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Epistemological Perspectives on Multi-Methodological Electronic Government Research

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ABSTRACT

Conducting eGovernment research, multi-national and multi-disciplinary collaboration becomes more and more important. Researchers from different (national) research communities and/or academic disciplines often use different research methods for approaching a certain research question. The resulting paradigmatic and methodological pluralism can be seen as one of the core issues of eGovernment research management, because in this case, studying the same phenomenon of interest – electronic Government – does not necessarily mean that mutual understanding prevails. Especially within this multi-national and multi-disciplinary context, the epistemological assumptions made by different researchers may vary fundamentally. But these assumptions have a great impact on the validity, the reliability and also the “quality” of research results. The extensive publication of epistemological assumptions is thus, in effect, almost mandatory. While eGovernment researchers from different (national) research communities and different academic disciplines often address distinct epistemological aspects appearing most relevant in their discourse context, the aim of this paper is to structure and systematize the epistemological discussion by providing an epistemological framework. The framework comprises four epistemological questions and selected answers to these questions most relevant in the context of IS and eGovernment research. As a conclusion, the consequences of epistemological assumptions for future eGovernment research will be discussed.

PLURALISM IN eGOVERNMENT RESEARCH

Electronic Government (eGovernment) has been a motor for modernizing public administrations for more than a decade. It draws on and provides nexus for many different research fields, academic disciplines, (national) research communities, and research approaches. Therefore, many distinct definitions of the term eGovernment exist, each very much depending on the researcher’s personal background and (indirectly) on the discourse history of the discipline the researcher is involved in (cp. for example Marchionini et al. 2003; Omura 2000). Coming from the Information Systems (IS) field, we here define eGovernment in very general terms as “development, implementation and usage of information systems in governmental institutions, especially in public administrations”. But eGovernment is not only topic in IS discipline. Different academic disciplines, such as organizational theory, political science, sociology, informatics, information systems etc., contribute to the discussion (cp. for example Coe et al. 2001; Yang 2003). The internationalization of research is conspicuous and in nearly all (national) research communities eGovernment research is conducted (cp. for example Schedler 2003; Wong 2003).

As a consequence, conducting eGovernment research, multi-national and multi-disciplinary collaboration becomes more and more important. Different (national) research communities and different academic disciplines contributing to eGovernment (research) are often shaped by certain research paradigms and a set of certain research methods and methodologies. Thus, the situation in eGovernment research that has developed can be described as a “methodological pluralism” (Mingers

2001). The wide spectrum comprises heterogeneous approaches which differ very substantially in their basic – especially epistemological – foundations and assumptions. These assumptions have a great impact on the validity, the reliability and also the “quality” of research results. The discussion of research rigor thus also has to consider epistemological issues. Therefore, the theoretical epistemological analysis of research methods applied in eGovernment – especially in the move of multi-methodological approaches – has great relevance for research practice. In this respect, however, the discussion of epistemological assumptions of research methods is, in effect, almost mandatory. Nevertheless, the lack of epistemological foundation of research methods is apparent and extensively discussed (in IS discipline cp. for example Hirschheim et al. 1995; Keen 1980; Mingers 2001). Thus, working together in multi-disciplinary and multi-national eGovernment research projects does not necessarily mean that mutual understanding prevails. The difference of (often non-explicated) epistemological assumptions becomes significant taking into account the distinct research cultures in different disciplines and/or research communities contributing to eGovernment research. Therefore, the main research question within is this paper is:

- What are the main theoretical – especially epistemological – issues that have to be considered in the context of planning, conducting, and evaluating multi-methodological eGovernment research?

Partitioning the research question, core issues are:

- Are multi-methodological eGovernment research approaches and projects desirable? (Section 2)
- What are theoretical issues that have to be considered conducting multi-methodological eGovernment research? (Section 3)
- How can theoretical-epistemological aspects be structured and systematized in order to provide the basis for feasible eGovernment research guidelines? (Section 3)

The paper will conclude with a summary of arguments and findings and will discuss possible ways of future research on epistemological perspectives on multi-methodological eGovernment research.

MULTI-METHODOLOGICAL eGOVERNMENT RESEARCH

According to Mingers (2001), we assume that all (eGovernment) research situations are seen as inherently complex and multidimensional, and would thus benefit from a wide range of research methods. Two basic arguments can be found to advocate methodological pluralism: a) different methods provide a different view on a certain phenomenon of interest and b) research (process) takes places in different phases which show substantially distinct characteristics requiring the application of different research methods.

“*Phenomenal*” argument. Different research methods focus attention on different aspects of the situation, and so multi-methodological research is necessary to deal the full richness of a certain problem

situation. Applying a particular research method “is like viewing the world through a particular instrument such as a telescope, an X-ray machine, or an electron microscope. Each reveals certain aspects, but each is blind to others. Although they may be pointing at the same place, each instrument produces different, and sometimes seemingly incompatible, representation” (Mingers 2001).

Processual argument. Research is not static, but rather a process comprising several phases which require different types of activities. In the recent literature, four phases are primarily discussed (Bhaskar 1979; Mingers 2001).

1. Appreciation deals with the initial conceptualization of the phenomenon of interest and with choosing and applying methods to collect data.
2. Analysis of the data collected.
3. Assessment and interpretation of the results/explanations provided by the analysis.
4. Action is undertaken in order to disseminate the research results and to bring a change to the problem situation analyzed, which is highly important conducting eGovernment research.

Though this phase schema is very much coined by a behavioural science approach (Hevner et al. 2004), it becomes clear that each phase necessitates distinct methods in order to meet the given requirements. In eGovernment research we not only have to take into account organizational, technical, and social systems, but also the political system. Hence, eGovernment can be understood as a complex and multidimensional phenomenon of interest. Its analysis therefore requires diverse research methods and methodologies.

EPISTEMOLOGICAL REFERENCE FRAMEWORK

Diverse academic disciplines as well as diverse (national) research communities contribute to eGovernment research. Different disciplines and different research communities are regularly coined by different research paradigms, they often use different research methods, methodologies and approaches, and furthermore they rely in many cases on different basic assumptions. E.g., Anglo-American research has been shaped more by a positivist paradigm while European research is more influenced by interpretivism (Chen et al. 2004). Such paradigmatic and methodological differences can also be found analyzing the different academic disciplines contributing to the field of eGovernment. To find a more general term which comprises these distinguishing aspects, we can assume that different disciplines and different research communities provide different *research cultures*. Drawing upon the theory of culture which was strongly coined by Edgar Schein (cp. for example Schein 1992), three levels of culture can be differentiated: the level of artefacts and symbols, the level of norms and values, and the level of basic assumptions.

These levels are distinguished by the degree of visibility to an observer. Applying this schema on research culture, we can classify the terms most relevant in the discussion of multi-methodological research: research methods, research paradigms, and epistemological assumptions. Research methods, methodologies, as well as research results (level of artefacts and symbols) are the most visible part of (eGovernment) research. In most cases these entities have to be interpreted, e.g., data,

results, language, etc. Research paradigms on the other hand (level of norms and values) are visible in some parts, for example (in IS research) when certain paradigms are questioned because they seem not to take into account significant influencing factors. The growing belief in subjectivity as a main influencing factor on IS research, for example, led to the broad discussion of positivism and interpretivism over the last years. Nevertheless, paradigms are mostly unconscious and not explicated in every research approach or by everyone conducting research. On the third level, the level of basic assumptions, we find entities that underlie those discussed above. Epistemological assumptions which shape research paradigms as well as research methods can be found here. They are mostly invisible and in most cases unconscious to the researcher (see figure 1).

Epistemological assumptions are those about the nature of human cognition. Epistemology can be understood as the science of analyzing the way human beings (eGovernment researchers in this case) grasp knowledge about what is (perceived to be) existing (Burrell et al. 1979; Niehaves 2004). It addresses the question of how a person can come to true cognition. Epistemological assumptions have a great impact on a) the research method selection and b) on the validity, the reliability and also the “quality” of research results. If one neglects, for example, the validity of inductive conclusions (see below, figure 2), he will restrict himself basically from empirical research methods in form of statistical analysis (ad a). If one emphasizes the influence of the subject during the research process (see below, figure 2), research results achieved by another researcher claiming that objective cognition would be possible, have little validity (ad b). Therefore, firstly, the epistemological analysis of research methods applied in eGovernment – especially in the move of multi-methodological approaches – has great relevance for research practice. Secondly, the epistemological assumptions of certain research methods which are about to be combined within a multi-methodological approach have to be a) epistemologically compared and b) aligned against the background of the epistemological position of the subject(s) conducting the research.

But the discussion of epistemological questions must, at least presently, be considered as an open issue. No theory based on a philosophy of science can be considered as binding on researchers. The individual selection, however, necessitates that the fundamental epistemological assumptions are made explicit. Here, basic and central epistemological questions must be differentiated from one another and will be presented in the following in form of an epistemological framework. The basic concept of this framework is the explicit breakdown of epistemological questions, which reveal especially high relevance in information systems and eGovernment research (see figure 2).¹ Based on an extensive literature review in the field of a) IS research (international journals, books, and major conference proceedings), b) eGovernment research, and c) philosophy of science, questions were formulated which address the epistemological foundation of current research paradigms (e.g., interpretivism and positivism) (Weber 2004), research approaches (e.g., qualitative and quantitative research) as well as research methods (e.g., empirical-statistical research or conceptual modelling) (Niehaves et al. 2004).

While the questions [I] to [III] are explicitly addressed and characterized within the framework (see figure 2 and also the references given for each epistemological approach), in the course of this paper, we are going to analyze in detail the aspect of truth/concept of truth:²

Ad [IV]: What is True Cognition? (concept of truth)

A central topic of epistemology is the question as to how humans can achieve “true” cognition. Expressed more intuitively, that means how far “correct” knowledge can be obtained and how the “correctness” of knowledge has to be verified.

- a. *Theory of correspondence of truth.* According to the theory of correspondence, truth causes a *correspondence* in terms of an *analogy* or *equivalence* between two relata. The first relatum of a two-digit relation are *statements*. The capacity for truth determines the characteristic of statements. By correlating statements

Figure 1. Distinct Level of (research) Culture

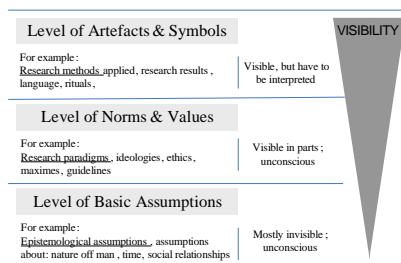


Figure 2. Epistemological Framework

[I] What is the object of cognition? (Ontological aspect)	<i>(Ontological) realism.</i> A world exists independently of human cognition, i. e. independent of thought and speech processes [cp. e.g. Bunge (1977)].	<i>(Ontological) idealism.</i> The „world“ is a construct depending on human consciousness [cp. e.g. von Foerster (1996)].
[II] What is the relationship between cognition and the object of cognition?	<i>Epistemological realism.</i> objective cognition of an independent reality is possible . It claims the possibility of eliminating subject-dependent distortions of the cognition of reality, as soon as suitable measures for the removal of appropriate intervening variables are found [cp. e.g. Loose (1972)].	<i>Constructivism.</i> Cognition in is subjective, i. e. „private“. The relationship of cognition and the object of cognition is thus determined clearly by the identifiable subject [cp. e.g. Glaserfeld (1986, 1987), Lorenzen (1987), Wyssusek and Schwartz (2003)].
[III] By what means can cognition be achieved? (Methodological aspect)	<i>Inductivism.</i> Induction is understood as the extension from individual cases to universal phrases, the generalization. An inductive conclusion means the transfer from statements via (observed, empirical) individual cases to a universal law a statement on the basis of an assumption of homogeneity on nature [cp. e.g. Rott (1995), Seiffert (1996)].	<i>Deductivism.</i> Deduction is seen as the derivation of a statement (thesis A) from other statements (hypothesis A ₁ , ..., A _n) with the help of logical conclusions . It is the derivation of the individual from the universal and is applied, for example, in mathematical axiom systems [cp. e.g. Gehmann (1995)].
[IV] What is true cognition? (Concept of truth)	<i>Correspondence theory of truth.</i> True statements are those which correspond with „real world facts“ [see below].	<i>Consensus theory of truth.</i> A statement is true (for a group), if and only if, it is acceptable for the group [see below].
		<i>Semantic theory of truth.</i> A requirement for true statements is the differentiation of an object and a meta language [see below].

and facts, the former can be classified as true or false. Facts thus represent the second relatum in the context of the correspondence view and act as *truth inducers* for statements, because of their assumed status as objective (Baumann 2002).

In the context of this construct, mainly the terms correspondence and fact, pose problems (Kirkham 1992; Schmitt 1994). If the term correspondence is understood as *analogy* or *equivalence* in terms of a *correct reproduction*, this is ultimately nothing other than rephrasing of truth, the explanation of which should have been object of the investigation. The solution to this problem can be found in the operationalization of the term correspondence from Wittgenstein, designated as *image theory* (cp. (Wittgenstein 2001). Image theory links the correspondence to two conditions:

- i. The elements of a statement represent appropriate, corresponding, elements of a fact (*semantic condition*).
- ii. The elements of a statement are arranged between each other as the elements of a fact (*condition of structural consistency*).

This deconstruction of the correspondence term, presents another problem: the likewise unclear term *structural identity*, cannot be perfectly and accurately defined. Thus, image theory creates the dilemma, that it either requires the term *truth* to be clarified or that it is substituted with the less clear term *structural identity* (Baumann 2002).

- b. *Consensus theory of truth.* The consensus theory of truth is a social variant of the epistemic truth concept. In its elemental form, truth results from the consensus of everyone (Habermas 1973):
 - i. A statement is true if, and only if, it is rationally acceptable for everyone under ideal and optimal conditions.

A variant of this thought can be, for example, that the range of truth is reduced. No longer is everyone then required for the consensus on the truth or falseness of a statement, only a group of a certain size. With this understanding, statements about truth are thus always to be understood relative to a group. The reference to rationality could also be dropped. To what extent the group now accepts the statements and what the sources of cognition are (from which the acceptance of the statement arises) remains intentionally open. A concept of the consensus theory of truth, altered to this effect, might be:

- ii. A statement is true (for a group), if and only if, it is acceptable under ideal and optimal conditions for the group.

This concept of truth implies that nothing exists or proves to be relevant in the context of a test of truth, which would not be apparent to the community/group doing the perceiving. Within the search for consensus and truth, the existence of facts and things which are independent from

Figure 3. Tarski's Semantic Concept of Truth

(T) „s“ is a true sentence of the object language L, if it applies: p

	Statement	Language
Object-level	s: the statement of the object language, whose validity has to be proven	L: object-language, which expresses the statement, whose validity has to be proven (e.g. ERM, eEPC)
Meta-level	p: translation of the object language based statement „s“ into the meta language M	M: meta-language, which contains predicates of truth regarding object-language based statements (e.g. English, German)

thought and speech of the subject striving for cognition, are not necessary conditions.

- b. *Tarski's concept of truth.* Tarski's so-called *semantic theory of truth* suggests an alternative comprehension of truth and is greatly discussed in the literature. This theory achieves clarity and precision of argumentation by using the compact instrument of modern semantics. Regarding the following remarks on the semantic theory of truth, see (Tarski 1944) as well as (Baumann 2002; Schmitt 1995). Thus, truth (T) is determined in terms of Tarski's semantic concept as follows (see figure 3).

Thus, the differentiation between object language and meta language is significant. Basically, the object language and meta language must be different from one another, so that a self-referentiality of a certain language is avoided. In fact, a language can contain predicates of truth, their application area, though, has to be limited to other languages. Reason for this is the so-called logical paradoxon, e. g., "I always lie [tell untruths]." The self-reference makes it logically impossible that the statement would be true. [If he would always lie, the statement couldn't be true. If he would tell the truth, the statement would be a lie.] Furthermore, it becomes clear that truth always refers to a language, the object language, and thus can only be understood as relative linguistic truth.

Tarski does not define the term truth. With his semantic theory of truth he rather expresses a condition for appropriateness, which represents the necessary requirement of a definition of the term truth (Baumann 2002). He transfers the predicate of truth to the meta language and thus relocates the problem of comprehension of truth into the linguistic area. This limits the scope of application of the theory considerably on the one hand, but on the other hand, the problem of reference to facts or other objects outside the language, does not apply.

The presented set of questions (see again figure 2) suggests a basis for the epistemological discussion of IS and eGovernment research methods, paradigms, and approaches. It offers the chance to support a comprehensive comparison of particular assumptions made which are mostly invisible and unconscious. Where appropriate, this list of questions should be extended to further issues (e. g., linguistic aspects).

CONCLUSIONS AND FUTURE RESEARCH

eGovernment research is conducted in many diverse research fields and academic disciplines. Also many (national) research communities conduct eGovernment research. Multi-disciplinarity and multi-nationality of eGovernment research shape the situation of methodological pluralism. In the move of joint eGovernment research, the combinability of different research methods is very much depending on their epistemological assumptions. The epistemological framework presented can be used to structurize and systematize the epistemological discussion.

In the move of future research, the consequences of epistemology for eGovernment research management have to be further pointed out. This could be in the form of research guidelines (cp. for example Hevner et al. 2004) which specifically take into account epistemological issues, including: What are the consequences for epistemology for a. research

rigor? b. research evaluation? c. research design? and so forth. Additionally, the framework presented in this paper should be applied to certain multi-methodological electronic government research approaches. As first step, it is intended to analyze a certain number of eGovernment research publications in high-quality journals. Here, it seems to be fruitful analyzing research approaches that are using a) different methodologies from different disciplines, b) different methodologies coined by different research communities, and c) diverse methodologies taken from different disciplines as well as different research communities. Furthermore, the epistemological framework presented has to be applied for explicating the assumptions of different eGovernment research or research evaluation methods, for example the Bunge-Wand-Weber ontology (cp. for example Shanks et al. 2003) for evaluation conceptual modelling methods, (social) simulation methods within eGovernment, or interviewing and observation methods in the context of (governmental) organization design. Here, singular research methods are taken as "modules" whose epistemological assumptions are analyzed independently from actual multi-methodological research approaches. By doing so, this general analysis would provide help for answering future questions of combinability of research methodologies in the move of eGovernment research.

REFERENCES

- Baumann, P. *Erkenntnistheorie* Metzler, Stuttgart/Weimar, 2002.
- Bhaskar, R. *The Possibility of Naturalism*, Hemel Hempstead, U.K., 1979.
- Burrell, G., and Morgan, G. *Sociological Paradigms and Organizational Analysis*, London, UK, 1979.
- Chen, W., and Hirschheim, R. "A paradigmatic and methodological examination of information systems research from 1991 to 2001," *Information Systems Journal* (14:3) 2004, pp 197-235.
- Coe, A., Paquet, G., and Roy, J. "E-governance and smart communities - A social learning challenge," *Social Science Computer Review* (19:1), Spr 2001, pp 80-93.
- Habermas, J. "Wahrheitstheorien," in: *Wirklichkeit und Reflexion. Walter Schulz zum 60. Geburtstag*, H. Fahrenbach (ed.), Pfullingen, 1973, pp. 211-265.
- Hevner, A.R., March, T.S., Park, J., and Sudha, R. "Design Science in Information Systems Research," *MIS Quarterly* (28:1) 2004, pp 75-105.
- Hirschheim, R., Klein, H., and Lyytinen, K. *Information Systems Development and Data Modeling: Conceptual and Philosophical Foundations*. Cambridge University Press, Cambridge/MA, 1995.
- Keen, P.G.W. "MIS Research: Reference Disciplines and a Cumulative Tradition," in: *Proceedings of the First International Conference on Information Systems*, Philadelphia/PA, 1980, pp. 9-18.
- Kirkham, R.L. *Theories of Truth. A Critical Introduction* Cambridge University Press, Cambridge/MA, 1992.
- Marchionini, G., Samet, H., and Brandt, L. "Digital government," *Communications of the Acm* (46:1), Jan 2003, pp 24-27.
- Mingers, J. "Combining IS research methods: towards a pluralist methodology," *Information Systems Research* (12/2001/3) 2001, pp 240-259.
- Niehaves, B., Dreiling, A., Ribbert, M., and Holten, R. "Conceptual Modeling - An Epistemological Foundation," American Conference on Information Systems AMCIS 2004, New York, U.S.A., 2004.
- Omura, H. "Information technology (IT) for e-Government," *Fujitsu Scientific & Technical Journal* (36:2) 2000, pp 232-235.
- Schedler, K. "Local and regional public management reforms in Switzerland," *Public Administration* (81:2) 2003, pp 325-344.
- Schein, E.H. *Organizational Culture and Leadership. A Dynamic View*, (2nd ed.) Jossey-Bass Publishers, San Francisco/CA, U.S.A., 1992.
- Schmitt, F.F. *Socializing Epistemology. The Social Dimension of Knowledge*, Lanham/MD, 1994.
- Tarski, A. "The Semantic Concept of Truth and the foundation of semantics," *Philosophy and Phenomenological Research* (4/1944) 1944, pp 341-375.
- Walsham, G. "Interpretive Case Studies in IS Research: Nature and Method," *European Journal of Information Systems* (4) 1995, pp 74-81.
- Weber, R. "The Rhetoric of Positivism Versus Interpretivism," *MIS Quarterly* (28:1) 2004, pp iii-xii.
- Wittgenstein, L. *Tractatus Logico Philosophicus* Routledge, London, 2001.
- Wong, P.K. "Global and national factors affecting e-commerce diffusion in Singapore," *Information Society* (19:1), Jan-Mar 2003, pp 19-32.
- Yang, K.F. "Neoinstitutionalism and e-government - Beyond Jane Fountain," *Social Science Computer Review* (21:4), Win 2003, pp 432-442.

ENDNOTES

- ¹ An attempt is in fact made to address the largest possible spectrum of research methods of IS research with the given central questions. However, there can be no claim of completeness. Certain questions might be added or even omitted, for example those depending on the individual assessment of the researcher or issues dependent on particular research methods. Furthermore, many questions should not be answered independent of each other. Interdependencies can be identified, though, on the basis of global arguments and can thus taken into account by the specifically positioned researcher. For this reason, however, the commonly prevailing reduction to two contrary positions, which represent both ends of the epistemological continuum, is not directed at the appropriate objectives. It is only possible to achieve the objective of the framework and to create a basis for the inter-subjective and inter-paradigmatic comparison of research methods and results, if the researcher is able to use a differentiated basic positioning.
- ² The question [I] about the existence of a "real" world as well as the question [II] about the relationship of the cognition and the object of cognition have been intensively discussed within the IS literature [cp. e.g. Walsham (1995), Weber (2004)]. But especially the question [IV] about the concept of truth has not yet been widely discussed in the IS and eGovernment research literature. Nevertheless, this aspect becomes highly important discussing a) the influence of language on research, b) expert-oriented research, c) conceptual modelling and modelling in general (especially Tarski's semantic theory of truth), d) interpersonal validity/truth of research results, etc.

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