistic approaches and theories, they have at least three major weaknesses and limitations. First, their fascination with the voices of those studied leads to IS research as mere reportages and local narratives which can lead to any narrative/reportage being as good as another narrative/reportage. Second, their focus on agency leads to ignoring the structural dimension—the agency/structure dimension is collapsed, leading to a flat treatment of the dimension. Third, their rejection of objectivist elements leads to problems when researching ICT-artifacts and ICT-based IS. For elaborate critique of post-approaches and post-theories, see Archer, Bhaskar, Collier, Lawson, and Norrie (1998).

An alternative to traditional positivistic models of social science as well as an alternative to post-approaches and post-theories is critical realism (CR). CR argues that social reality is not simply composed of agents' meanings, but that there exist structural factors influencing agents' lived experiences. CR starts from an ontology which identifies structures and mechanisms through which events and discourses are generated as being fundamental to the constitution of our natural and social reality. This article briefly presents CR and exemplifies how it can be used in IS research.

## CRITICAL REALISM IN IS RESEARCH

CR has primarily been developed by Roy Bhaskar (1978, 1998) and can be seen as a specific form of realism. Good summaries of CR are available in Sayer (2000) and Archer *et al.* (1998) and key concepts and main developments are presented in Hartwig (2007). CR's manifesto is to recognize the reality of the natural order and the events and discourses of the social world. It holds that:

*... we will only be able to understand—and so change—the social world if we identify the structures at work that generate those events and discourses ... These structures are not spontaneously apparent in the observable pattern of events; they can only be identified through the practical and theoretical work of the social sciences.* (Bhaskar, 1989, p. 2)

Bhaskar (1978) outlines what he calls three domains: the *real*, the *actual*, and the *empirical*. The real domain consists of underlying structures and mechanisms, and relations; events and behavior; and experiences. The generative mechanisms, residing in the real domain, exist independently of but capable of producing patterns of events. Relations generate behaviors in the social world. The domain of the actual consists of these events and behaviors. Hence, the actual domain is the domain in which observed events or observed patterns of events occur. The domain of the empirical consists of what we experience; hence, it is the domain of experienced events. Bhaskar argues that:

*...real structures exist independently of and are often out of phase with the actual patterns of events. Indeed it is only because of the latter we need to perform experiments and only because of the former that we can make sense of our performances of them. Similarly it can be shown to be a condition of the intelligibility of perception that events occur independently of experiences. And experiences are often (epistemically speaking) 'out of phase' with events—e.g. when they are misidentified. It is partly because of this possibility that the scientist needs a scientific education or training. Thus I [Bhaskar] will argue that what I call the domains of the real, the actual and the empirical are distinct.* (Bhaskar, 1978, p. 13)

CR also argues that the real world is ontologically stratified and differentiated. The real world consists of a plurality of structures and mechanisms that generate the events that occur.

CR has primarily been occupied with philosophical issues and fairly abstract discussions. In recent years attention has been paid to how to actually carry out research with CR as a philosophical underpinning—see Layder (1998), Robson (2002), Kazi (2003), and Pawson (2006). Gregor (2006) argues that five interrelated types of IS theory can be distinguished: (1) theory for analyzing, (2) theory for explaining, (3) theory for predicting, (4) theory for explaining and predicting, and (5) theory for design and action. The five types can be clustered into two main types: “traditional” natural/social research (first four types) and design science research (fifth type). This section briefly presents how CR can be used in the first four types of IS research and the next section addresses IS design science research based on CR.

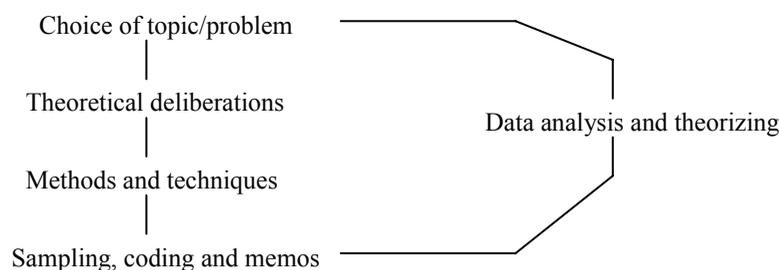
Bhaskar says that explanations (theories) are accomplished by the RRRE model of explanation comprising a four-phase process: (1) *Resolution* of a complex event into its components (causal analysis); (2) *Redescription* of component causes; (3) *Retrodiction* to possible (antecedent) causes of components via independently validated normic statements; and (4) *Elimination* of alternative possible causes of components.” (Bhaskar, 1998). This is a rather abstract description of explanation (theory) development. Here we will instead use Layder’s (1998) less abstract “adaptive theory.” It is an approach for generating theory in conjunction with empirical research. It attempts to combine the use of pre-existing theory and theory generated from empirical data. Figure 1 depicts the different elements of the research process. There is not some necessary or fixed temporal sequence. Layder stresses that theorizing should be a continuous process accompanying the research at all stages. Concerning research design and methods, CR is supportive of: (1) the use of both quantitative and qualitative methods, (2) the use of extensive and intensive research design, and (3) the use of fixed and flexible research design.

To exemplify how CR and Layder’s adaptive theory can be used in IS research addressing Gregor’s (2006) four first IS theory types, we will use a project on the use of executive information systems (EIS). The project was done together with Dorothy Leidner.<sup>1</sup> Here a new discussion of the research is carried out.

Layder’s adaptive theory approach has eight overall parameters. One parameter says that adaptive theory “uses both inductive and deductive procedures for developing and elaborating theory.” (Layder, 1998). The adaptive theory suggests the use of both forms of theory-generation within the same frame of reference and particularly within the same research project. We, based on previous EIS theories and Huber’s (1990) propositions on the effects of advanced IT on organizational design, intelligence, and decision making, generated a number of hypotheses (a deductive procedure). These were empirically tested. From a CR perspective the purpose of this was to find patterns in the data that would be addressed in the intensive part of the study. We also used an inductive procedure. Although previous theories as well as the results from the extensive part of the project were fed into the intensive part, we primarily used an inductive approach to generate tentative explanations (theories) of EIS development and use from the data. The central mode of inference (explanation) in CR research is retrodiction. It enables a researcher, using induction and deduction, to investigate the potential causal mechanisms and the conditions under which certain outcomes will or will not be realised. The inductive and deductive procedures led as to formulate explanations in terms of what mechanisms and contexts could lead (or not lead) to certain outcomes—outcomes being types of EIS use with their specific effects.

Another parameter says that adaptive theory “embraces both objectivism and subjectivism in terms of its ontological presuppositions” (Layder, 1998). The adaptive theory conceives the social world as including both subjective and objective aspects and mixtures of the two. In our study, one objective aspect was the ICT used in the different EIS and one subjective aspect was perceived effects of EIS use.

Figure 1. Elements of the research process (Layder, 1998, p. 29)



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