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User Attitudes and Management Information System Use[1]

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A study of an industrial sales force shows several specific attitudes to be positively related to use of a computer based information system. The results support and extend previous findings and suggest a model of information system use based on expectancy theories of job motivation.

The development and increased use of computer based management information systems (MIS) in organizations have led many researchers to investigate the problems of system users. Early published case studies (Ackoff, 1960; Quinn & Mueller, 1963; Stillson, 1963) have provided a strong impetus for management scientists and behavioral scientists to explore the causes for system failure. Probing theoretical and conceptual analyses by Ackoff (1967), Churchman and Schainblatt (1965), and Mason and Mitroff (1973) gave later investigators frameworks for research on the "implementation problem." The present high concern over implementation within the profession of management science is apparent in Wysocki's (1979) extensive classified bibliography of published work on implementation.

The basic problem may be succinctly stated: MIS can and does fail where user psychological reactions and organizational factors are ignored by system designers. Although the movement from anecdotal evidence and case studies has been slow, subsequent empirical research has supported this general position. One notion receiving attention is that attitudes of MIS users are related to their actual use of a system. Surveys and experiments show that attitudes toward various features of an MIS, systems development personnel, and computers in general are related to user behavior. Designers are urged, therefore, to create favorable user attitudes, usually through such practices as involving users in system development work.

[1]The author appreciates the helpful comments of Hank Lucas and Dana Farrow.

Although such findings probably are necessary for establishing preliminary groundwork and generating interest in implementation problems, they are neither surprising nor novel. Research in this area tends to underutilize existing knowledge in the behavioral sciences and typically fails to tie "implementation" research to more general models of work behavior. Notable exceptions are Zand and Sorensen's (1975) and Ginzberg's (in press) use of the Lewin change model to study implementation of management science projects. The ultimate danger is the creation of a "new" area of inquiry in which investigators reinvent theory and learn empirical lessons through their own mistakes rather than through the experience of others.

This paper deals with this problem and addresses the relationship between user attitudes and behavior. The literature on attitudes and behavior in the MIS environment will be reviewed, and theoretical shortcomings and gaps in research findings will be identified. Data then will be presented that support the general expectations in the literature. Finally, these results and those of others will be used to develop an expectancy based model of user reaction to MIS.

PREVIOUS RESEARCH

The most extensive program of research on MIS user behavior has been that of Lucas (1973, 1974a, 1974b, 1975a, 1975b, 1976, 1978). His descriptive model (1975b) identifies five main determinants of voluntary system use: user attitudes and perceptions, technical quality of system, performance, situational and personal factors, and decision style. His basic hypothesis regarding attitudes and perceptions is stated: "Favorable user attitudes and perceptions of information systems and the information services staff lead to high levels of use of an information system" (1975b, p. 23). In developing operational definitions for the many variables in the model, Lucas generally relies upon questionnaire measures of attitudes, perceptions, and use. Scale characteristics for some of these variables are briefly described (Lucas, 1975a), indicating use of two- or three-item scales. Reliabilities are not reported. In tests of the model Lucas generally has used field surveys of managers, analyzing data by use of stepwise multiple regression. Hypotheses are accepted if predictor variables enter the regression equation with a significant beta coefficient. Tests for interaction among predictor variables are generally not performed although the model clearly leads one to expect interaction among situational and personal variables.

In summaries of six studies Lucas (1975b) supports the model's proposition on attitudes and use. Specifically he finds that *attitudes* toward the computer's potential and toward the systems staff predict use in a large number of tests across three samples. In addition, several specific *perceptions* are consistently related to use. These include: suitability of number of reports received, on-line system rating, output quality, management

support, involvement in setting goals, and compensation based on goals (1975b). From Lucas's description of the research design the distinction between attitudes and perceptions is unclear. It is obvious that the objects of attitudes are different from the objects of the perceptions, and perhaps attitudes are more general. However, the model groups attitudes and perceptions together and hypothesizes the simple relationship as cited earlier.

In a subsequent study of a computer based planning system, Lucas (1976) does distinguish between "general attitudes and perceptions" and "attitudes toward the model." The general attitudes and perceptions are: management support for modeling effort, rating of in-house computer output, involvement in developing and designing model, and potential of computer based planning systems. The specific attitudes are: few impediments to use, user interface with output, quality of data base, contribution of data base, simplicity of model, and ease of understanding model. Furthermore, general attitudes and perceptions are hypothesized to influence "attitudes toward the model." Both general and specific attitudes were significantly related to actual use.

Schewe (1976) also has devised and tested a model relating user attitudes to system use. Utilizing actual requests for MIS reports as his operational definition of system use, Schewe attempted to predict use from a wide assortment of perceptual, attitudinal, and exogenous variables. Conceptually, Schewe's model represents a theoretical step forward in the study of user attitudes in that he explicitly formulates the linkage among beliefs, perceptions, attitudes, and use. Attitudes result from a set of evaluated beliefs. These attitudes along with beliefs about exogenous factors are hypothesized to affect the degree of system usage. However, Schewe's results appear to support a more direct association between usage and perceptions of MIS dimensions, without attitudes playing a major role. He concludes that feelings of satisfaction with use of the system do not appear to influence behavior. Close examination reveals, however, that the primary distinction between attitudes and perceptions lies in the object being evaluated. Perceptions of MIS require the respondent to agree or disagree with statements about MIS characteristics (e.g., depth of information, accuracy, access time delays, etc.). Attitudinal variables require the respondent to indicate the degree of satisfaction he/she finds with consequences of MIS use (e.g., decision making effectiveness, job productivity, information usefulness, etc.). Both classes of variables, however, reflect beliefs or perceptions about some aspect of the system. Thus, one may conclude that Schewe's study does show user perceptions of the system and the environment in which the system is used to be related to actual use, but does not show attitudes toward system outcomes to be related to use.

In evaluating the Lucas and Schewe studies one must be aware of limitations in the measurement of perceptual variables. Schewe relied on single questionnaire items to measure all variables except "use" and five of the

exogenous variables. This undoubtedly affects the size and significance of resulting correlations. Although each perceptual or attitudinal item does measure something quite specific, research is likely to benefit from aggregation of items into more reliable scales. Lucas relies to a great extent on users' self-reports of system use. Although objective and self-report measures of use are often correlated (Lucas, 1976), these measures are not substitutes for each other. The overall conclusion one can derive from the Lucas and Schewe studies is that behavior is related to users' feelings or beliefs about their systems. Yet little is offered in the way of psychological explanation for the findings. It remains for other investigators to explore the full implications of their findings and to extend methodological improvements to this line of research.

With hopes of developing a more reliable measure of user attitudes, Schultz and Slevin (1975) drew a series of statements from the growing anecdotal literature on implementation. The statements were cast into a Likert-type questionnaire to measure the concerns of users of MIS, management science, and operations research techniques. In a pilot test, factor analysis of 106 responses yielded 7 factors. A total of 57 items loaded significantly (loading > .30) on these 7 factors. The factor names, descriptions, and examples of items are shown in Table 1. A subsequent

TABLE 1
Attitudes Measured by the Schultz and Slevin Questionnaire[a]

	Factor Name	*Number of Items*	*Description*	*Sample Item*
I.	Performance	13	Effect of system on manager's job performance and performance visibility	I have more control over my job.
II.	Interpersonal	5	Interpersonal relations, communication, and increased interaction and consultation with others	I need the help of others more.
III.	Changes	4	Changes which occur in organization structure and people dealt with	The management structure has changed.
IV.	Goals	9	Goals will be more clear, more congruent to workers, and more achievable	Company goals have become more clear.
V.	Support/resistance	11	System has implementation support; adequate top management, technical, and organizational support and does not have undue resistance	The developers of the system have provided adequate training to users.
VI.	Client/researcher	3	Researchers understand management problems and work well with their clients	I enjoy working with those who are implementing the system.
VII.	Urgency	12	Need for results, even with costs involved; importance to self, boss, top management	The sooner the system is in use, the better.

[a]Schultz and Slevin, 1975. All items are measured on a 5-point scale to indicate whether the respondent strongly agrees, agrees, is uncertain, disagrees, or strongly disagrees with the statement.

study by Keim (1976) supported the basic factor structure of the instrument using alternate clustering methods and additional samples. In their initial use of the instrument, Schultz and Slevin were able to find significant correlations between Factors I, IV, V, VII and perceptions of system value. However, no measures of actual use were obtained, and both dependent and independent variables were measured with the same questionnaire. Nevertheless, the development of attitude scales that isolate specific user concerns and that meet normal psychometric criteria is an important step in implementation research.

Schultz and Slevin do not make a distinction between attitudes and perceptions, nor does it seem that such a fine conceptual distinction is necessary. For these reasons, the term "attitudes" will be used here in reference to the Schultz and Slevin measures, and more emphasis will be placed on the *object* of those attitudes than on whether the measurement is of a belief, an affective response, or a perception.

The Schultz and Slevin instrument has been used to investigate a number of implementation issues. Robey and Zeller (1978) reported structural and attitudinal differences between two plants in which a quality control information system was introduced. In one plant users rejected the system; in the other it was accepted and used. Attitude Factors I (performance) and VII (urgency) differed significantly between managers in the two plants. Because the study did not focus on individual users, however, only aggregate conclusions about attitudes and MIS success can be drawn.

Robey and Bakr (1978) found several attitude dimensions to vary predictably with individual differences in work values and with time of exposure to new information technology. Again, Factors I and VII varied significantly, as did Factor IV (goals). Robey and Bakr identified an interaction between work values and exposure to a new system in determining attitudes. Respondents with intrinsic work values (Friedlander, 1965) had less favorable attitudes as their experience with the system increased, but the attitudes of respondents with extrinsic work values became more positive with experience. The authors interpret this "novelty effect" in light of the increased structure brought to the job by the system. Although *introduction* of the system was challenging (and rewarding to the intrinsic workers), *task scope* was effectively reduced. No measures of actual usage or performance at the individual level were reported.

Finally, Rodriguez (1977) used the Schultz and Slevin instrument in a laboratory study to test the effects of different implementation strategies on attitudes and use of an interactive decision support system. Attitudes I, IV, and VII were positively related to subjects' perceived worth of the system and their actual use of it. Use was measured independently by tracking the number of interactive queries of the system at the computer terminal.

From this research it can be observed that three attitudinal factors are more "volatile" than the other four. It is tempting to identify these as "key concerns" and generalize them to all implementation situations.

However, it is clear that insufficient research has been conducted to support such a conclusion. Only one of the studies using the Schultz and Slevin instrument also measured system use at the individual user level (Rodriguez, 1977). This experiment used MBA students as subjects. The only other studies reported above that assessed system use objectively were Schewe's (1976) and Lucas's (1976). The research reported in the present paper partially overcomes limitations of past research by using the Schultz and Slevin instrument to predict actual use of a system in a real-world environment.

METHOD

The sample consisted of 66 members of the sales force of a large industrial products manufacturer. These salespeople used a computer based system to record, update, and maintain information pertaining to their customer accounts. The system had been in use for 15 months prior to this study. In using the system, each salesperson was expected to initiate changes in any information pertaining to his/her customers and add new customers as required. Salespeople were urged to maintain the accuracy of the information in their customer accounts on a daily basis, although all accounts were to be updated at least once a year. Thus, use of the system was voluntary. The primary function of the system was to permit selective distribution of the corporation's product catalogs and promotional materials to its customers. Because a wide variety of industrial customers was serviced and salespersons represented many product divisions of the company, the system was implemented to achieve cost savings in distributing material to support personal selling efforts. Duplicate mailings and omissions could be controlled potentially through proper use of the system. Salesperson-users benefited from the system to the extent that the promotional materials and catalogs did support personal selling and the seller knew precisely what materials each customer had received.

Two indicators of actual use of the system were developed. First, the percentage of customer records that had to be updated annually was used as the basis for ranking users in terms of continual use of the system. If a large number of accounts required annual updating, it was assumed that the salesperson was not a continual user of the system. For reasons of confidentiality, a company staff member ranked the sales personnel in reverse order on this variable using the annual update records for the first year of system use. (Direct access by the researcher to system records was not permitted.)

A second dependent variable reflected the number of customer records maintained on the system per account. An account typically consisted of a company, and salespersons might visit many individual customers within that company (at different plants, for example). Because the number of accounts varied among sales personnel, the average number of customers per account for whom computerized records were kept was used as a more

comparable measure of use. Again, rankings on this variable were provided by corporate staff to assure confidentiality of company records.

To assess users' attitudes toward the system the questionnaire developed by Schultz and Slevin (1975), described earlier in this paper, was sent through the corporate mail to the 66 members of the sales force. Satisfactory responses were received from all 66 persons. Appended to the questionnaire were four additional questions asking the respondent to assess (1) the probability that others will use the system (10-point scale from 0 to 1.0); (2) the probability that the system will be a success (10-point scale from 0 to 1.0); (3) the overall worth of the system (10-point scale from 1 to 10 with "not useful," "moderately useful," and "excellent" as anchoring words); and (4) the level of accuracy expected from the system (10-point scale from 1 to 10 with "no accuracy," "moderately accurate," and "extremely accurate" as anchoring words). These four items were used as subjective dependent variables and were patterned after Schultz and Slevin's initial study with the attitudes questionnaire. Because of high intercorrelations among the subjective dependent variables, these items were summed and treated as a single variable, labeled "perceived worth." The reliability of this variable, as measured by Cronbach's coefficient alpha, was .84.

RESULTS

The primary objective of this research was to relate the objective measures of system use to attitudes. Table 2 shows the correlation coefficients between five attitude factors, the two objective measures of system use, and perceived worth. Factors II and III are not shown here because of low internal reliability of the subscales. The reliabilities of the remaining scales are shown in Table 2.

Clearly, the strongest associations are between performance and the use variables. Significant association between use and attitudes also is found

TABLE 2
Correlations Between Attitude Dimensions and Dependent Variables for 66 Industrial Salespersons

			Spearman Rank Correlations		*Pearson Product-Moment Correlations*
	Attitude Factor[a]	*Scale Reliability*[b]	*Accounts Kept*	*Annual Updating*	*Perceived Worth*
I.	Performance	.81	.79***	.76***	.36**
IV.	Goals	.58	.42***	.42***	.08
V.	Support/resistance	.76	.78***	.75***	.31**
VI.	Client/researcher	.74	.63***	.59***	.25*
VII.	Urgency	.76	.71***	.67***	.35**

[a]See Table 1 and Schultz and Slevin (1975).
[b]Cronbach's coefficient alpha.
*$p < .05$
**$p < .01$
***$p < .001$

for Factors IV (goals), V (support/resistance), VI (client/researcher), and VII (urgency). The correlations between attitudes and perceived worth are much lower, although four of the five are significant. Similar results are obtained when the four worth items are treated separately. (This analysis is not shown here.)

The correlations between use and perceived worth are significant ($r_s = .42$ for both use variables) beyond the .001 level. The r_s between the two measures of actual use was .97, indicating that users are very consistent in at least these two aspects of system use. Those that keep a high percentage of their customers' records on the system also update those records frequently. Conversely, users who keep fewer customer records on the system are unlikely to update those records with any frequency.

DISCUSSION

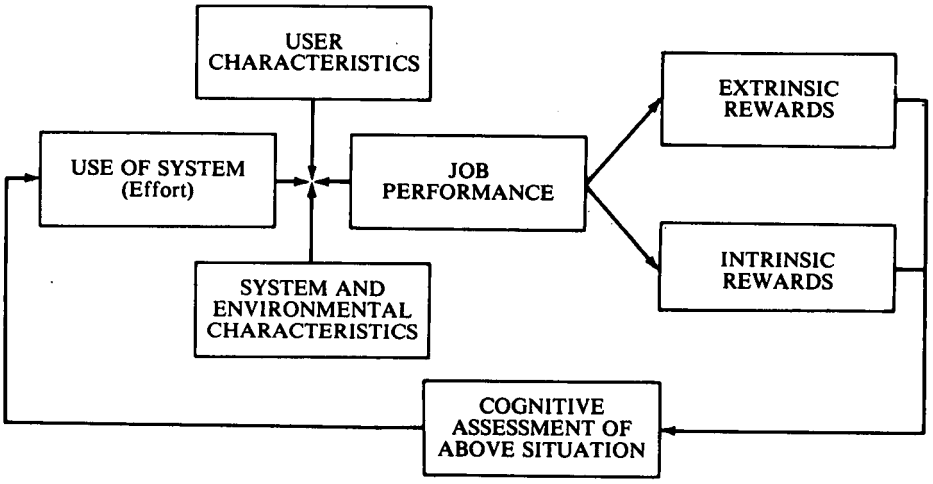
Overall, these results support the established notion that user attitudes (or perceptions) are significant correlates of system use. Attitudes are less powerful in predicting *subjective* assessments of perceived worth, although the relationships are significant. Thus, the data here generally support the basic thrust of the research discussed earlier. The finding that attitudes are more strongly related to actual use than they are to measures of perceived worth has important implications. If it is assumed that MIS designers and managers are more interested in actual usage of MIS, it seems important to focus on actual use in research. Computer logs often contain records on an individual's frequency and nature of use, and this source of data should be exploited for research purposes. Although self-reported measures of use often are highly correlated with actual use, they do not replace the need for objective, independent assessments of use. This is not to say that actual use is the only variable of interest. As Lucas (1978) observes, where system use is not optional with the user, measures of user *satisfaction* are more meaningful criteria for system success. Furthermore, neither satisfaction nor extent of use replaces user *performance* as a variable of interest. Lucas's model accurately portrays the importance of performance (e.g., decision quality) in MIS design. The relationships among performance, use, attitudes, system features, and situational variables remain as demanding research issues.

As stated earlier, one objective of this paper is to suggest a model within which user attitude research might continue more productively. The following model is based on expectancy theories of motivation as presented by Porter and Lawler (1968). Expectancy models are cognitive explanations of behavior, casting man as an active, thinking, predicting being in his environment. He continuously evaluates the consequences of his behavior and subjectively assesses the likelihood that his action will produce various results. He also is capable of evaluating outcomes or rewards and basing behavioral choices on rational analysis of the present and the past. Although empirical testing of the expectancy model seems to

pose some serious difficulties (Mitchell, 1974), it has assumed an influential role in current thinking about work behavior and management. The interpretation in the present paper is strongly influenced by Vertinsky, Barth, and Mitchell (1975), who used the expectancy model to approach implementation problems in operations research.

Figure 1 depicts a simplified version of the expectancy model as it pertains to the MIS user. It shows that the direct determinant of system use is an assessment by the user of various relationships. User perceptions or attitudes are formed concerning (1) the value of rewards received from performance, (2) the likelihood that rewards result from performance, and (3) the likelihood that performance results from use. This last component is affected by user characteristics such as ability and training and by system characteristics. Thus, job performance may decline in spite of extensive system use if the system provides inaccurate information to users. If this low performance results in lower job rewards, users are likely to reduce their use of the system and find other means to increase performance and rewards. The model also directly implies that unless rewards are contingent upon performance, use of the system will not increase even if performance depends heavily on use. There is support for this model from the research reported and reviewed here. The beginning focus will be on the use-performance relationship because this is the area on which most of the research to date has placed emphasis. Later, speculative arguments pertaining to the rewards portion of the model will be given.

FIGURE 1
Model of User Behavior



The results from the present sample show that the attitude most strongly associated with actual system use is Factor I (performance). Other research

(Robey & Zeller, 1978; Robey & Bakr, 1978; Rodriguez, 1977; and Schultz & Slevin, 1975) also has found this performance concern to be a significant correlate of implementation success. Attitude dimensions VI (client/researcher) and VII (urgency) also seem to tap concerns related to performance. System developers and support staff can make certain aspects of the system clearer to the user and can facilitate higher performance through their efforts. The urgency dimension could reflect users' concern over performance problems, which the MIS could rectify. Furthermore, Lucas's attitude variable of "computer potential" seems to imply performance concerns. This variable, too, was strongly related to use in several of the Lucas samples. The specific attitudes and perceptual variables noted by Lucas (1975b, 1976) also suggest the instrumental value of MIS to user performance. Factors such as output quality, suitability of reports, quality of data base, simplicity, and ease of understanding are clearly related to performance issues. Schewe's (1976) results linking use to variables such as quality of support personnel, response time, and search effort also indicate user concerns with performance. Stated quite simply, use of an information system depends on the user's perception of its impact on his/her performance.

The second major relationship in the model involves rewards: the extrinsic and intrinsic consequences of performance. Although there is little reason to expect formal extrinsic rewards themselves to change as a result of MIS, performance may become more visible, leading managers to tie rewards more closely to performance. Of course, this all depends on whether levels of user performance are maintained in the system. In many applications of MIS, decisions of users become part of the data base and are retrievable as a performance indicator. This capability probably further arouses the user's concern over how the system helps or hinders performance.

The data show a strong relation between concern over goals (Factor IV) and the use of MIS. This may be further evidence of the importance of performance to use, but it also suggests the importance of clear objectives. As goals become more clear, task performance increases either in direct anticipation of goal achievement or because of expected extrinsic rewards. MIS has the potential to make goals clearer and to increase job structure so that users know more completely what they need to do in order to achieve performance goals.

An area of speculation is the impact of MIS on intrinsic rewards stemming directly from task behavior. Considerable debate has transpired over the impact of MIS on tasks and user motivation (Anshen, 1960; Leavitt & Whisler, 1958). Empirical studies show that the introduction of information technology may increase task scope (Hardin, 1960; Eason, Stewart, & Damodaran, 1977) or reduce it (Robey & Bakr, 1978; Whisler, 1970). Research on task scope also suggests that individual preferences must be accounted for before the motivational consequences of task changes can be predicted (Pierce & Dunham, 1976). It is likely that changes in task

scope and intrinsic rewards will have some impact on use, however. Schewe's (1976) data show that change in job content is the most important predictor of use of an interactive (on-line) MIS, although the *direction* of change is unclear. At present, the Schultz and Slevin scales on task and other changes are not sufficiently reliable to detect concerns in this area, at least in the tests conducted so far.

The model presented here is tentative at best and is only implied from the research in this article. It is a preliminary attempt to place research on MIS implementation in perspective to consider it as a special case of job behavior that can be potentially explained by existing models. Further testing should take advantage of previous research on expectancy theory to avoid the many pitfalls already encountered by expectancy researchers.

In returning to the more direct implications of this research, it is important to note its limitations. First, although the Schultz and Slevin instrument appears to be superior to single-item scales used elsewhere, it has not received extensive validation. Factor structures have varied somewhat across samples (Keim, 1976), and there is some conceptual overlap among factors. As researchers in the implementation area see the value of expectancy or other models to guide their research, instrumentation should be drawn from those contexts. Second, a word of caution must be extended to those interpreting these results and the results of any cross-sectional study. Strong positive relationships have been demonstrated between specific user attitudes and actual use of an MIS. It does not necessarily follow, however, that attitudes *cause* behavior. It is just as logical to argue that use of the system is instrumental to attitude formation, and correlational data support either position. Before causation can be demonstrated, controlled laboratory studies (Rodriguez, 1977), longitudinal field studies (Lucas, 1978), and field experiments need to be conducted. Finally, this study may be affected by a limited range in the dependent variables of actual use. As noted, ranks were provided by a company representative in order to preserve record confidentiality. The actual distribution of use remains unknown.

Beyond these suggestions for future research, what practical implications may be drawn from this study? The importance of user attitudes to system usage has been restated strongly. User concerns are critical to success of MIS, particularly concerns about the impact of MIS on individual performance. Obviously, these concerns should be addressed during implementation, but in some cases it may be too late by then. A system that does not help people perform their jobs is not likely to be received favorably in spite of careful implementation efforts. A system that reduces rewards for users is likely to meet with disaster. A logical and often recommended approach to systems design is to involve users in the design effort. This appears to be one valid method of addressing user concerns over performance and rewards before irretrievable investments are made in design efforts. Systems designers and implementation teams would be well advised to find some means of addressing these concerns during MIS development.

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