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Quo vadis: Scandinavian Information Systems Development Research?

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Abstract

The paper attempts to direct its readers' attention to information systems development research in Scandinavia in the future. It does so not by trying to make any forecast, but by indicating reflections to make and questions to ask when we in our actions as researcher shape the future of Scandinavian information systems development research.

Keywords: composite entities, dialectics, domain of observation, existential themes, external properties, hermeneutics, internal properties, knowledge interests, logical-empiricism, observer, research traditions, schools of meta-science, simple entities.

Introduction

The comprehensive overview "Research on Information Systems Development in Scandinavia—Unity in Plurality" by Iivari and Lyytinen ends looking towards its future.

In this brief essay I intend to direct the readers attention to this future. This may seem to go far into a land where Angels fear to tread.[2] I neither can nor intend to embark upon such an impossible mission. I only intend to suggest some reflections to make and some questions to ask, while we[3] undertake information systems development research in Scandinavia tomorrow and the day after tomorrow.

The essay will first focus on the existence of several research traditions and how these delimit questions, which can be asked within a tradition and possible answer that can be given. Two sets of schools of meta-science, Logical Empiricism and Hermeneutics-Dialectics, become contrasted. Some fundamental dif-

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ferences between these schools then will be presented and discussed. Then choosing methods for information systems development research will be treated. In that context I will point out that the dividing line between the two research traditions does not go between the methods of inquiry developed within each of them. It goes instead between those studies in which no objects of study are human beings and those in which also human beings are studied. Still, when it comes to methods on inquiry I will argue that the two schools can be looked upon as complementary. Such an outlook I presume will support constructive dialogues between different research groups in the field. Next I will touch upon some other means to support such dialogues. Finally, I will give a brief summary and some conclusions.

Research traditions and research questions

Questions asked in research depend upon the research tradition in which the researchers raising them work. As told in Iivari & Lyytinen's paper Scandinavian information systems development research (ISDR) appears to have followed many different research traditions. As summarised in their abstract Scandinavian researchers in the field "... seek varying and innovative theoretical foundations for IS and ISD, and apply dominantly anti-positivistic and action oriented research approaches." By connecting to many different theoretical foundations the fundamental distinctions between two dominant research traditions get out of sight.

Why study information systems development (ISD)? Of course, in order to gain more knowledge about a phenomenon called "ISD". For whom to undertake ISDR? That question does not make sense! Knowledge represents an approximate description of the reality studied as long as researchers arrive at it and validate it by accepted methods of research. As such it takes on the same truth-value for everybody. Theory and practice have to remain strictly separated. In practice people and their different values and interests may enter but not in the realm of theories and knowledge. In my discussions of the two questions above I have adhered to the canons of meta-science of Logical Empiricism (LE) as presented by Radnitzky (1970). Also the answer to the first question I have framed within the language of LE traditions. What do I intend to illustrate by the questions and the answer? I try to show that questions, which a researcher can raise at all, and answers to "researchable questions" depend upon the research tradition a researcher chooses to work within.

As researchers, we might want to discuss research interests by raising question on for whom we undertake research or do not want strictly to separate theory and practice. If so, we should choose some school of meta-science subsumed under the label of Hermeneutic-Dialectic (HD) traditions according to Radnitzky (1970). Within these schools belong Habermas' (1978) distinctions between different research interests, which many Scandinavian researchers have drawn upon in their work. Radnitzky presents Habermas' knowledge interests and supplements them with two more as shown in table 1.[4]

TABLE 1. Table 1. Knowledge interests according to Habermas and Radnitzky.

Knowledge interests	*Medium for survival*	*Research approach*	*Types of knowledge*
(Habermas)			
Technical	Work	naturalistic	information
Mediating tradition(s)	Language	hermeneutic	interpretation
Emancipatory	Steering and control	critical	criticism
(added by Radnitzky)			
Improving the world-picture	Shared prenotions in communities of researchers	metaphorical interpretation of scientific theories	philosophical cosmologies and anthropologies
Improving the reflection upon existential themes	Style of life in the private sphere	contemplating and discussing riddles of life	ideas of Death, God, History, Number, Chance, etc.

The ideas from Radnitzky I have fetched from a section addressing scientific enterprises (research programs) at the level of the anthropology of knowledge. The limited size of this paper only allows a few comments on the contents of table 1.

Researchers in the field of ISD may reflect upon why Radnitzky (1970) has chosen the term "information" for the type of knowledge connected with technical research interests.

About the naturalistic approach Radnitzky (1970, Vol. II, p. 9) states: "The naturalistic approach is concerned with the study of objective or objectifiable processes. Thus it corresponds to the cluster of disciplines constituted by the natural sciences and the "quasi-naturalistic" turns ... of human science ... Presupposed is the distinction between two kinds of entities: those with which we cannot in principle communicate and those with which we can. ..."[5]

In a note (ibid., Vol. II, p. 9) Radnitzky points out that applying only natural science methods to all disciplines entails the ideal of "replacing the observer by measuring instruments". This does not mean that "measuring instruments" never have any place in human and cultural sciences. However, if researchers use measuring in these sciences, they must broaden the domain of observation to include design, calibration, validation and use of the instruments.

Radnitzky stresses that the aspect of language in mediating traditions largely lies in its capacity to provide a key to the world. In this context researchers must not reduce the function of language only to a means of communication (ibid., p. 7).

The former of the two research interests added by Radnitzky (1970) emanates from the necessity to have "some global prenotions ..., without which one could not even start with any research tasks nor conceive of any question!" (Ibid., Vol. II, p. 12) The questions we ask in a research task or an investigation depend upon our prenotions, even if these many times remain implicit. At least when I have tried to answer a ques-

tion for a long time without success, it might give me new ideas to try to make my prenotions conscious and reflect upon starting from different ones.

The second added research interest has to do with a necessity of some reflection on our style of life as human beings. About the possible consequences of not including this last knowledge interest Radnitzky (1970, Vol. II, p. 13) writes: "... If we ignore this we risk loosing sight of all the contemplative aspects of intellectual activity in favor of action-orientation only. Reflection on existential themes may not be necessary for survival (hence Habermas is justified to disregard them)—but it will certainly reflect upon such a theme even as the value of survival ...; and it may provide motivation both on the level of the individual and that of tradition, much as religion, which is akin to it or involved in it, may sometimes be the opiate of the people but sometimes their benzedrine. ..."

As Radnitzky points out: "Self-reflection, as a hermeneutic task, falls outside any non-hermeneutic tradition. Hence a logical empiricist cannot within the boundaries of his tradition reflect upon the underlying research-guiding interests of any inquiry. ..." (Ibid.,vol. II. p. 10) This means questions based on the contents of table 1 and the discussions of them a researcher cannot even raise within a LE tradition. At least to me, as a researcher, this gives a good reason to reflect upon which research tradition to follow before embarking upon a research program. As a bases for such a choice I need to understand some more fundamental differences between the LE and HD traditions. The next section will cover this issue.

Fundamental differences between the research traditions of LE and HD

Many researchers in the field of ISDR have started in a research tradition of LE. They need, metaphorically, to cross the rubicon to arrive at a meta-scientific school of HD. Apel (1980, chapter 5, pp. 141-147) has given three fundamental reasons for researchers in the social sciences, where man takes the role of both subject and object of study, to cross the rubicon:

1. "First of all, there already exists a fundamental distinction in the identification of the objects of science at the level of so-called description. This distinction is based on the question as to whether the so-called 'data' can be made 'available' through repeatable experiments as instances of possible explanations by means of laws—or can at least be subsumed under class concepts—or whether they should be treated as spatio-temporally individualized elements of the totality of an irreversible historical process that is itself mediated through these elements. ..."

The two different ways of description open two completely different concepts of experience. Only the first mentioned way of description opens a horizon for contingent 'laws' or inductive corroboration according to the 'logic of science'. The second opens a horizon for an experience including not only inductive corroboration or falsification. More importantly it opens a horizon for qualitative revisions of its conceptual presuppositions by means of self-reflection.

2. "Even 'more doubtful' than this implication of our step over the rubicon of the modern logic of science for the theory of experience is the associated transcendence of the concept of value-free science that Max Weber also made obligatory for the social sciences. The recognition of what Weber termed 'purposive rational understanding' as a "good reason essay" which, as such, cannot be reduced to a causal, motivational explanation already necessitates a critical evaluation of human behaviour, even if the latter remains confined to the normative standard of instrumental rationality and seeks to understand the goals in question without evaluating them. ..."

System theories of societies, which understand their objects functionally, also presuppose instrumental rationality. Moreover, they not only presuppose a positive evaluation of functional efficiency. They also do so for system formation and adaptation in the form of self-preservation and self-improvement. Such an absolutisation of the value of system formation contradicts a presupposition of all sciences that Apel (1980) has given good reasons for. The realisation of truth depends a priori on the realisation of the unlimited communication community within a historically given society. It takes place in a society organised in limited functional systems to secure its physical self-preservation. This introduces a contradiction between the implicit evaluation on the part of a functionalistic systems theory and its own truth-claim. A critical social science, which perceives its object at the same time as a potential subject of science, cannot abandon the goals of human actions that remain still to become evaluated.

3. "The necessity for evaluation in the critical social sciences outlined above indicates the final and most radical consequence that is implicit in the theory of science's recognition of society as the subject and object of science: namely, the distinction between theory and practice. The apparently similar distinction that was established by Kant with reference to the foundation of natural science in the form of the distinction between theoretical and practical reason cannot be maintained as the foundation for the critical social sciences.

Even the purely theoretical character of the causal explanatory natural sciences can only be asserted in a way that is free of ideology if ... one reflects upon the fact that value-free theory formation in natural science is a priori framed in such a way that it is, ..., the precondition for the possibility of the technological utilization of its results. This a priori interlocking of interests itself ... is valid a fortiori with reference to the social-technological function of the so-called empirical-analytical social sciences. That this is the case, is manifested in the mostly quite naively formulated demand that the perfection of scientific progress in modern industrial society must lie in the extension of man's natural scientific control over nature through the social-scientific control of man over man. ..."

The last demand is not merely and obviously of practical relevance. It is, as a practical, relevant demand, deeply ambiguous. If the separation of the subject

and object of science has also to be maintained in the social sciences, this could only signify that society must be split up into those who are controlled and those who control.

As researchers we should ask ourselves who in our current societies controls whom within the field of developing and using "IT support". Dividing lines between those who control and those who become controlled may be found also in other cases than between managers and workers. To what extent do producers of IT hardware and software and their salesmen control consumers of these products? What features built into IT artefacts, or not maid available in them, contribute to or counteract control of IT product consumers by producers? To what extent do IT protagonists perceive and respect the unlearning and learning they generate for IT product consumers? Will serious producers perceive research programs focused on emancipating IT product consumers as a valuable challenge and be prepared to support them financially?

The set of questions suggested I have framed in the spirit of HD research traditions. This section has made some fundamental differences between LE and HD traditions of research apparent. The reader may have got the impression that I suggest ISD researchers should entirely make use of research methods developed within HD traditions. Such a research strategy would mean a simplification, which, I presume, would turn out as not very fruitful. A more adequate position with respect to choice of research methods I will discuss in the next section.

Choosing methods for ISD research

In some studies there exist no objects with which the researchers can in principle communicate. In other studies at least some objects exist with which the researchers can communicate. Here the concept of 'communication' comprises more than exchange of data. Both parties to this kind of communication must potentially have autonomy in their interpretation of data they capture and context for interpretation they relate them to. One way to characterise this kind of autonomous partner to a conversation I fetch from Aulin (1982). Such a conversation partner correspond to what Aulin (1982, pp. 57-65) describes as a self-steering system existing in an expanding state space, i.e. a space in which the set of "realised states" will expand all the time. A self-steering system cannot be manipulated from outside, and it creates its own goals, which might be multiple, on many levels, and even contradictory. Men, groups of men, and human societies have the capacity to act as self-steering systems. The formal definition given by Aulin (1982), however, does not exclude artefacts from the set of self-steering systems.

There goes a dividing line between research delimited to domains without any self-steering systems and domains comprising at least some such systems. In the former research questions framed in traditions of LE in most cases will be relevant. Different methods of measurement, experimentation and descriptions from traditions within LE will offer methodological support. These kinds of methods researchers often subsume under the headings of hard or quantitative

methods. The research interest in this case will be a technical interest. In order to support this interest regularities are looked for and explained.

In the latter case a number of questions should be raised, which only can be framed within traditions of HD. In order to answer them, of course, a number of research methods developed within traditions of HD will be used. These kinds of methods researchers often subsume under the headings of soft or qualitative methods. These methods have their rules of how to validate findings. In the case of applying hermeneutic methods Radnitzky (1970, Vol. II, pp. 26-30) presents some canons of hermeneutic technique. As researchers in the field of ISD we have an additional way to check our interpretations of what people say and do. As we normally work with people, who still live, we can check by asking them. The research interests addressed in these studies mostly will belong to the categories of mediating traditions, emancipatory, and improving the world-picture. With these research interests in focus we, as researchers, rather will try to understand what happens in the domains we study and why than produce law-like explanations.

Radnitzky (1970, Vol. II, pp. 41-68) drawing upon Apel (1967) points out the fact that as we, as human beings, are not fully transparent to ourselves and each other. Hence HD methods alone will not suffice in investigations aiming at mediating traditions, emancipating people or groups of people and improving the world-picture. They have to become supplemented with "quasi-naturalistic" turns. In these "...the hermeneutic dialogue is temporarily ... interrupted in favor of naturalistic methods of inquiry—a temporary distantiation ... and objectification." Even if in these quasi-naturalistic turns methods developed in LE traditions become used the research interest guiding the study remains in focus. What insights a quasi-naturalistic turn may give the researcher he or she translates into the language of the people in the field and brings back into the dialogue with them.

So, when working on questions framed in a HD tradition methodologically the researchers will have to tack between HD and quasi-naturalistic turns in their inquiries. ISD research—as any kind or research—in order to ground its validity and to develop has to be undertaken in communities of researchers. Its findings have to be discussed and critically scrutinised both within and between such communities. These communities should also comprise communities of researchers from other disciplines.[5]

As a consequence this need of critical debates entails a need for applying methods from HD traditions also by those researchers, who in their domains of inquiry can restrict themselves only to work with methods from LE traditions.[6] The methods from the two traditions most fruitfully can be looked upon as complementary. Independently of within which of the two traditions an ISD researcher works some knowledge of the other tradition, its methods and history will be helpful for constructive exchange of ideas with researchers outside of his own peer group.

In the next section I will discuss some other means potentially useful in improving a broad critical and constructive debate of information systems development and use.[7]

■

Means to support critical and constructive dialogues on ISDR

The field of ISDR fights with considerable conceptual and terminological difficulties. Scandinavian researchers often take a broad look at information systems, including organisational and societal issues. To these difficulties comes the fact that they as clearly shown in the paper by Iivari and Lyytinen in their work draw upon many different theories. Partly research proceeds by introducing new distinctions, and thereby new concepts needing names. This means there neither could nor should exist a final solution to this problem.

However, this should not be taken as an excuse from trying to approach a use of concepts and terms in a way facilitating a broad dialogue on ISDR.[8] For a number of years a number of members of IFIP WG 8.1 have worked on "A Framework of Information Systems Concepts" (Falkenberg *et al.* 1998). Two members of this group are Scandinavian researchers. In order to improve communication between different ISD research groups a study of their conceptual/ terminological framework could be helpful. Using it when adequate and relating to it in cases, which warrant other concepts/terms might prove worthwhile.

Theorising within the traditions of LE entails an ideal of formulating broad generalisations. ISD and the usefulness of ISDMs often strongly depend on local contexts. Concepts used in ISDR contrary to this seem to refer to broad and at least implicitly homogeneous classes. As examples take the concepts of 'information system', 'knowledge', and 'user'. It might turn out as more fruitful to look upon such concepts as referring to rather heterogeneous classes, which in many cases better could become studied as a set of subclasses. In the case of the concept of 'number' 'integers', 'real numbers', and 'imaginary numbers' have been distinguished as belonging to different subclasses from the beginning of computerisation.

A distinction made long ago by Börje Langefors was to distinguish between external and internal properties of composite entities (Langefors, 1993, pp. 35-53). For the study and description of a composite entity as a simple entity in its environment only its external properties are relevant. For the study and description of how a composite entity is composed by elements and the way these are interconnected only these and their ways of interrelation are relevant. Seen from the latter perspective the external properties of the composite entity can be called emergent properties. The domain of a composite entity as a simple one in an environment and the domain of the elements composing it by their interconnections do not intersect. Any connections between these belong to conclusions drawn by observers, who are able to observe both domains and reflect about their relations. (Cf. Maturana, 1988.)

Take the case of an application program when executed intended to support some activity in an enterprise. The designers in their design task focus on its internal properties. They will also observe its future environment both with respect to its IT infrastructure, in the form of hardware and systems software, and with respect to its organisational and human environment in the enterprise. They will, in their minds, try to relate these different domains with the intention to design a program with emergent,

external properties that fulfil the expectations of their customers without negative side effects. Still, there exists no guarantee that the effects of using the program will turn out as intended by the designers. This follows from the statement above of non-overlapping between the domain of composing a program from a number of elements and the domain(s) in which the program exhibits its emergent, external properties. What external properties finally will emerge has to be observed using the implemented program in its operating environment.

This will not surprise any practitioners in the field of ISD. Still, recurrent hopes appear that new methods of ISD and suitable CASE tools would enable us to circumvent this fundamental point. This occurs in spite of the theory published in Langefors (1966) and a more general theory applicable to all kinds of research in Maturana (1988). These indicate that some of the practical difficulties encountered in ISD cannot be eliminated only by improved software design. To many researchers in the field of ISD this will not come as a surprise. Still, even these researchers may find some value in a theoretical grounding of what they may have arrived at on other grounds.

> "Would you tell me, please, which way I ought to go from here?"
>
> "That depends a good deal on where you want to get to," said the Cat.
>
> "I don't much care where ----" said Alice.
>
> "Then it doesn't matter which way you go," said the Cat.
>
> "--- so long as I get somewhere," Alice added as an explanation.
>
> "Oh, you're sure to do that," said the Cat, "if you only walk long enough."
>
> From Alice in Wonderland by Lewis Carroll.
> First published in 1863.

Summary and Conclusions

Which reflections and questions might help Scandinavian ISD researchers to do a good job in the next ten years? The paper has indicated some partial and tentative answers to this question.

The first section on research traditions and research questions can stimulate reflection on the need of a critical attitude to the way in which research questions in ISD are framed. Firstly, a consciousness of the existence of several research traditions is needed. For researchers, who have been trained in some of the LE traditions, this will be far from self-evident. Secondly, the close connection between a research tradition and the questions, which can be asked and answered within it, should be kept in mind. Thirdly and closely connected to the second point, questions related to which knowledge interest to support by a research program should be raised and answered. Fourthly, the section shows two broad research traditions to which the theoretical approaches of Scandinavian ISD research could fruitfully be related. As both of them have long historical roots there exists a good chance they will turn out as applicable also to a number of new theoretical approaches, which might appear on the horizon of future Scandinavian ISD research. A familiarity with these two traditions may help to place both earlier and new approaches into a broader historical perspective than

so far has been the case when importing a new theory into the field.

The second section draws a line of distinction between the traditions of LE and HD. This is intended to help in discriminating between domains of inquiry in which research programs can be framed predominantly in one of the traditions. What, in the first section, was written about different research interests is important here, too.

In the third section I have tried to resolve, what sometimes seems to be a misunderstanding among researchers, who recently have "converted" from a LE tradition to one of HD. Some of these converts seem so afraid of falling back into their earlier tradition that they think they have to avoid all methods developed in LE. This mainly means to avoid any kind of measurement and use of quantitative methods. The section argues that while research question and research interest should decide which tradition to work within tools of inquiry could be used irrespective of in which tradition they originally have been developed. When it comes to tools of inquiry the two research traditions can be seen as complementary. This insight will equip researchers, whether working in a LE or a HD tradition, with a broader set of tools of inquiry. This means they will have a broader set of intellectual resources at disposal for their research tasks.

All research becomes undertaken in communities of investigators. ISD research findings should become critically debated within and between communities of researchers and of other people potentially affected by them. Some means to support such debates I have discussed in the last section.

One of the means I have distinguished is to put more effort into conceptual and terminological clarification. In the field of ISD this amounts to a big task where much remains to be done. As innovated research entails the creation of new important distinctions and naming them this task will never be finished. However, this should not be taken as an excuse for every research group to choose its concepts and terms with little regard for the corresponding choices of other groups. Here it might pay to take advantage of serious work done over a number of years by a group of researchers, who have proposed a framework of information systems concepts and given good reasons for their choices. (Falkenberg *et al.* 1998). The availability of this material in machine-readable form enhances its usefulness. Even researchers, who have reasons to work with some other concepts and terms, would facilitate constructive critical debates by relating them to this framework.

ISD and ISDMs often exhibit strong dependence on local contexts. This contrasts to the broad character of many concepts, which purport to cover large, homogeneous classes of phenomena. Here it might prove worthwhile to make the heterogeneity of phenomena explicit by introducing subclasses. This opens for better delimiting and describing the applicability of particular research findings.

This last section finally takes up an important distinction for all composite entities. All IT artefacts belong to this category. The distinction, introduced in Langefors (1966), distinguishes between external and internal properties of composite entities. The external properties emerge from the properties of the ele-

ments of a composite entity and the way they compose it. The external properties can only be studied by observing a composite entity as a simple entity in its environment. In the domain where they are studied the elements and their properties and interrelations are irrelevant. In the domain in which the elements of a composite entity can be studied its emergent external properties do not even exist.

Maturana (1988) has introduced a distinction, valid for research in general, equivalent to that between external and internal properties introduced by Langefors, but on different grounds. Two conclusions can be drawn from this. Firstly, the fundamental difficulty, of no intersection between the domain of observation of design of an artefact from its components and the domain in which its emergent properties can be observed, cannot be eliminated only by improved software design. Secondly, the intellectual tool of clear distinctions between observers and their domains of observation can avoid wrong conclusions created by projecting relations established by researchers, who are able to observe several disjoint domains, into one or the other of these domains. Such relations do not operate in the domains observed but belong to the cognitive domain of explanations constructed by these observers. (Cf. Maturana, 1988.)

To the extent some of the reflections and questions in this paper will reorient the research work undertaken in the future by Scandinavian ISD researchers it has not been written and studied in vain. If this materialises can only be decided in the future and by others.

Notes

[1]The expression I have borrowed from a book by Gregory Bateson and Mary Catherine Bateson (1987).

[2]By "we" I here refer to members of different Scandinavian information systems development researchers.

[3]These two latter research interests also belong to HD traditions.

[4]The concept of 'quasi-naturalistic' turns in human sciences will become explicated in the section on "Choosing methods for ISD research" below.

[5]These critical dialogues also should comprise all people interested in our research findings and their applications.

[6]Apel (1967) has discussed what physicists do as compared with the methodological prescriptions they give for research in physics. He points out the fact that when physicists establish what kind of experiment best would help them to discriminate between two competing hypotheses they de facto used hermeneutic methods.

[7]Over the lifetime of an information system I perceive that reflecting on its use constitutes an integral and not separable part of its development.

[8]I cannot pretend I have done as much as I could myself to follow this suggestion.

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