

# **Towards Rethinking the Nature of ‘Soft’ Information Systems Development**

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## **Abstract**

*The development of a ‘Soft’ approach to information systems development that is based upon interpretive social theory is a key development within the information systems discipline. In this paper a leading contribution to this stream of research is subjected to a process of critical interpretive inquiry. The strengths and weaknesses of the current position are identified and these are used as the basis for a new and radical research agenda for the area.*

## **Keywords**

Systems Theory, Soft Systems, IS development, Philosophy of IS

## **INTRODUCTION**

Information, information system, and information system development are concepts that form the very foundation of the Information Systems discipline. Any serious effort to evaluate and develop these concepts further is therefore itself worthy of serious consideration and critical analysis. The aim of this paper is to contribute to the debate concerning IS concepts initiated by the recent work of Checkland & Holwell (1998). In particular the focus of this paper is to develop a critical analysis of the concept of Information Systems development that Checkland & Holwell argue emerges from taking a constructivist view of organisations. Their proposal is based upon taking a Soft Systems perspective and therefore it represents a contemporary view of the situation surrounding the application of SSM to IS development. The position of this paper is that the development of the use of interpretive social theory to underpin information systems activity is an interesting and important area of the IS discipline. Further, it is assumed that the work of Checkland & Holwell provides a statement of the leading-edge position of contemporary research in this area. Finally it is thought important to try to organise a firmly directed research program that builds upon prior work. The contribution of this paper is therefore to provide an assessment of the strengths and weaknesses of Checkland & Holwell’s position and to generate a research agenda based upon a critical analysis of their ideas.

Checkland & Holwell neither describe IS development nor investigate the practical issues and problems surrounding such activity. Rather they present a normative concept of IS development that they claim is based upon Soft Systems as a body of knowledge. As such it is difficult to directly evaluate the concept. Therefore the route to evaluation adopted in this paper is itself innovative in that it adopts an interpretive perspective and views the concept as a basis for creating interaction with a context. The concept of IS development is regarded as an element

within an inquiring system where the emphasis is upon exploring the meaning of the concept in relation to situations or contexts that seem relevant to that understanding. In the language of SSM the conceptual model is being compared with an expression of the problem situation in order to generate a deeper appreciation of both. The results of the analysis are fourfold. First, a realisation that the Checkland & Holwell concept of IS development is extremely limited in application. Second, that it does not reflect some of the contemporary developments in Soft Systems thinking. Third, that much of the limitation stems from making an initial assumption that IS cannot be separated from IT, and fourth, that an interesting and challenging research agenda can be recognised because of the very limitations that are seen to emerge.

The paper begins by providing an overview of Checkland & Holwell's research contribution before turning to a critical analysis of their concept of IS development. A brief discussion and justification of the analysis approach is provided prior to a presentation of the analysis results. Finally the implications of the results for future research directions are addressed. Thus the paper contributes a new approach to critical interpretive analysis, a critical evaluation of Checkland & Holwell's concept of IS development, and a discussion of new possibilities for a program of research into information systems from an interpretive social science perspective.

## **IS DEVELOPMENT AND THE INTERPRETIVE PERSPECTIVE**

The contribution of Checkland & Holwell (1998) brings together three streams of thinking. First, they strongly advocate the use of interpretive social theory as a basis for understanding and developing IS activity. This is quite a radical position given the dominance of the rational functionalist model of organisations in the IS discipline. Second, they provide a contemporary authoritative account of Soft Systems Methodology (SSM). This is important in that not only is SSM an approach that has strong recognition in the IS discipline, it is also a practical approach to problem-solving activity based in an interpretive model of social reality. Third, they set out from a position that the IS discipline is intellectually confused and operating with out-of-date thinking about the nature of management and organisations, and aim to “*initiate conceptual cleansing in the IS field,*” (pg. xii). Their work is therefore both a critical analysis of the IS discipline as an intellectual field and a promotion of interpretive social science as a foundation for future development of the field.

It is not the purpose of this paper to review the whole of Checkland & Holwell's contribution but rather to focus upon one aspect of it, and that is their concept of Information Systems Development (ISD). Based upon soft systems thinking and grounded in the experiences that support the emergence of soft systems methodology the authors develop and advocate an interpretive concept of IS development. It is therefore the most advanced, and most practical, statement of the interpretive-based SSM approach to IS activity available within the authors' work. It can also be taken to be the current orthodoxy within the SSM-focused research program. As such it represents a statement of current thinking, of what has been achieved, but also a position that is a starting point for future intellectual development.

Checkland & Holwell (1998) summarise their concept of ISD as follows;

### *1. “Assumptions*

- *Information is selected data (capta) to which meaning is attributed in a context.*

- *IS serve people taking purposeful (intentional) action, commonly in organizations; attention must first focus on the people and the action.*
  - *Organizations are complex and may be thought about in many ways, eg. instrumentally, or culturally.*
  - *This area can be conceptualised using soft systems thinking.”*
1. *“Core Concept*
    - *IT-based IS can be thought of as capta-processing systems which serve people taking action”.*
  2. *“Principles relevant to an IS Development process*
    - *Start by exploring, with the people concerned, the action which is to be supported.*
    - *Express that purposeful action.*
    - *Hence explore, with the people concerned, the information they feel they need to carry out the action and monitor and control it.*
    - *Then explore how IT could provide the required capta-processing and select and design a method.”*

Checkland & Holwell (1998 pg. 117).

The importance of this concept is that if someone was contemplating using an interpretive, and particularly an SSM-based, approach to tackling an IS problem then it is this concept of ISD to which they would turn. It is a set of principles that could be used to structure and guide a real project, and is essentially the authors’ most practical contribution. It should however be noted that the concept itself is not new. The basic shape of the established ‘Soft Systems’ approach towards Information Systems was set in Checkland’s (1981) original discussion of the development of SSM. Wilson (1984) described an SSM-based ‘Information Systems Methodology’, and SSM has also formed a basis for the development of the Multiview methodology (Avison & Wood-Harper 1990). It would appear therefore that the ISD concept has had a considerable impact already, but arose alongside SSM rather than arising from the application of SSM.

The problem with the concept of ISD proposed by Checkland & Holwell is that it is like a lifeless full stop. It provides no progress or dynamic, it is just a set of statements. The discussion of the concept is not set within the context of the problems of ISD practice, nor is empirical evidence of the value of the approach presented. It is rather a theoretical development based upon espoused principles but seemingly unrelated to practice. The issue that arises is how to evaluate this ISD concept. It is not a descriptive account of IS development but is rather a set of principles coupled with some normative statements. At the same time in the sense that it is a conceptualisation of ISD it relates to other models of ISD therefore entering the discourse about ISD that forms part of the IS discipline. Further it is purported to be based within the interpretive view of organisations, and to the praxis of SSM, and therefore should relate to those contexts.

It is the aim of this paper to develop the critical debate that can provide the impetus for further development in this area, and to identify ways of breaking out of the intellectual impasse provided by Checkland & Holwell. The next section will outline the approach taken to developing a critical analysis of this area.

## ANALYTICAL APPROACH

Checkland & Holwell develop and present a model of IS development, yet it is quite clear that this model is not descriptive but normative. It is not a *model of* ISD in the sense that it could map onto or describe some real-world ISD activity. It is rather a *model that is relevant to* ISD. It is a set of principles that could be used to structure, evaluate, or inquire about some real-world ISD activity. It is a model intended to support interpretation rather than representation.

If a model is intended to represent something then the quality of the model can be assessed by a direct comparison between model and that which it represents. However within the interpretive perspective the criteria is the usefulness of the model in creating insight, debate, and learning rather than in its validity as description. An interpretive model can only be assessed as an element within a process of inquiry and within a particular episode of inquiry.

A concept of the process of interpretive inquiry is shown in fig. 1 below. It involves the purposeful bringing together of interpretive model(s) and contextual domain(s) into a process of engagement in order to generate insights into both the model and the domain of inquiry. The formation of the purposeful inquiry not only provides an initial choice of models and domains but also creates implied relationships between the two. These relationships provide a context within which the insights generated through engagement can be made meaningful. A basic structure of these relationships is given by the concepts of Expectation, Desirability, and Importance (EDI) (Ledington & Ledington 1997, 1999a, 1999b). Expectation, indicates the kind of meaningful relationship between domain and model that is expected by the inquiring system. Desirability, indicates whether the model is seen to represent a desirable or undesirable state of affairs. Finally Importance, is the understanding of why certain elements are given prominence within a model rather than others. In practice, as engagement proceeds, and understanding of EDI elements involved can emerge. In other words the inquiring process can learn about its implicit taken-for-granted ideas, as well as about a particular area of interest or the utility of a particular model.

For example, in this current inquiry it would be expected that meaningful relationships would be generated between the 'ISD concept' and other concepts of ISD, between the concept and SSM/interpretive social science, and between the concept and possible application situations. The model clearly represents a desirable model in relation to practice in that it suggests what ought to happen, but is also desirable philosophically given the argument that interpretive social science is a preferred model of organisations. Therefore an inquiry can proceed that focuses on trying to understand the different emphasis (Importance) given to various things by different approaches. In the next section the results of enacting this inquiring process will be presented.

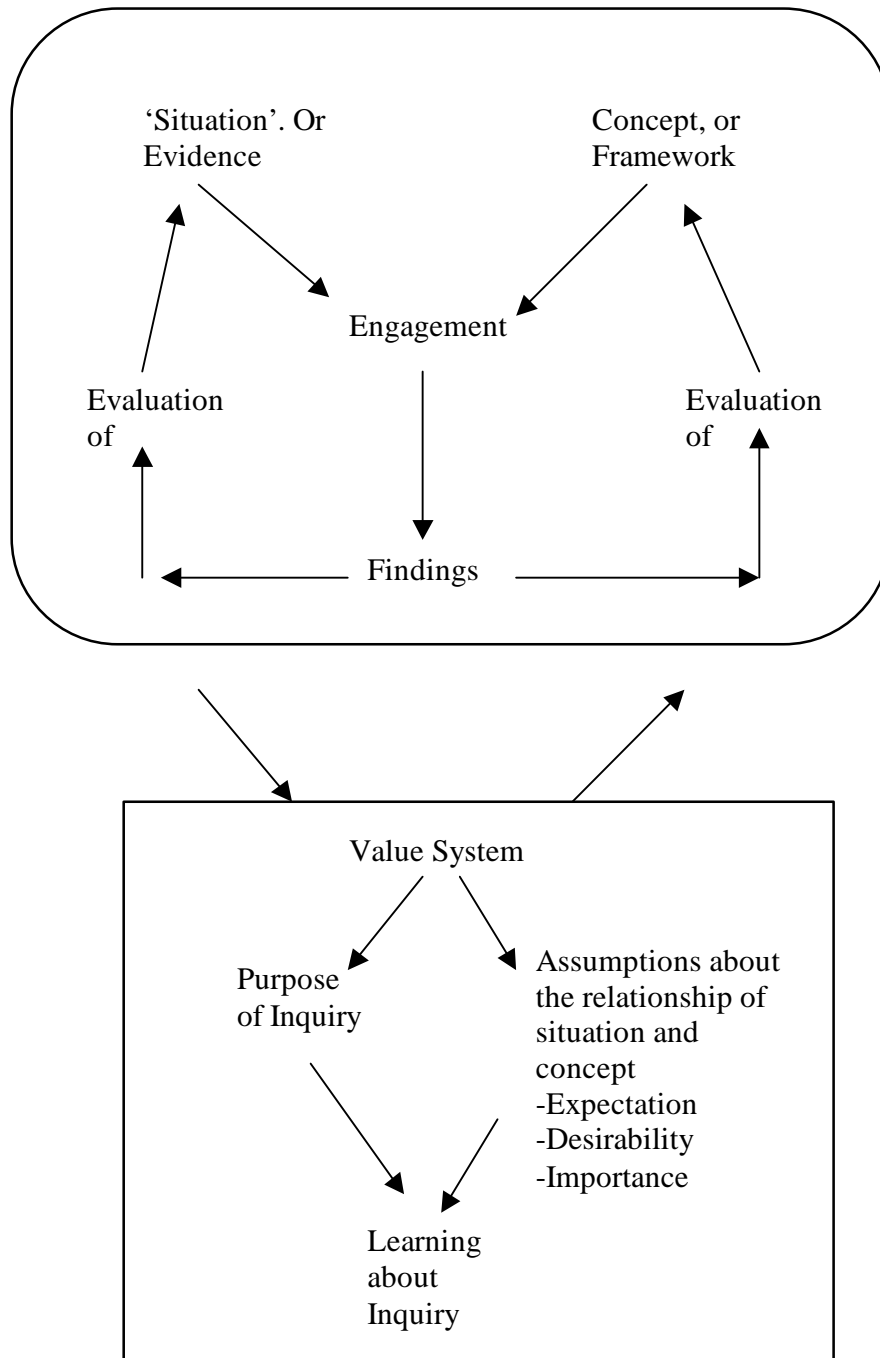


Figure 1: The structure of Interpretive Inquiry

## ANALYSIS

This section summarises briefly the results of operating the inquiry process with respect to Checkland & Holwell's concept of IS development.

### **Engagement with conventional ISD ideas.**

- The outcome of the approach is an operational IT system and in this respect the concept is comparable with many other approaches that are based around the conventional information systems lifecycle.
- The concept is very sparse and limited compared with conventional approaches and is clearly at a level of principle rather than method or technique. It avoids many of the issues of design, development, implementation, and project management that dominate other views of ISD.
- The primary focus of the concept is to identify 'relevant' data that is to be captured and processed by the information system. This is the only problem that is addressed. The design of the IS and the application of IT is taken to be unproblematic. In conventional terms the concept maps to the requirements determination phase of the ISD lifecycle. It would therefore perhaps be better to view the Checkland & Holwell concept as a set of principles for requirements determination rather than as a complete IS development concept.
- What make the two approaches distinctive are fundamental assumptions. The conventional approach assumes that the requirement is either given or relatively easy to identify and that the central problems of ISD arise in trying to design and realise a system to meet the requirements. By contrast the Checkland & Holwell position is to assume that the problem is defining the requirement in the first place.
- The definition of the requirement is taken to be problematic and it is assumed that the definition can be achieved by applying Soft Systems Methodology. This approach assumes a focus upon the core activities that make up the organisation in question.

The conclusion can be drawn that there is no fundamental difference between the ssm-based concept of ISD and the conventional concept of ISD. The difference only lies in the assumption about the requirement and in the approach to arriving at the requirement. It is perhaps preferable to view the SSM-based approach as being limited to a requirement definition approach rather than a full-scale ISD. The implicit assumption of Checkland & Holwell is that the success or failure of IS development depends solely upon the quality of the requirement. This position seems somewhat at odds with the experience of the IS community where ISD is regarded as a much more complex process.

### **Engagement with the IS discipline.**

1. Checkland & Holwell begin their analysis of the IS field by assuming that its "... *core concern is taken to be the orderly provision of information in (and between) organizations using IT,...*" (pg. 62) and go on to focus their ISD concept around IT-based IS. To a great extent this position flies against the view of an IS discipline that has been struggling for many years to dissociate the concept of Information System from that of Information Technology, and move away from a view of ISD based solely on producing IT-based solutions. It is somewhat of a paradox that Checkland & Holwell spend considerable time discussing the notion of information and meaning attribution. They even create a "Processes for Organizational Meanings" (POM) model to try to make sense of information in relation to human activity, yet limit their concept of an information system to an IT-based data processing system. On one hand they ignore the debates within the IS discipline and provide a

retrograde concept of IS development, and on the other provide a fresh contribution to ideas about organisational information processes.

2. Some within the IS discipline (see for example Hirschheim, Klein, and Lyttinen (1995)) have characterised SSM as an alternative approach to IS development. Yet it has been argued above that although SSM might be used as an alternative requirements engineering approach the SSM-based concept of ISD discussed here is not apparently an alternative to the conventional approach. Clearly researchers in the IS discipline are viewing SSM in a very different light to that of one of its main protagonists. This is quite an unexpected disparity and one that points towards other possible ways of applying 'Soft' concepts to information systems issues.

There is a considerable gap between the IS discipline and the views of Checkland & Holwell both in terms of the concept of an Information System itself and in terms of the way in which 'Soft' ideas are seen as related to IS development. The work of Checkland & Holwell seems confused in offering innovative theory on one hand coupled to what seems to be a very limited and perhaps out-moded view of IS development on the other.

### **Engagement with the practical situation.**

The SSM-based approach to IS requirements development is couched in normative terms and therefore it is possible to consider the assumptions about a practical situation in which the concept might be used to inform practice. The assumptions underlying the concept are;

- That a prior decision (policy) to create an IT-based information system is in place.
- That a formal IS development process to produce such an IS has been initiated.
- That the 'Requirement' has been recognized as problematic.
- That an interpretive view of management and organizations is operative, and that a human activity system approach to problem-solving is understood and valued.

Under these circumstances the SSM-based approach to requirements determination would be adopted and enacted. The approach also assumes that "*the people concerned*" are readily identifiable, and willing and able to participate in the process. That the "*action to be supported*" is readily expressible and that there are no conflicts inherent in the situation that mean that agreement on the action cannot be reached. Further, that information is readily identifiable in the context of action and again that there are no insurmountable conflicts. In short the concept assumes that the need for an IT-based IS has already been recognised and evaluated, and that the situation is relatively homogenous. Finally, it must also be assumed that someone is able to recognise when a complete and valid 'requirement' has been established, because it is this that terminates the activity and initiates the rest of the IS development process.

Although the approach starts with the idea of treating the situation as problematic it also implicitly assumes that the situation is not inherently uncertain or involves strong differences of view. Essentially it assumes a stable mature situation that is readily expressible in the form of an agreed activity model. The approach therefore seems far more appropriate to the monitoring and control IS of a well-established core operational area rather than the inherent uncertainty and

multiple viewpoints of a strategic policy-making activity. Once again the approach of the authors seems to be somewhat limited.

### **Engagement with the “Soft” approach.**

Given the background of the authors concerned and the association of the ISD concept with both a presentation of SSM and a discussion of the interpretive view of organizations then it seems reasonable to assume that the ISD concept reflects these concerns. In the sense that the approach boils down to assuming that the requirement is a problem and employing SSM to address the problem then it seems that the ‘Soft’ provenance of the approach is easily established. However on a closer inspection some concerns do begin to emerge.

Soft Systems Methodology spearheaded the enlargement of the notion of the systems approach to problem-solving and helped to establish and cement the distinction between the ‘Hard’ and ‘Soft’ approaches (Checkland 1981). This distinction can be made plain in the following way. The classical ‘Hard’ approach to problem-solving (or rational action) assumed that in any situation there was one operative value system (normally of the client) that could define a coherent set of goals to be achieved. Further that the situation contained independent phenomena, or ‘Systems’. These systems could be modified through specific actions in order to achieve desired outcomes and hence to meet defined goals. Given a ‘problem’ of how to achieve specific goals then the approach to solving the problem was to identify the system(s) involved, understand how they worked, and to identify and evaluate ways of changing the system(s) that would achieve the goals stated. The major approach to support such problem-solving activity is to create a *model of* the ‘System’ and use the model to investigate the behaviour of the ‘System’ under the influence of specific intervention actions. Solutions are generated, evaluated, and the ‘best’ is implemented.

The ‘Soft’ approach by contrast recognises the intrinsic human element to all problem situations, that there will always be many value systems possible and operative, and that humans create complex patterns of ‘meaningful’ action – meaningful in terms of a particular viewpoint. A ‘problem’ thus arises when the inability to take effective action is encountered by someone. In such circumstances problem-solving involves creating and sustaining a complex learning process in which the understanding and meaning of action is renegotiated. One way of supporting this problem-solving process is to generate *models-relevant-to* and use them to engage people in learning about action. It became recognised in the development of the ‘Soft’ approach that human action could only be conceptualised from a particular perspective, and these models were termed models-relevant-to rather than models-of. It should also be apparent that it becomes inappropriate to talk of ‘Systems’ ‘independent’ of the observer. A particular model might express a ‘Systems’ view of something, but this is different to saying that the ‘thing’ is a ‘system’.

It is here that concerns with the Checkland & Holwell concept begin to take shape.

- They use the term Information System to denote a tangible real-world thing; as they take it as embodied in operational IT. This harks back to some extent to the ‘Hard’ approach. Strictly within a ‘Soft’ approach the term Information System would only be applied to an ideal concept



that was used to help structure thinking, debate, and action within a situation. It would not be applied to some real-world phenomenon.

- There is not the clear discrimination between model and situation that 'Soft' inquiry requires. They generate a model and a set of principles but there is no discussion of how this model relates to a real situation. It is very easy to slip into regarding the model as being representative. There is a strong sense in which the model is used to describe rather than as a basis for generating discussion and action in a situation. It is unclear as to the intention of the authors and therefore the extent to which the ISD concept can be seen as based upon a 'Soft' rather than a 'Hard' perspective is unclear. Checkland & Scholes (1990) point out that the constitutive rules of SSM require that "*careful distinction is made between unreflecting involvement in the everyday world and conscious systems thinking about the world*" (pg 287). It is this careful distinction between real-world activity that can be thought as IS development and a systems-based account of an ideal concept of ISD that is intended to facilitate inquiry about the real situation that is so strangely missing in Checkland & Holwell's account of ISD.

Far from offering a new and insightful account of ISD that is firmly rooted in the 'Soft' paradigm Checkland & Holwell provide something that is at least ambiguous and ill-founded.

## DISCUSSION

The process of interpretive inquiry has been carried through in a limited way. There are other areas that could be engaged with. For example, a more detailed engagement with the 'Hard' approach might be interesting as would a more detailed analysis of how the authors' ideas relate to contemporary views within the IS discipline. However the analysis is terminated at this point because it has led to a deeper challenge. The results are not as anticipated and it is in the recognition of this that the inquiry becomes revealing. The purpose of the inquiry was ostensibly to evaluate the ideas proposed by Checkland & Holwell yet it has become more apparent that the concern is to understand the position of contemporary work on applying interpretive social theory to IS activity. In this situation the work of Checkland & Holwell was expected to reflect a cutting-edge statement of developments in this area. It was taken as important because of its provenance with the SSM stream of research, and was initially considered to represent a desirable model of ideas in this area. The analysis however fundamentally challenges these assumptions.

First, it is not clear that the ISD concept proposed is rooted in explicit interpretive social theory. A limited and rather mechanical view of IS is adopted, and it is restricted to viewing IS as technology. There is little regard for information as an active component of organisational sense-making. Further the concept does not seem to reflect the current developments of thinking in this area of the IS community. It has to be concluded that the proposed ISD concept is limited, rather old-fashioned in its view of information and IT, and is out-moded in relation to current theoretical developments in the area.

The Importance of the ideas is also challenged. The ideas originate in the early days of the SSM program (Checkland 1981, Checkland & Scholes 1990, Wilson 1984) and in fact seem to pre-date the emergence of SSM itself. Further, the ideas do not seem to have been challenged or developed in the 20 years since they were first presented. Yet it is very clear that there have

been immense changes in IS thinking and in the nature of technology in that time. Therefore based upon this analysis it is difficult to maintain that the concept is a desirable view of ISD. In fact given its limitations there is a strong sense in which it is a reactionary model and one which could even be regarded as undesirable if ones interest is in the development of interpretive approaches to IS activity.

Finally one of the disappointments of the Checkland & Holwell work is its isolation from an active research perspective. It does not recognise problems with IS development, place the use of the 'Soft' approach into such a context and evaluate the strengths and weaknesses of the approach. Although the authors start with the view of the IS discipline as a learning process they do not attempt to place their own work within the context of development. The use of interpretive social theory is simply taken to be more appropriate without relating it to problems and progress. Their ideas are simply stated as completed ideas and in many cases lack any supporting evidence. The authors tend to present theoretical ideas as if they describe real things even though they often point out that these are concepts for learning.

In the next section the findings of this inquiry process will be used to generate an agenda of research directions based around this critical evaluation of Checkland & Holwell's work.

## **A RESEARCH AGENDA**

Although the analysis to this point has revealed a concept that is perhaps not as advanced as initially thought it has provided a set of insights that can form a research agenda for advancing the understanding of interpretive approaches to IS activity. The following are the major areas identified in the analysis.

1. The account of the ISD concept provided lacks the careful distinction between model and situation demanded of interpretive work and needs to be re-conceptualised as an element within an interpretive learning process similar to the process that has been demonstrated in this paper. The concept could usefully be developed through being used and evaluated within an action research process.
2. One of the main drawbacks with the concept has been identified as its restriction of the idea of an IS to being an IT-based application. The concept could usefully be re-thought by adopting the concepts used in the IS discipline that separate the two ideas. Further the concept of information used as a basis for the concept is an arbitrary choice. It would be a useful development to explore other concepts of information.
3. The concept implicitly takes an IS to be a real-world object. The 'Soft' approach would also give legitimacy to viewing the notion of an information system as a concept to be used within a process of 'situation' development based on the use of that concept. These are 'Soft' versions of the notion of IS and ISD which differ substantially from the conventional definitions of these ideas. Although Checkland & Holwell present a concept of ISD it is much closer to a *model of* than a *model relevant to* and therefore reflects a 'Hard' perspective more strongly than a 'Soft' one.

4. Central to the development of the ISD concept, and repeated as a main theme throughout the book, is the idea that information systems support activity. The basis for this assertion is never examined. Clearly if the prime concern is the decision (perhaps generalised to being an activity) then an IS does support this. However this equates to the “Outdated” goal-oriented view of organisations. The interpretive view places sense-making as the central concern and hence information processing becomes primary. It is conjectured that from an interpretive perspective action can be regarded as supporting information systems – which is the opposite of the concept promoted by Checkland & Holwell. In practice both perspectives are likely to be useful. The implications of these changes need to be examined critically.
5. Given the interpretive emphasis on sense-making then Soft Systems methodology, or the more general concept of interpretive inquiry, can be recognised as providing a version of a ‘complex information system’. Thus instead of using SSM to design an IS, SSM is used as a basic concept of an IS.

Together these five ideas provide a new and radical agenda for the development of the interpretive approach to Information Systems development.

## CONCLUSIONS

In this paper the work of Checkland & Holwell was taken to represent the leading-edge of contemporary research into the application of ‘Soft’ paradigm thinking to information systems activity. Their work was subjected to a process of critical interpretive inquiry that concluded that their concept of Information systems development was surprisingly limited, old-fashioned, and out-of-touch with recent developments in the IS discipline. The results of the inquiry were then used to generate a radical research agenda for the development of the interpretive approach to IS activity.

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