Critical Realism: A philosophical perspective for case study research in information systems

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Abstract

This paper discusses two traditional philosophical perspectives that are currently used in the field of information systems – positivism and interpretivism. It also analyses a more recent philosophical perspective, critical realism, and contributes to explain how case study research can be conducted within a realist perspective of social enquiry by presenting an analysing a research model.

The main objective of the paper is to provide the basis for academic researchers in the field of information systems to follow a realist approach of social enquiry and use case studies as a research strategy to conduct their investigations.

Key words: information systems, critical realism, research methods, case study.

1. Introduction

Information systems are very much a social, rather than a technical science and the main goal of research in social sciences is to produce knowledge that enables us to understand and explain the social world. Although the technological perspective is the dominant perspective and the human and social dimension is less considered, some literature stresses the importance of the social aspects of information systems rather than the technical ones [Checkland and Scholes, 1990; Walsham, 1993]. Rivas [1989] cleverly argues that there is no organisation without an information system. Business organisations can be interpreted as information systems simply because it they are systems that manipulate and use information. Many practitioners have also realised that some of the problems using information technology effectively stem from political, organisational and social problems [Backhouse and Land, 1994: p.20]. Galliers [1992: p.162] stresses that “information systems researchers are becoming aware of the limitations of the scientific approaches to their work, given the socio-technical nature of their chosen field of endeavour”. The concept of information systems is basically an organisational concept and can be understood as a system that receives, processes, stores and transmits any form of data or information. Therefore, the study of information systems, and its management issues, can be classified in the field of the social sciences.

The goal of research in social sciences is to produce a reliable body of knowledge that enables us to understand and explain the social world. In order to achieve this goal, the identification of a philosophical perspective is important. It exposes the researcher’s assumptions about the nature of the phenomena under investigation (ontology) and his/her point of view of the ways in which is possible to acquire knowledge (epistemology).

Philosophical perspectives are rooted on ontological and epistemological claims and lead to a particular approach, or set of approaches, to social enquiry. Research methods are not self-valid, they depend on epistemological justifications. Each research strategy, like case study research or the use of surveys, may have specific advantages and disadvantages, according to
several factors, like the type of research question or the control the researcher has over the research object.

Positivism and interpretivism have been the dominant philosophical perspectives in the history of social sciences, and probably critical in order to understand other ontological and epistemological claims. Both these perspectives are also frequently adopted in information systems research (see, for example, Walsham, 1993). Therefore, their major issues and viewpoints will be briefly introduced and discussed.

Despite the proliferation of interrelated philosophies in information systems research, it may be suggested that positivism and interpretivism are located in opposite corners and are essential to understand other ontological and epistemological claims. This paper analyses a more recent philosophical perspective – Critical Realism – and discusses the use of case study research in the field of information systems, within a Realist perspective of social enquiry.

2. Philosophical perspectives

2.1 Positivism

Positivism has a long tradition in the history of natural sciences. Positivist science has been historically pursued by well-known philosophers and scientists like Locke, Decartes, Galileo or Comte. Comte attempted to establish the study of society as a scientific discipline, capable of exactness and prediction in a similar way to the natural sciences. Philosophically based on the work of Bertrand Russell and Ludwig Wittgenstein, logical positivism emerged in the early twenties as a doctrine claiming that the only meaningful propositions are those that can be verified empirically. According to logical positivism, systems of logic and mathematics are essentially true by virtue of their logical forms and can be derived from axioms, while any other claim to knowledge is seen as synthetic and can be counterfactually shown to be false [Giddens, 1976]. Logical positivism has a strong influence in both natural and social science research.

Positivism can be primarily synthesised through the assumption that the social world really exists and that its characteristics can be measured through objective methods, rather than being mentally constructed or subjectively appreciated through reflection and intuition (interpretivism). Its epistemology seeks to explain and predict what happens in the social world by looking for regularities and causal relationships between its elements [Burrell and Morgan, 1979].

Hirschheim [1992] considers that positivism has a five point doctrine:

- The unity of the scientific method - which means that the accepted approach for knowledge acquisition is valid for any form of inquiry and any research domain;
- The aim to find regularities and causal relationships among the elements of the study;
- The conviction that only experience can provide valid data;
- The assumption that science and its processes are value-free. Science transcends all cultural and social beliefs held by the scientist;
- The belief that logic and, more generally, mathematics provide the foundations of science. They provide a universal language and a formal basis for quantitative analysis.

It is a common belief that experimentation and observation, correctly applied, can eradicate the influence of social and cultural values and, therefore, build up an image of reality independent from the observer. The aim of social enquiry is the identification of causal explanations and
fundamental laws that explain regularities in social behaviour. For the positivist, science embodies a set of universal statements, whose truth or falsity can be analysed and evaluated by systematic observation and experience. Moreover, science is seen as an attempt to predict and explain the external world by identifying regularities through observation and rejecting any scientific concepts that go beyond the domain of the observable.

Positivism explains human behaviour in terms of cause and effect. Social and natural phenomena can be explained in the same way. Research in the social sciences must be conducted with the same state of mind as a physicist or biologist when investigating an unknown scientific domain of the natural sciences. Positivism is the dominant perspective in computer science studies, although it has some limitations in management research.

2.2 - Interpretivism

An interpretivist perspective of science considers that the social world is essentially relativistic and can only be understood by interpreting the activities which are to be studied. Interpretive methods of research assume that our knowledge of reality is a social construction by human actors and researchers, and thus subjective. In contrast to the assumptions of positivism, interpretive ontology sustains that “there is no objective reality which can be discovered by researchers and replicated by others” [Walsham, 1993: p.5].

From an interpretivist point of view, there are significant differences between the research object of the natural and the social sciences. The study of natural phenomena requires the scientist to invent concepts and theories in order to describe and explain nature. By using those theories, the natural scientist decides about what is appropriate to the problem under investigation. On the other hand, the study of social phenomena requires an understanding of the social world that people produce and reproduce through their continuing activities. Since people are constantly involved in interpreting their world (social situations and behaviour), they develop meanings for their activities and ideas about what is relevant for making sense of those activities [Blaikie, 1993].

Interpretive approaches adopt the philosophical position that knowledge is a social construction and that theories concerning reality provide ways of viewing and understanding the world rather than discoveries about the world representing absolute truth. From this viewpoint, there are no correct or incorrect theories but more and less interesting ways to see the world [Walsham, 1993]. Blaikie synthesises the underlying purpose of an interpretive approach to social enquiry by saying that:

…”the major task of interpretive social science is to discover why people do what they do by uncovering the largely tacit, mutual knowledge, the symbolic meanings, intentions and rules, which provide the orientations for their actions. [Blaikie, 1993: p.176]

Interpretivism has its roots in hermeneutics and phenomenology. Hermeneutics is basically concerned with interpreting and giving meaning to texts. For example, Boland [1985] argues that the use, design and study of Information Systems can be seen and understood as an hermeneutic process, since the output of an information system can be a text that must be interpreted by people other than the author. Phenomenology is deeply rooted in the work of Husserl and Schütz and views phenomena as objects of perception rather than facts or things that exist independently of the observer. Phenomenology focuses on the ways in which people think and interpret the world around them and views reality as relative and subjective. The world is socially constructed and the observer is part of what is observed.
2.3 - Realism

Realism is a relatively recently emerging philosophical perspective, with its own ontology and epistemology. As Blaikie [1993: p.59] explains: “while sharing positivism’s desire for producing casual explanations and interpretivism’s views on the nature of social reality, realism argues for a view of science that is different from either of these approaches.” A realist approach to social enquiry is essentially described in the work of philosophers like Keat and Urry [1975], Harré [1986] and Bhaskar [1978, 1986, 1989a and 1989b].

Bhaskar’s [1989a] concept of critical realism emerged by linking his general philosophy of science (transcendental realism) with his philosophy of the human sciences (critical naturalism). Bhaskar [1978; p.250] clarifies the ontology of realism by saying that “things exist and act independently of our descriptions, but we can only know them under particular descriptions”. In other words, science is seen as a systematic attempt to express in thought the structures and ways of acting of things that exist independently of thought [Bhaskar, 1978]. According to realism, the ultimate objects of scientific inquiry exist and act independently of scientists and their activity and science is essentially concerned with what kind of things exist and how they behave. Bhaskar explains the role of a realist philosophical perspective in guiding social research by saying that:

> Realism is not, nor does it licence, either a set of substantive analyses or a set of practical policies. Rather, it provides a set of perspectives on society (and nature) and how to understand them. It is not a substitute for, but rather helps to guide, empirically controlled investigations into the structures generating social phenomena. [Bhaskar, 1989a: p.3]

Outhwaite [1987: p.19] explains that “realism is a common-sense ontology, in the sense that it takes seriously the existence of things, structures and mechanisms revealed by the sciences at different levels of reality”.

Bhaskar [1978] identifies three domains of reality to classify experiences, events and mechanisms: the empirical, the actual, and the real. The empirical is made up of experience, of events that can be observed. The actual is composed of events, whether or not they are observed. The domain of the real consists of structures and mechanisms which produce these events. All these domains are interdependent. The empirical is a subset of the actual, which is itself a subset of the real. Consequently, realism is grounded in the assumption that the conceptual and the empirical do not exhaust the real.

Bhaskar [1989a] carefully distinguishes between the human descriptions of reality and the reality that the researcher pretends to describe. Within this philosophical perspective, experiments can be seen as closed systems constructed by humans to test their theories, while causes must be seen as tendencies that may, or may not, react with other tendencies to produce effects [Williams and May, 1996: p.83].

Critical realism, as described by Bhaskar [1989a], aspires to explain the relationship between human activity and social structures. As the author says, “the existence of social structure is a necessary condition for any human activity” [Bhaskar, 1989a: p.3]. Social phenomena are perceived as a result of a multiplicity of structures, which cannot be directly perceived, but may be inferred and identified through the examination of their effects.

From an epistemological perspective, realism is “methodologically open”, in the sense that does not define a method. Realism “is concerned with developing methods appropriate to the particular subject matter of the social sciences” [Blaikie, 1993: p.58]. While accepting that the social world is real and exists, a realist perspective of the social sciences also accepts the interpretive view that society is both produced and reproduced by its members, who may have
different perceptions and interpretations about the same reality. As Layder [1993: p.16] explains, “a central feature of realism is its attempt to preserve a “scientific” attitude towards social analysis at the same time as recognizing the importance of actors' meaning and in some way incorporating them in research”.

May [1993] exposes the main assumptions of realism:

Realism argues that the knowledge people have of their social world affects their behaviour and, unlike the propositions of positivism and empiricism, the social world does not simply exist independently of this knowledge. However, people’s knowledge may be partial or incomplete. The task of social research is not simply to collect observations on the social world, but to explain these within theoretical frameworks which examine the underlying mechanisms which structure people’s actions and prevent their choices from reaching fruition. [May, 1993: p.7]

Based on the work of Bhaskar, Outhwaite [1987: p.45] presents a summary of the ontological principles of realism:

- The distinction between transitive and intransitive objects of science: between concepts, models, etc. and the real entities and relations which make up the natural and the social world.
- A stratification of reality into the domains of the real, the actual and the empirical.
- The conception of causal relations as tendencies, grounded in the interactions of generative mechanisms; these interactions may or may not produce events which in turn may or may not be observed.
- The rejection of both empiricism and conventionalism. The practical expression of this epistemological position is the concept of real definition. Real definitions are statements about the basic nature of some entity or structure.
- The concept of explanation involves the postulation of explanatory mechanisms and the attempt to demonstrate their existence.

Several criticisms have been made, from a realist standpoint, to the positivist and interpretive views of the world. Tsoukas [1989] criticises the positivist perspective of science by arguing that:

If positivistic claims about the natural and social sciences were true, scientific activity would not have been possible because most events in the natural and the social world take place in open systems, in which events do not invariably follow a determined and recurrent patterns; ... instead they are subject to diverse causal variations. Precisely because of the open character of the world, scientists need to engage in experiments in which the conditions for constant conjunctions of events (i.e. closed systems) need to be constructed so that causal laws can be identified. [Tsoukas, 1989: p.552]

The scientist in experimental activities does not produce the causal laws he/she identifies. Instead, the scientist should be seen as an agent of patterns of events, generated under conditions of closure, through which he/she gains access with the aim of identifying causal laws. In the social sciences, the impossibility to construct a closed environment for research leads to the development of theories that should be essentially seen as explanatory by nature and not predictive because, as Tsoukas [1989: p.552] argues, “explanation and prediction are symmetrical only under conditions of closure”.
Unlike positivism, a realist perspective of the social sciences does not assume that we can know the “world out there”. This philosophical perspective is located between the positivist assumption that there is a “world out there” independent of our interpretations and the interpretive view that reality is a mental construction. Realists defend that the “world out there” exists, but it may not be possible to perceive its essence, so the aim of realist research is a search for generative mechanisms instead of predictive theories.

Layder [1993: p.16], approaching the question of how a realist view of social sciences affects the practice of social research and the formulation of a strategy and method, states that “a central feature of realism is its attempt to preserve a scientific attitude towards social analysis at the same time as recognising the importance of actors’ meaning and in some way incorporating them in research”.

In the light of a realist perspective, Whitley states that “there are no epistemological barriers to management research being scientific in the sense of gaining knowledge of invariant causal mechanisms which operate as tendencies in open systems” [Whitley, 1984: p.387]. In management studies, including the information systems management, the objective of the research may be essentially explanatory:

...research goals and orientation may be primarily intellectual and explanatory so that the main concern is to understand and explain managerial practices and activities as part of more general phenomena such as changing patterns of the organisation and control of work in highly differentiated societies. The basic focus here is to provide better explanations of theoretically significant phenomena... [Whitley, 1984: p.372]

3 - Approaches to case study research

3.1 - Positivist approach versus interpretive approach

A research strategy must be selected according to the object of study, research objectives and researcher’s philosophical perspective. According to Hamilton and Ives [1992: p.143], “the key to good research, though, is not just in choosing the right research strategy, but in asking the right questions and picking the most powerful method(s) for answering the questions given the objectives, research setting and other salient factors”.

Compared with surveys, case studies provide a deeper understanding of the research subject. Yin [1994: p.13] argues that a case study is an “empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between the phenomena and the context are not clearly evident”. Traditional positivist research, based on surveys, tends to look at context either “as a set of interfering variables that need controlling, known as noise in the data, or other controlled variables which are experimentally set up in order to seek for cause and effect relationships” [Myers, 1997: p.244].

The validity of case study research in information systems studies is not affected by the argument, pointed out by Pratten [1991], that managers of enterprises with problems tend not to allocate time to participating in survey research. Case studies are not supposed to be a statistically valid sample of the population, and one or two cases may be enough to conduct the research and reach valid conclusion.

According to Yin [1994], how and why questions are more appropriate to the use of case studies. How questions are usually associated with describing relationships (previously identified by answering what questions), while the so-called why questions tend to explain the reasons why those relationships exist [Whetten, 1989; Yin, 1994]. As Yin [1994] stresses, case
studies are appropriate when the nature of the study is to understand a previously unresearched subject.

Surveys using highly structured questionnaires are regarded as easily replicable and reliable but their weakness is a relative lack of naturalism [Gill and Johnson, 1991]. Furthermore, surveys have a specific scope of action. This means that they tend not to be the most suitable research method to provide a deep understanding of the nature of the phenomena under study. As Williams and May [1996] state, to talk about causes and effects without identifying the underlying mechanisms is to elaborate a fiction.

Lacity and Jason [1994: p.152] explain that the two reasons for the discrepancy between interest in and adoption of qualitative approaches may be that “researchers are unfamiliar with qualitative methods and they may mistake “qualitative” research for “nonpositivist” research”. Although, traditionally, case studies have not always been accepted as a research method in the logical positivist tradition, Yin’s [1993, 1994] approach to case study research is a positivist approach. As the author declares: “the approach here has been to base case study research within the framework of the scientific method - to develop hypotheses, collect empirical data, and develop conclusions based on the analysis of such data” [Yin, 1993: p.47]. Case study research may be used to “emulate” positivism, although it does not provide the traditional statistical generalisation that positivists usually look for. Instead, case studies, within the positivist school of thought, provide analytical generalisations:

...case studies, like experiments, are generalisable to theoretical propositions and not to populations or universes. In this sense, the case study, like the experiment does not represent a “sample”, and the investigator’s goal is to expand and generalise theories (analytical generalisation) and not to enumerate frequencies (statistical generalisation). [Yin, 1994: p.10]

Yin [1994] also explains that in analytic generalisation “a previously developed theory is used as a template with which to compare the empirical results of the case study. If two or more case studies are shown to support the same theory, replication may be claimed.” (p.31)

According to Yin [1994], the criteria for judging the quality of case study design is essentially based on four major concepts: construct validity (defining the appropriate operational measures for the concepts being studied); internal validity (establishment of correct relationships between patterns); external validity (possibility of replication and generalisation); and reliability (proper execution of the procedures, so that another researcher would obtain similar results). Triangulation is usually seen as an important mechanism for validating data. Data triangulation is accomplished by analysing if the data obtained from different sources of evidence (for example, interviews, documents or observation) are consistent in pointing in the same direction.

Case studies have also been related to an interpretive perspective of social research. Following a postmodernist Anglo-American perspective, rooted in a constructivist approach to information systems research, some researchers, like Crowe et al. [1996: p.13], accept that “validity should be expressed in terms of usefulness rather than truth”.

Since interpretive research methods start from the philosophical position that our knowledge is a social construction, case studies are designed to understand or explain a specific subject, by capturing the different perspectives and views of the actors involved in the process or context being analysed. Therefore, the use of validating techniques like triangulation must be used in a way different from a positivist approach, because interpretive researchers sustain the view that multiple perspectives of the same facts and events may coexist. These perspectives must be equally represented and “there is no way to establish, beyond contention, the best view” [Stake, 1994: p.108].
Geoff Walsham [1993, 1995] argues that theories which researchers present are interesting to themselves and may, or may not, be interesting to others. The quality of interpretive research, Walsham [1993] explains, is evaluated by the criterion of intersubjectivity:

…the use by an individual author of a particular theoretical approach derives no doubt from his or her personal experience and insight, the testing of the value of these insights to others can be carried out by exposing the approach through verbal and written discourse to enable broader judgements to be made. Theory can be compared evaluated and improved by this form of public testing; the result is not the generation of ‘best’ theory, but the creation of intersubjectively tested theoretical approaches, considered of value to a broader group than a single individual. [Walsham, 1993: p.6]

3.2 – Case studies within a realist perspective

Bhaskar’s [1986, 1989a] theory of critical realism is an interesting philosophical perspective for case study research. Critical realism can be used in the social sciences, in particular in management information systems research, and is capable of solving many of the problems related to representational claims, theoretical focus and explanatory status. As Porter [1993] states, “the aim is not to describe events, but to explain why they occur” (p.591).

Research conducted within a realist perspective of science focuses on understanding the mechanisms and structures that rule social behaviour. The primary problem of realism is how to establish the plausibility of hypothesised structures and mechanisms considering that they are not immediately available to experience [Harré, 1979]. As Blaikie [1993: p.163] explains, “a critical issue for realism is how to arrive at the postulated structures and mechanisms,…, how to derive theories from everyday activities and meanings“. Harré [1976] states that, in realist research, the creative task is to invent a plausible analogue of the mechanism which is really producing the phenomenon.

Bhaskar [1979] suggests a “retroductive” strategy to research that is summarised in Blaikie [1993]:

1. In order to explain observable phenomena, and the regularities that exist between them, scientists must attempt to discover appropriate structures and mechanisms.
2. Since these structures and mechanisms will typically be unavailable to observation, we first construct a model of them, often drawing upon already familiar sources.
3. The model is such that, were it to represent correctly these structures and mechanisms, the phenomena would then be causally explained.
4. We then proceed to test the model as a hypothetical description of actually existing entities and their relations.
5. If these tests are successful, this gives good reason to believe in the existence of these structures and mechanisms.
6. It may be possible to obtain more direct confirmation of these existential claims by the development and use of suitable instruments.
7. The whole process of model-building may then be repeated, in order to explain the structures and mechanisms already discovered.

Harré [1976] argues that a significant difference between the natural and the social sciences is that, in the natural sciences, scientists create models based on the existing world, while in the
social sciences, social actors create the world based on models that represent their individual perceptions. The social scientist creates models as a surrogate for generative mechanisms.

Layder [1993] proposes a new strategy for social research, based on a realist perspective of social enquiry. Layder’s work has been frequently pointed out as the most comprehensive approach to social research within the realism perspective. The research strategy, presented by Layder, is developed by discussing and criticising two well-established approaches: Merton’s middle-range theory [Merton, 1968] and grounded theory [Glaser and Strauss, 1967; further developed in Strauss and Corbin, 1990].

The research strategy proposed by Layder [1993] includes the following key features:

1. An initial focus on the research topic using a research map (presented in figure 1);
2. The use of a multistrategy research;
3. The development of structural typologies;
4. An examination of the dimensions: power, commitment and constraint.
5. An historical analysis.

The central purpose of the research map is to help in the formulation of initial ideas about social research with the primary aim of generating theory. The map intends to present the different levels and dimensions of social reality: the self, situated activity, setting, context and history (see figure 1). It enables the researcher to approach the problem of the links between the different levels of social reality. Moreover, the research map allows the researcher to be sensitive to different units and time scales that are involved in social processes.

<table>
<thead>
<tr>
<th>CONTEXT</th>
<th>Macro social organisation. Values, traditions, forms of social and economic organisation and power relations. (ex: class, gender, ethnic relations)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SETTING</td>
<td>Intermediate social organisation Intermediate environment of social activity (ex: factory, schools, …)</td>
</tr>
<tr>
<td>HISTORY</td>
<td>Social activity. Face-to-face activity involving symbolic communications by skilled, intentional participants implicated in the above contexts and settings. Focus on emergent meanings, understandings and definitions of the situation as these affect and are affected by context and settings (above) and subjective dispositions of individuals (below).</td>
</tr>
<tr>
<td>SITUATED ACTIVITY</td>
<td>Self-identity and individuals social experience. As these are influenced by the above sectors and as they interact with the unique psychobiography of the individual. (ex: focus on life-career).</td>
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<td>SELF</td>
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answer the research questions; the availability and accessibility of data; and the resources at the researcher disposal (such as, time, equipment, etc.).

In realist research both qualitative and quantitative data can be used [Layder, 1993; Mingers, 1997a and 1997b]. The multistrategy approach, proposed by Layder, encourages the use of quantitative data in order to complement the core of qualitative analysis. Methodological and analytical cuts into data are suggested in order to prepare the researcher to respond to hidden aspects and problems of the research. Furthermore, these cuts increase the possibility of producing grounded theory, which is considered by Layder [1993] as methodologically robust.

The development of structural typologies, which concentrate on the nature of the settings and context of activity, are assumed by Layder as important means of generating theoretical and empirical descriptions of social phenomena. A similar viewpoint is found in Doty and Glick [1994], who see typologies as a unique form of theory building. These academics criticise the way typologies are traditionally viewed - as classification systems rather than theories. Instead, they argue that "typologies are complex theories that are frequently misinterpreted" (p.231). According to Doty and Glick [1994], a theory is usually perceived as “a series of logical arguments that specifies a set of relationships among concepts, constructs, or variables” (p.232). Thus, to fit this definition, a good typological theory should: make explicit theoretical assertions; completely define the set of ideal types; provide a complete description of each ideal type using the same set of dimensions; state the assumptions about theoretical importance of each construct used to describe the ideal types; and be tested with conceptual and analytical models that are consistent with the theory.

Layder [1993] argues that a realist approach to fieldwork should try to find aspects of power in the data. Moreover, he stresses that some forms of power and domination lie very much “behind the scenes” of the every day activities and interpersonal behaviour. Hence, the researcher must understand how these forms of power operate and how they may influence relationships and organisational behaviour. In a similar way, the notion of commitment also reflects the dual nature of social activity. An historical analysis is considered important in social research. The historical dimension can give an indication of organisational development and how this development is likely to affect the interpersonal relations and justify the present situation.

4. Conclusion

In Portugal, case studies are not a frequently adopted research strategy in the field of information systems. Furthermore, most case studies are usually based on the Positivist paradigm or are purely narrative. In this paper, the basic concepts of Critical Realism are analysed and a research approach, developed by Layder based on the Realist paradigm, is presented and discussed.

Critical Realist is becoming more popular amongst the academic community and seen as an interesting philosophical perspective to conduct case study research in the social sciences, including the field of information systems, which has a strong social component. However, there is a need for more research methods that fit a Realist perspective of social enquiry and research projects following this approach. This paper discusses the basic concept of Critical Realism and encourage further research in the field of information systems to use critical realism as a philosophical perspective.
References


