From Our Readers

To the Editor:

For years most professionals in the MIS area have been proselytizing about the behavioral aspects of the field but in general the literature has been scant. The probable reason behind this has not been a scarcity of literature but a reluctance on the part of professional journals to print such literature. I've just finished reading the September 1977 issue of *MIS Quarterly* and was delighted to see not one, but two, articles dealing with the behavioral aspects of MIS. *MIS Quarterly* deserves kudos for the courage, or better yet, professional maturity, that our other "MIS-type" journals lack. Let's hope we'll see more.

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Discussion of "Determining Management Information Needs: A Comparison of Methods" appearing in the ***MIS Quarterly,*** *June 1977.*

Munro and Davis stress in their article the growing importance of the task of Information Analysis as a part of the information systems design process. They likewise emphasize the need for empirical research regarding methods for performing this task and they report on one such research effort. I agree completely with them on the importance of research in this area and I find their article very interesting and it has stimulated me to advance a number of comments. From what I understand from their article, the authors share with me the opinion that the subject they bring up would profit from extensive discussion.

What I think is most in need of extended discussion are methods for doing empirical research in the area of the article and criteria for evaluation of such research. The authors have, through their example, clearly focussed our interest on these fundamental points. I want to discuss these problems as they are brought up by the authors. In addition, I want to make some comments on the methods for information analysis and the need for such analysis.

Needs for the Study and the Criteria for Information Value

The criteria which might be used for research attempting to evaluate analysis methods are, of course, crucial to the research results. If the criteria are wrong the results are inconclusive or misleading. This cannot be compensated for through the use of impressive statistical techniques. They might, in fact, make results more misleading by making them look more credible than they are. (This is a problem with much of the social science research.)

But the criteria problem is crucial already to the method itself. Consequently, I feel that the criterion problem deserves extensive discussion before any other aspects are really worth arguing. The authors choose to use the user perceptions of the value of the information obtained by each method as the criterion. The choice of such a subjective criterion will look remarkable to any traditional, positivistic, scientist who would ask for more objective criteria. The subjective evaluation in my view is well justified, but only partly so. I think it desirable in any case that researchers provide a thorough discussion of criteria before doing empirical research and I would have liked to have seen the authors do more of this.

The dependence on a subjective evaluation by the relevant users is important for several reasons:

1. results are good only to the extent that they contribute well to the valuations of people and these are, of course, subjective;

2. data provide information to people only if the data are conformal with the conceptions and perceived needs of the users; and
3. information will be employed only if the users are motivated to use it.

Hence not only in *post-hoc* evaluation, but in active information analysis the criteria of user-perceived need must be considered. In a final evaluation, on the other hand, it is nevertheless relevant to consider also possible objective or multisubjective criteria. For instance, it is not enough if the primary users are highly satisfied; other relevant people may think that more important information should have been used also. Surely, these problems are difficult, but because they are also important I think we have reason to start discussing them.

The authors state that criticism of the state-of-the-art focused attention on the need for more powerful methods. I agree and to their reference [Ackoff 1971] I would add [Langefors 1963], where it was stated:

> *"What is sorely needed in this area is a systematic . . . technique for establishing the real needs for information . . ."*

That paper and [Langefors 1966] also considered the usefulness of analyzing the manager's decisions in order to identify the information needed to make the decisions. Thus, what the authors refer to as "decision analysis" was considered by me in 1963, but was replaced by a slightly different and more general approach which may appropriately be referred to simply as "information analysis." Thus, in addition to the two methods of "data analysis" and "decision analysis" for doing information analysis, there is a third one: "information analysis."

Information Analysis through "Information Analysis"

The method "information analysis" as proposed in [Langefors 1963] and developed and applied increasingly since then in Sweden and in other countries differs from the "decision analysis" in a number of ways:

a. Before one may ask for the information needed to make a decision, one has the more fundamental question of what decisions are needed. It was found that this question led to the recognition of the need for another stage of analysis, logically preceding Information Analysis. It was referred to as Analysis of the Company Functions which more recently we call "Object System Analysis", thus recognizing (1) that not only decisions but also other activities call for information, and (2) that the need for functions, such as decisions, determines whether there is need for their information inputs.

b. The information needs of a decision may be looked upon in the way that the result of a decision is information; hence, the information needed to make the decision is the information needed to derive the information which is the intended result of the decision. It is here that the decision analysis turns into an information analysis: when some information is found to be needed *or useful*, then other information, its information precedents, can be found to be needed or useful. Thus, this part of the information analysis is often referred to as precedence analysis.

c. It was found on closer analysis that to determine the precedents of some information it is more appropriate not to get bogged down into the procedural details of how the decision process or a computation process is performed. What is important is how strong a correlation there is between some information and its potential precedents or, rather, between the corresponding aspects of reality.

Structured Information Analysis

The finding that information precedence analysis could be and *should be* done before determining process details turned out to bring several advantages. One of them is that the analysis gets simplified; another is that it is easier to follow for most people concerned. One important advantage was that structured analysis became a possibility. Analysis could be done quickly yet precisely on crude levels first, and then successively refined in component analysis. This resulted in quicker, tentative design and the testing of several alternative designs.

User Learning About Needs

One thing which has come out clearly from our practical or participative research during the years is that users and analysts work together through the levels of object system analysis and information analysis and successively *learn* what the needs are. Also, it has been found to be necessary to train the users in the structured analysis methods in order to make them effective. These points have implications for the evaluation research of the paper.

Use of User Relevant Analysis Approaches

The most important factor in object system analysis and information analysis is *active* user participation. It follows that if users find a certain approach to be relevant in a certain situation, then it should be applied for part of the work. Also, for rational reasons, whatever seems appropriate to do in a specific situation should be done. It should not be "prohibited" by the analysis method. Hence, whenever "data analysis" is judged appropriate, it is integrated into the work. Thus, methods need-not be exclusive alternatives. In our application of Information Analysis we feel free to apply any specific technique that is deemed desirable or effective in specific situations or with specific people. Studies of decision procedures, action rules, factor analysis, data analysis, or experiments with pilot implementations are among the tools that may be used. But most of the time, the more pure and intuitive forms of precedence analysis and component analysis are preferred by the participants.

It follows that to compare the two or three approaches, as if they were mutually exclusive, does not appear too useful, and also cannot be expected to yield big differences in results.

The kinds of descriptions or documentation being used may well make a greater difference. For instance, if users attain real influence or control on the system design process, it is important that documented specifications are intelligible to the users, and that it can be verified whether they are satisfied by the designers. It is also often important that the descriptions provide information on system-global connectivity and its effects.

Other aspects that also seem more significant than the differences studied in the paper are: the learning support characteristics of the design procedure being used, and the way the organizational, social, and political problems are handled by the design project.

A Biased Criterion?

It appears to me that the criterion used by the authors, that of user value perceptions, is biased in favor of the "data analysis" approach in that this approach contains moments of reviewing based on "perceived need."

The Prior Expectations

The authors point out that some of their results are not in accordance with expectations "based on published opinion." I do not agree with these prior expectations, based upon my theory and experience. For instance, I would not necessarily expect that the analysis would perform better on programmed decisions. This is implied already in my early findings, leading to a preference for precedence analysis; it is not the procedural details that determine what information is relevant. I have also seen frequently in practice that programmed decisions were severe simplifications that ignored relevant information as well as ignored lack of structure in the real problems.

Also, I would not expect the company function to be decisive for the choice of the analysis method. Rather, I would expect generally the possible distinction to be made between "necessary operative information" and "useful-while-not necessarily directive information" [Langefors 1966]. I would expect the decision analysis to hamper the perception of the user as to the information needs, because of its being cluttered by procedural detail; hence, the criterion used would be biased against this method. This would not be the case with the information analysis approach, *i.e.*, precedence/component analysis. Thus, *if* the decision analysis method does identify valuable, objectively relevant information, then it might not make the user perceive this as subjectively relevant to him.

Conclusion

To conclude, I agree that empirical research is desirable, but I believe that we need more theoretical analysis before we know the relevant things to evaluate, the criteria to use, and the hypotheses to formulate.

In addition, I feel that in many problem situations I trust more a good theoretical analysis based on highly credible axioms, rather than statistically extensive empirical results based on insufficient theory or concepts. I look upon the Munro/Davis article primarily as an initiator to open up a thorough discussion and study that hopefully would bring us into promising research positions; and, along this line, I welcome the article as a potentially important contribution. I hope my extensive arguing will be seen as an indication of my appreciation.

Finally, I want to mention that over many years the ISAC group at the University of Stockholm has conducted empirical research of a different kind, in testing and attempting to improve methods in projects of "action research" done in cooperation with a number of organizations and companies. Unfortunately this has required the researchers to write their reports in Swedish, but a summary of the experiences is presented in Mats Lunberg's paper, "Utilization of New Information Systems Development Method in Practice — Perspective and Prospects" in the **IFIPS Conference Proceedings**, Toronto 1977. Of course, participative research does not replace empirical research of the kind outlined in the paper discussed here.

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