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ABSTRACT

There has long been a recognized need to measure the "success" or efficacy of information systems and the implementation process. Various constructs related to success have been suggested, such as user attitudes, system use, performance, and value. The attitude construct has received a great deal of attention for both theoretical and operational reasons. This paper focuses on the need for a convincing theoretical model linking *systems or policies* and *user attitudes* on the one hand, and *user attitudes* and *performance or value* on the other. Using job satisfaction research as a reference discipline for understanding the relationship between attitudes and performance, a model of IS attitudes, beliefs, and performance is developed. This model suggests that performance is affected by the correspondence or "fit" between the task requirements and the functionality of the IS environment. In addition a distinction between beliefs and attitudes is recommended. While satisfaction might be best determined by measuring attitudes, the correspondence between task and functionality is best determined by measuring beliefs. The implications of this model for future research are discussed.

INTRODUCTION

There has long been a recognized need to measure the "success" or efficacy of information systems and the implementation process. Various constructs related to success have been suggested, such as user attitudes, use, performance, and value. The attitude construct has received a great deal of attention for both theoretical and operational reasons. Some researchers theorize that user attitudes are a causal factor explaining use of a system (Swanson, 1982a). Attitudes are also sometimes seen as a surrogate for a key factor, such as quality of design, performance or value itself (Epstein and King, 1982). Attitude research is attractive operationally because user attitudes can be measured after the fact--they don't require the large up-front organizational commitment associated with unobtrusive measures of use. Attitude measures are also seen as more generalizable and more general purpose than context specific measures of performance or value.

MIS research in this area has been criticized for poor operationalization of the theoretical constructs and insufficient attention to measurement error (Treacy, 1985). However, the successful use of attitudes in information systems research is also dependent upon the development of a convincing theoretical model of the causal chain from systems to value, and the place of attitudes in that system-to-value chain. Thus we need models linking both *systems or policies* and *attitudes*, on the one hand, and *attitudes* and *performance or value* on the other. Without a strong theoretical base of this type, we will be unable to build a body of empirically supported theory, regardless of the statistical significance of individual results.

This paper focuses on the underlying theory supporting user attitude research in MIS by discussing the theoretical basis of recent MIS attitude research and developing one approach to the study of IS attitudes by using job satisfaction research as a theoretical basis for understanding the link (or lack thereof) between attitudes and performance. A model distinguishing between attitudes of job satisfaction and ratings of individual "fit" with job requirements is used as a platform to build a model of IS attitudes, beliefs, and performance. This model suggests that performance is affected by the correspondence (or fit) between the task requirements and the functionality of the IS environment, mediated by the abilities of the individual. Finally, we discuss the implications of this model for future research.

REVIEW OF IS ATTITUDE RESEARCH

Various studies have sought to link attitudes about information systems to hypothesized antecedents or consequences. Figure 1 shows some of the relationships which have been studied. Measuring changes in user attitudes has been hypothesized as a means of testing the efficacy of different organizational structures for the IS department, different chargeback schemes, and different allocations of time to phases of the system development process, to name only a few. Hypothesized consequences of IS attitudes include perceived value and use.
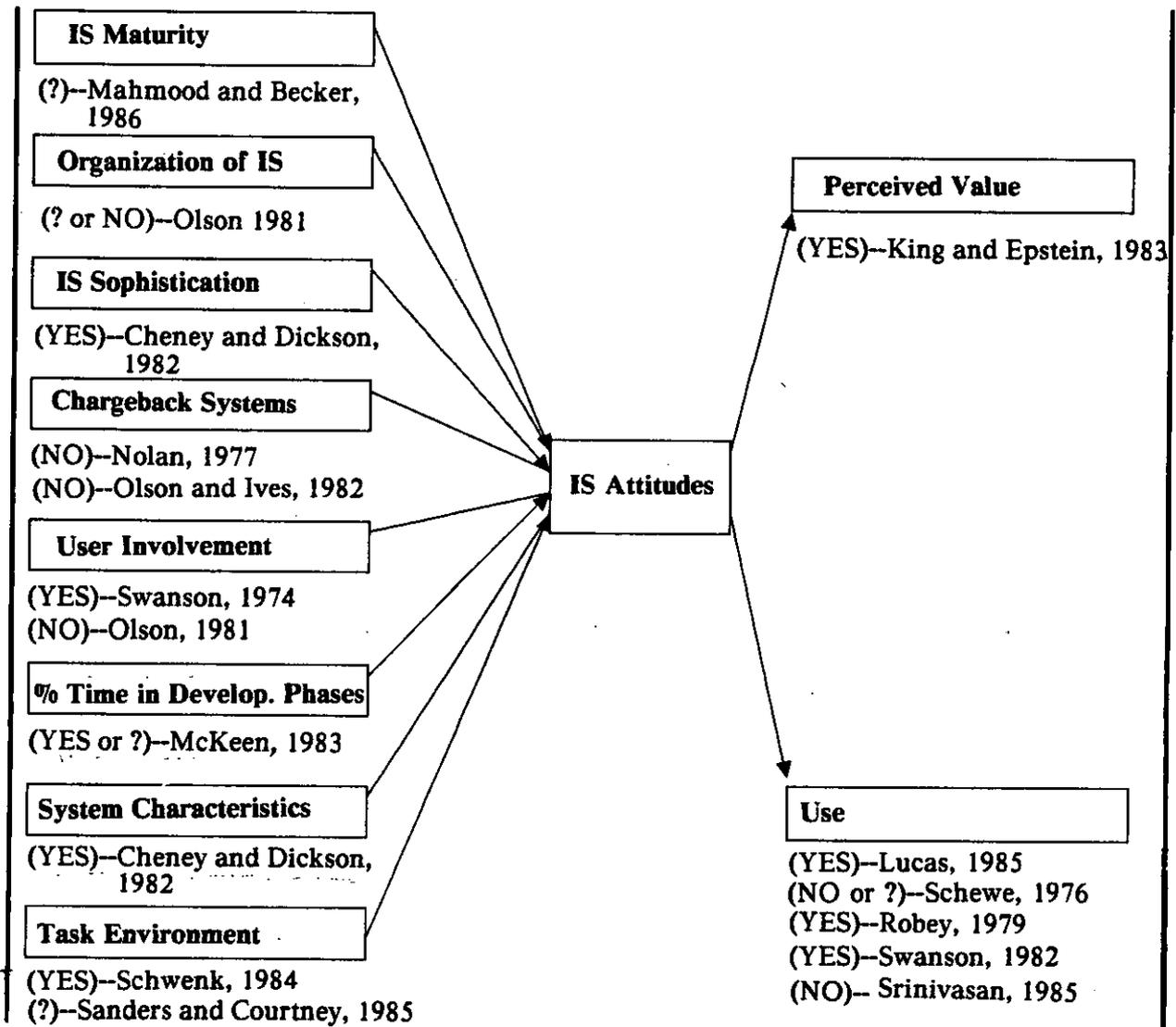

IS Maturity

(?)--Mahmood and Becker, 1986

Organization of IS

(? or NO)--Olson 1981

IS Sophistication

(YES)--Cheney and Dickson, 1982

Chargeback Systems

(NO)--Nolan, 1977
(NO)--Olson and Ives, 1982

User Involvement

(YES)--Swanson, 1974
(NO)--Olson, 1981

% Time in Develop. Phases

(YES or ?)--McKeen, 1983

System Characteristics

(YES)--Cheney and Dickson, 1982

Task Environment

(YES)--Schwenk, 1984
(?)--Sanders and Courtney, 1985

IS Attitudes

Perceived Value

(YES)--King and Epstein, 1983

Use

(YES)--Lucas, 1985
(NO or ?)--Schewe, 1976
(YES)--Robey, 1979
(YES)--Swanson, 1982
(NO)-- Srinivasan, 1985

Figure 1. Relationship of MIS Attitudes to other Theoretical Constructs.

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The results of these studies have been decidedly mixed. Some have found statistically significant links; others have not. It is difficult to extract from these results any generally accepted finding or an underlying model upon which future research can be built. One possibility is that these contradictory results are due in part to the lack of a strong theoretical basis. We will explore this possibility.

Underlying Theory

Few MIS attitude studies rely on any existing strong underlying theory as a basis for their theoretical models. Figure 2 classifies 28 recent studies according to the type of theoretical underpinning given to the measurement of attitude. While classification of any particular study may be subject to interpretation, the major thrust of the figure remains.

Only a very few studies hypothesize the structure of the attitude construct based on an underlying theory. In this category, both Swanson (1982) and O'Reilly (1982) point to *quality and accessibility* as key factors. Larcker and Lessig (1980) identify *usableness and importance.* Jenkins and Ricketts (1985) build on Simon's model of decision making (intelligence, design and choice) to justify the components of their model of satisfaction.

Even for these studies, however, the theoretical base is not well developed, and the justification for the hypothesized structures is often less grounded in any existing theory than we would like. These studies typically claim that "a review of the literature suggests that" two or three factors are key aspects of IS attitudes, yet it is not clear what link between the literature and the hypothesized key exists, nor how these aspects should fit in the larger system-to-value chain.

The second row of Figure 2 shows studies with a predominantly empirical, exploratory approach to developing the structure of attitude and instruments to measure it. No theory of the structure of attitudes is stated up front, and in general no theoretical explanation of the structure is stated even after the analysis. Schulze and Slevin (1975), Zmud (1978), and Ives, Olson and Baroudi (1983) are examples. This approach does serve to identify those dimensions

of a construct which are seen as distinct in the minds of users. It may help focus future theory builders in empirically justified directions.

However, the lack of theoretical bases for understanding the resultant factors makes it difficult to interpret the results of studies which use these instruments. For example, Ives, Olson and Baroudi (1983) identified four factors of user information satisfaction. It is not clear whether the identification of these four factors is meant to support the validity of the overall measure, or whether these four factors are proposed as the major sub-constructs in a theoretical model of the structure of user attitudes. If the latter is true, the new model would represent part of the total causal chain from the systems to value.

When Mahmood and Becker (1986) used the Ives, Olson, Baroudi instrument, they were able to show a correlation between overall satisfaction and overall measures of IS maturity, but no significant correlation between any of the individual four factors of satisfaction and specific measures of maturity. If we believe that the four factors are subconstructs of satisfaction, then we would expect that IS maturity could only affect satisfaction through one or more of these four subconstructs. Thus, Mahmood and Becker's work raises questions about what user information satisfaction is, and whether the four factors have theoretical meaning.

A Single Well-Defined Attitude Construct For the System-To-Value Chain?

An important question as we think about developing theory in this area is, "What degree of standardization is desirable in our attitude constructs?" Do we want attitude constructs which link as closely as possible with some theoretical antecedent or some theoretical consequence so that we are more likely to be able to detect correlation? Or do we want a more basic and standardized construct which sits between system or policy antecedents and performance or value consequences, so that we can more easily integrate the results of many studies across the whole system-to-value causal chain?

As the left side of Figure 3 shows, there are at least four different theoretical constructs which
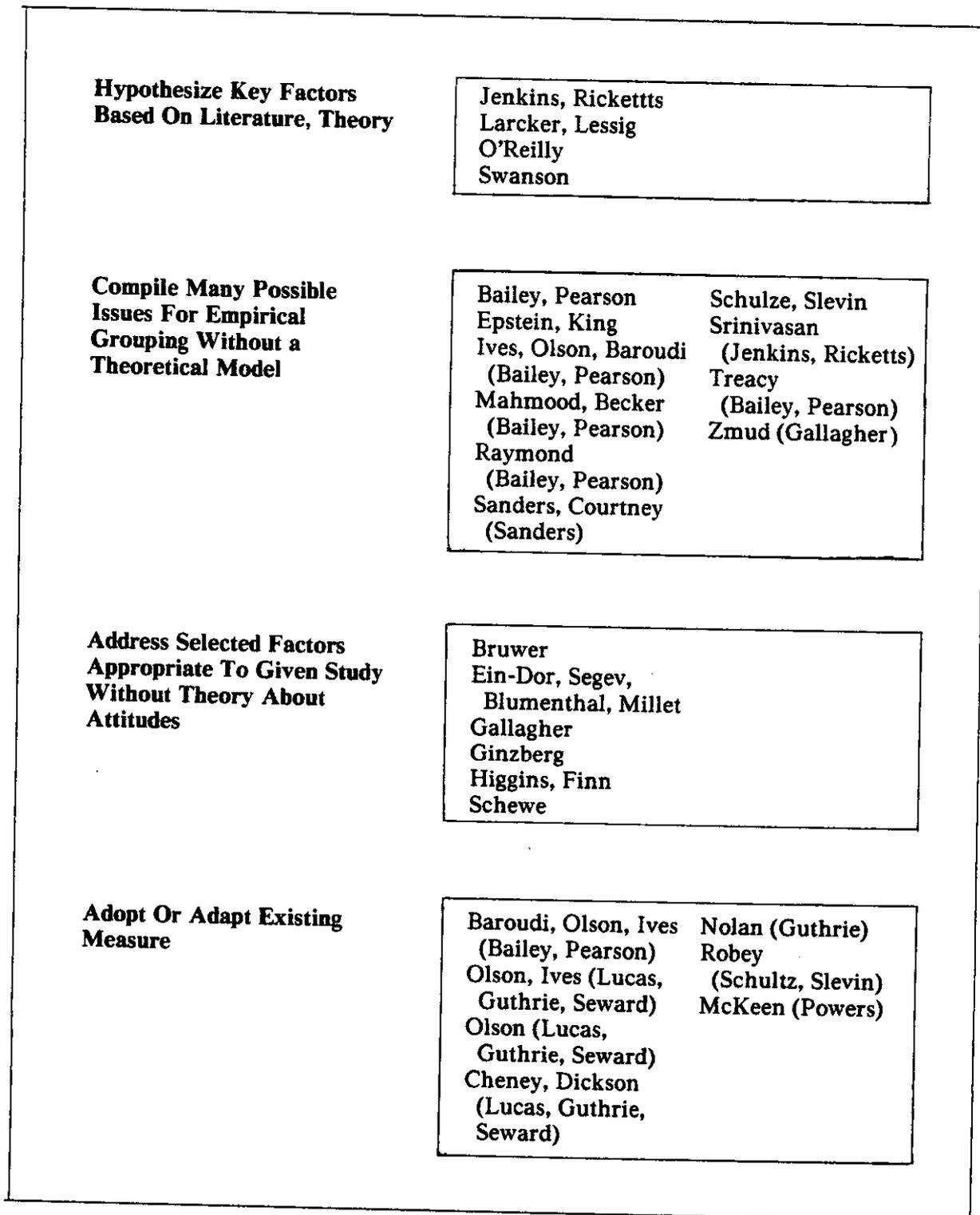
Hypothesize Key Factors
Based On Literature, Theory

Jenkins, Rickettts
Larcker, Lessig
O'Reilly
Swanson

Compile Many Possible
Issues For Empirical
Grouping Without a
Theoretical Model

Bailey, Pearson   Schulze, Slevin
Epstein, King   Srinivasan
Ives, Olson, Baroudi   (Jenkins, Ricketts)
  (Bailey, Pearson)   Treacy
Mahmood, Becker   (Bailey, Pearson)
  (Bailey, Pearson)   Zmud (Gallagher)
Raymond
  (Bailey, Pearson)
Sanders, Courtney
  (Sanders)

Address Selected Factors
Appropriate To Given Study
Without Theory About
Attitudes

Bruwer
Ein-Dor, Segev,
  Blumenthal, Millet
Gallagher
Ginzberg
Higgins, Finn
Schewe

Adopt Or Adapt Existing
Measure

Baroudi, Olson, Ives   Nolan (Guthrie)
  (Bailey, Pearson)   Robey
Olson, Ives (Lucas,   (Schultz, Slevin)
  Guthrie, Seward)   McKeen (Powers)
Olson (Lucas,
  Guthrie, Seward)
Cheney, Dickson
  (Lucas, Guthrie,
  Seward)

Figure 2. Theoretical Underpinnings of Empirical MIS Attitude Studies.

Underlying Focus	Attitudes Vs. Beliefs		
	Attitudes, Subjective "Feelings"	Beliefs, Objective Opinions	Both Attitudes And Beliefs
Implementation Success			Schulze, Slevin
Overall Values	Epstein, King	Gallagher Zmud (Gallagher)	
Disposition Toward Use		Swanson	
Meeting Info Requirements			Ives, Olson, Baroudi (Bailey, Pearson)
Operational Definitions		Jenkins, Ricketts Ginzberg O'Reilly Schewe	Bailey, Pearson

Figure 3. Categories of Definitions in Attitude Studies.

have been used in MIS attitude studies. One attitude construct is defined to be as closely linked to system implementation practices as possible (Schulze and Slevin, 1975). Another is defined to be as closely linked as possible to value (Epstein and King, 1983). And a third (Swanson, 1982b, 1982c) is closely linked with use of a system. One difficulty with using several different attitude constructs is that it is not easy to interpret the patchwork of significant and insignificant results shown in Figure 1, since the relationship between the various attitude constructs is unclear.

In order to build a research tradition in MIS, we need to move toward a standardized attitude construct. In fact, the diagram in Figure 1 makes sense only with the assumption that the box labeled IS attitudes is a single, well defined construct, whether we are looking backward toward antecedents or forward toward consequences.

Ives, Olson and Baroudi (1983) argued for a standard measurement instrument for the IS attitude construct. They examined several possible instruments and chose the user information satisfaction instrument developed by Bailey and Pearson (1983) because it covered both the information product and support, had adequate empirical support, and was derived from MIS literature, interviews with practitioners, and empirical work. Ives, Olson and Baroudi also defined user information satisfaction (UIS) (which Bailey and Pearson had not explicitly done) as "the extent to which users believe the information system available to them meets their information requirements."

The approach taken by Ives, Olson and Baroudi was to choose the best of existing user satisfac-

tion measures. Unfortunately, since none of the measures considered had a strong underlying theoretical basis, they did not consider theoretical bases in their evaluation. This leaves the MIS field with a standard measure, but without a strong theoretical basis.

Mixing Attitude and Belief Constructs

MIS research often blurs the distinction between beliefs and attitudes, and may lose needed clarity of definition in its theoretical models. Figure 3 shows a number of MIS studies, and across the top of the figure categorizes them as to the use of attitudes, beliefs, or both in the actual questions.

While attitudes broadly construed might include beliefs, social psychologists distinguish between attitude and belief constructs as follows:

> ". . . the term *attitude* should be used to refer to a general and enduring positive or negative feeling about some person, object or issue. . . The term *belief* is reserved for the information that a person has about other people, objects, and issues. The information may be factual or it may be only one person's opinion. Futhermore, the information may have positive, negative or no evaluative implication for the target of the information (Petty, Cacioppo, 1981).

For some theoretical contexts, attitudes may be the appropriate construct to measure; in others, beliefs may be more useful. For example, if we hypothesize that success of a system is affected by positive or negative feelings about changes in the workplace, then we certainly need to measure attitudes. If we hypothesize that features and functionality of a system are key to acceptance, we might wish to measure beliefs about the existence of those features. Research which solicits attitudes when beliefs are more appropriate, or vice versa, or which mixes aspects of the two constructs is likely to introduce additional bias or random error into measurements.

In summary, MIS research on user attitudes lacks a strong research tradition of generally accepted propositions from which we can build new theory. MIS could strengthen its research tradition by borrowing and expanding theory from relevant reference disciplines which would provide both models and precisely defined theoretical constructs. Too often we create new theory "from the whole cloth." The result is the inconclusive and mixed picture of Figure 1.

A THEORETICAL CONTEXT FOR IS ATTITUDES AND VALUE

If we want to develop clear theoretical models we must be explicit about how attitudes fit into a causal chain from systems to value. There are two quite different ways attitudes might fit into that chain. We could view attitudes as surrogates for value itself, or for some instrumental variable in a process leading to value. For example, attitudes might be a surrogate for how well the design of a system meets the needs of the users. In this case the appropriate design of the system is considered instrumental to creating value, and attitudes are a measure of appropriate design.

On the other hand, positive attitudes might be a prerequisite to optional use of a system, and thus important in their own right. (Fishbein and Ajzen (1975) suggest that beliefs predict attitudes, which predict intentions, which predict actions.) This paper takes the first approach, that is, viewing attitudes as a surrogate for a key instrumental variable in the systems-to-value chain.

Figure 4 shows the basic theoretical model which will be developed in the remainder of this section. In this model, *individual performance* is seen as the mechanism by which systems lead to value. The correspondence between individual task needs and information system functionality leads to individual performance. Beliefs about the correspondence are a surrogate for this correspondence. This model does not address group effects, nor does it explicitly address attitudes as a cause of use. The model is derived from work in the job satisfaction research tradition.
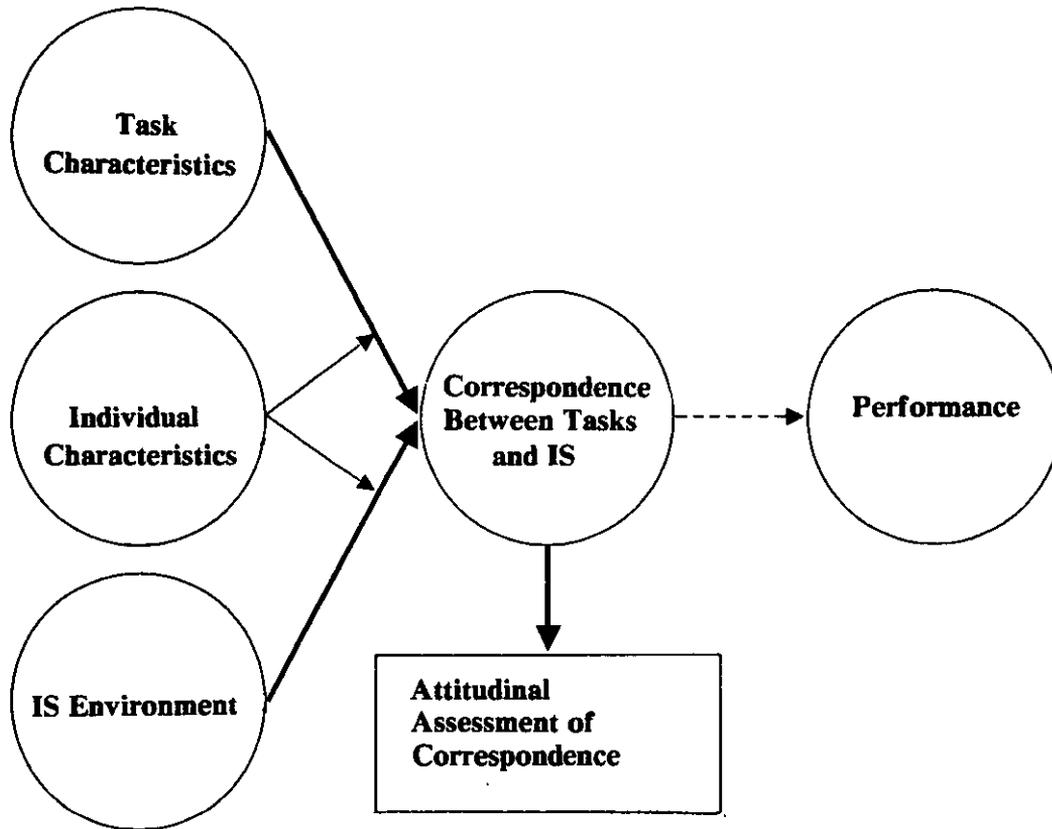
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Figure 4. Model of IS Attitudes and Performance to be Developed in this Paper.

Job Satisfaction Research: A Reference Discipline for IS Satisfaction

Job satisfaction research has long been concerned with the relationship between job attitudes and job performance. Since our focus is on the relationship between attitudes and performance, there is much to be learned from this research tradition. Further, we need sufficient definitional clarity to be able to state in what ways IS satisfaction is similar to job satisfaction and in what ways it is different. We will start by surveying the theoretical models relating job satisfaction and job performance, and the empirical support for those models. We will then take a closer look at one theoretical model which can be expanded to include both job and IS satisfaction.

Job satisfaction and performance

The question of whether job satisfaction leads to improved job performance has been extensively studied. Schwab and Cummings (1973) review the theories relating satisfaction and performance by grouping them into three categories. In the first category are theories suggesting that satisfaction does lead to better performance. Herzberg is the best example of this school. His two factor theory suggests that job satisfaction facets can be grouped into two types: *hygiene factors* such as supervision, physical working conditions, regular salary and benefits, company policies, etc., and *motivators* such as challenging assignments, recognition, the opportunity for professional growth, etc. Herzberg claims that hygiene factors can lead to dissatisfaction with (and a willingness to consider quitting) a job, but not to satisfaction or performance.

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Likewise, motivators can lead to satisfaction (and better performance) but not to dissatisfaction (Herzberg, *et al.*, 1957).

A second category of researchers suggest that the link between satisfaction and performance is much less direct. Schwab and Cummings cite three theoretical models. The first is Dawis, Loftquist and Weiss's (1968) theory of work adjustment, which distinguishes between job satisfaction and individual satisfactoriness. Individual satisfactoriness is a measure of the fit between employee skills and abilities on one hand, and technical job requirements on the other. Dawis, Loftquist and Weiss claim that satisfactoriness is closely associated with performance, but that job satisfaction will only lead to a decision to quit or stay. A second model is that of March and Simon (1963) which focuses on the motivational aspects of the expected value of rewards and aspiration levels. The third model is Triandis's (1959) which emphasizes the importance of pressure for production as an organizational variable.

Schwab and Cumming's third category of researchers claim that performance leads to satisfaction. Porter and Lawler's model is cited in this category, in which the relationship between performance and satisfaction is circular, but with the most direct path leading from performance to satisfaction (Lawler and Porter, 1980).

Empirical evidence for a relationship between job satisfaction and performance

There has been considerable empirical work studying the link between job satisfaction and job performance. Brayfield and Crockett (1955) reviewed the literature at that time and concluded there was "insufficient evidence that employee attitudes bear any simple. . . or for that matter, appreciable . . . relationship to performance on the job." Vroom (1964) looked at 20 studies and found a median correlation of .14.

Iaffaldano and Muchinski (1985) performed a meta analysis of 74 empirical studies testing the relationship between job satisfaction and performance. They concluded that the best estimate of the correlation between the two constructs is .17, with a variance of .016. They also tested to see if higher values of observed correlation could be explained by characteristics of the study. They found no relationship between correlations and nine possible characteristics of the studies, including white collar vs. blue collar, longitudinal vs. cross-sectional, and traditional instrument vs. experimenter developed. They further demonstrated that the few studies showing the highest correlations are consistent with a true mean and variance of (.17, .016), given the number of studies published. The inherent bias of the publishing process for higher correlations only strengthens their argument.
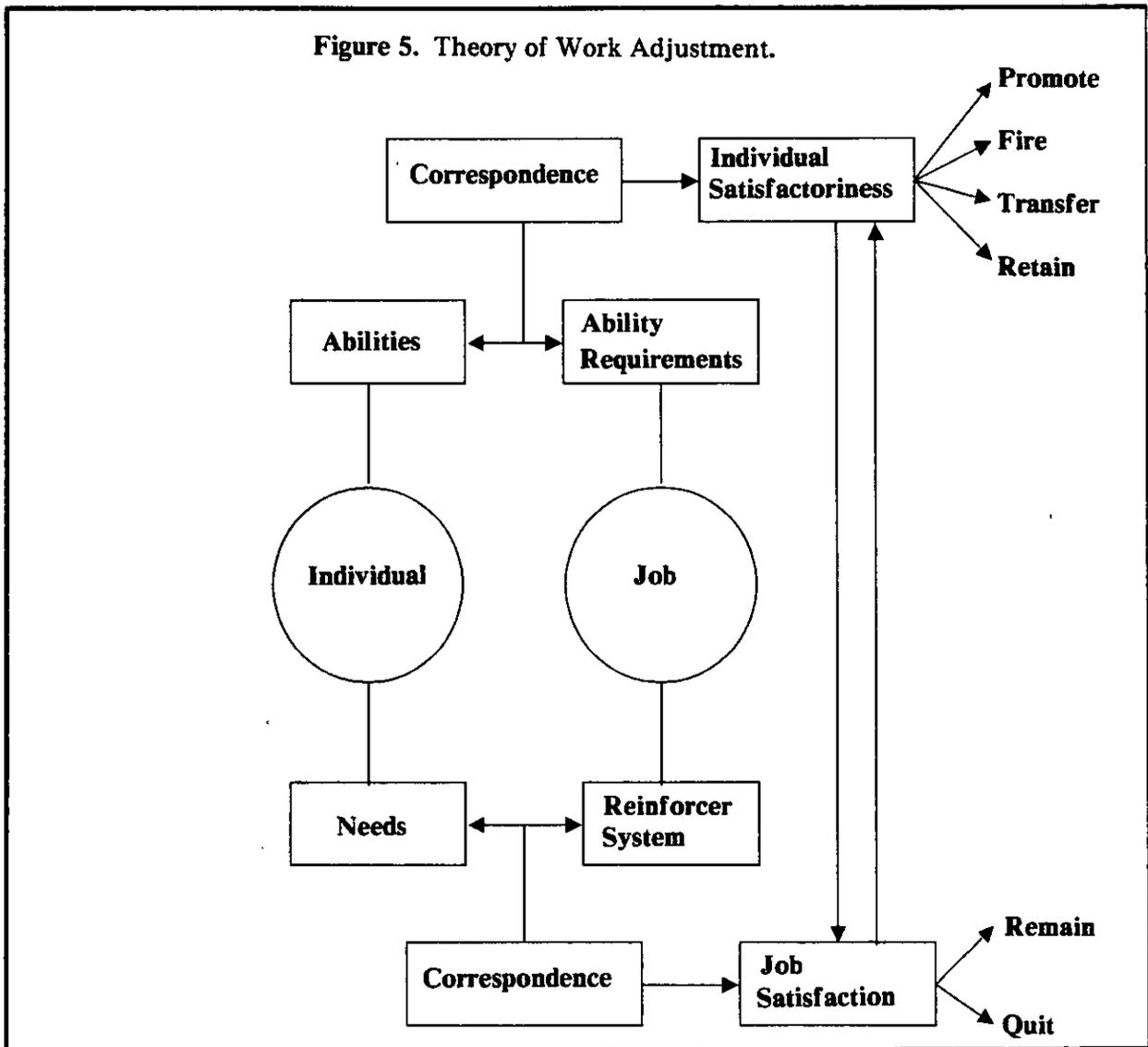
The small correlation between job satisfaction attitudes and job performance is worthy of careful consideration by IS attitude researchers. If job satisfaction and IS satisfaction are closely related, it suggests that IS satisfaction and performance are also only weakly related, and we might begin to look for another line of work. If, on the other hand, we still believe that IS satisfaction is related to performance, it becomes critical to understand the ways in which IS satisfaction is similar to job satisfaction, and in what ways it is different. Our definitions of IS satisfaction must be sufficiently refined and clarified to allow this.

Extensions from job satisfaction research: a definition for IS "satisfactoriness"

The theory of work adjustment (Dawis, Lofquist and Weiss, 1968) provides a structure within which job satisfaction and IS attitudes can be distinguished. That model is shown in Figure 5, with individuals and jobs in the center of the diagram. In the model we see that individuals have needs and they have abilities. The job has ability requirements and it has a reinforcer system.

The correspondence between the individual's needs and the reinforcer system leads to job satisfaction, which in turn leads to a decision to remain on the job or to quit. Job satisfaction is an *attitude* held by the individual about the *subjective* characteristics of his job. It is measured by a questionnaire, given to the individual, in which all questions are of the form "How do you *feel* about" various aspects of the job (Weiss, Dawis, England and Lofquist, 1967).

Satisfactoriness is a *belief* held by a supervisor about the *objective* fit between an employee and his job. The correspondence between the individual's abilities and the ability require-

Figure 5. Theory of Work Adjustment.

ments of the job leads to the individual's satisfactoriness for the job, which in turn leads to decisions to either promote, fire, transfer, or retain the individual. It is measured by a questionnaire given to the supervisor in which questions are of the form, "Compared to others in your experience, how does this person rate" on various aspects of the job (Gibson, Weiss, Dawis and Lofquist, 1970).

In the model we see that an individual's job satisfaction attitudes can be a factor leading to a supervisors belief in that individual's satisfactoriness on the job. Also, a supervisor's belief in

an individual's satisfactoriness can be a factor leading to an individual's job satisfaction attitudes. However these links are not necessarily strong. They correspond to the (.17) correlation between satisfaction and performance found by Iaffaldano and Muchinski.

Figure 6 extends the theory of work adjustment to include an information system which has certain functionality and also has certain intrinsic benefits of use, such as providing a sense of accomplishment due to crisp attractive output, providing a sense of control due to complex but predictable functions, etc. The correspondence
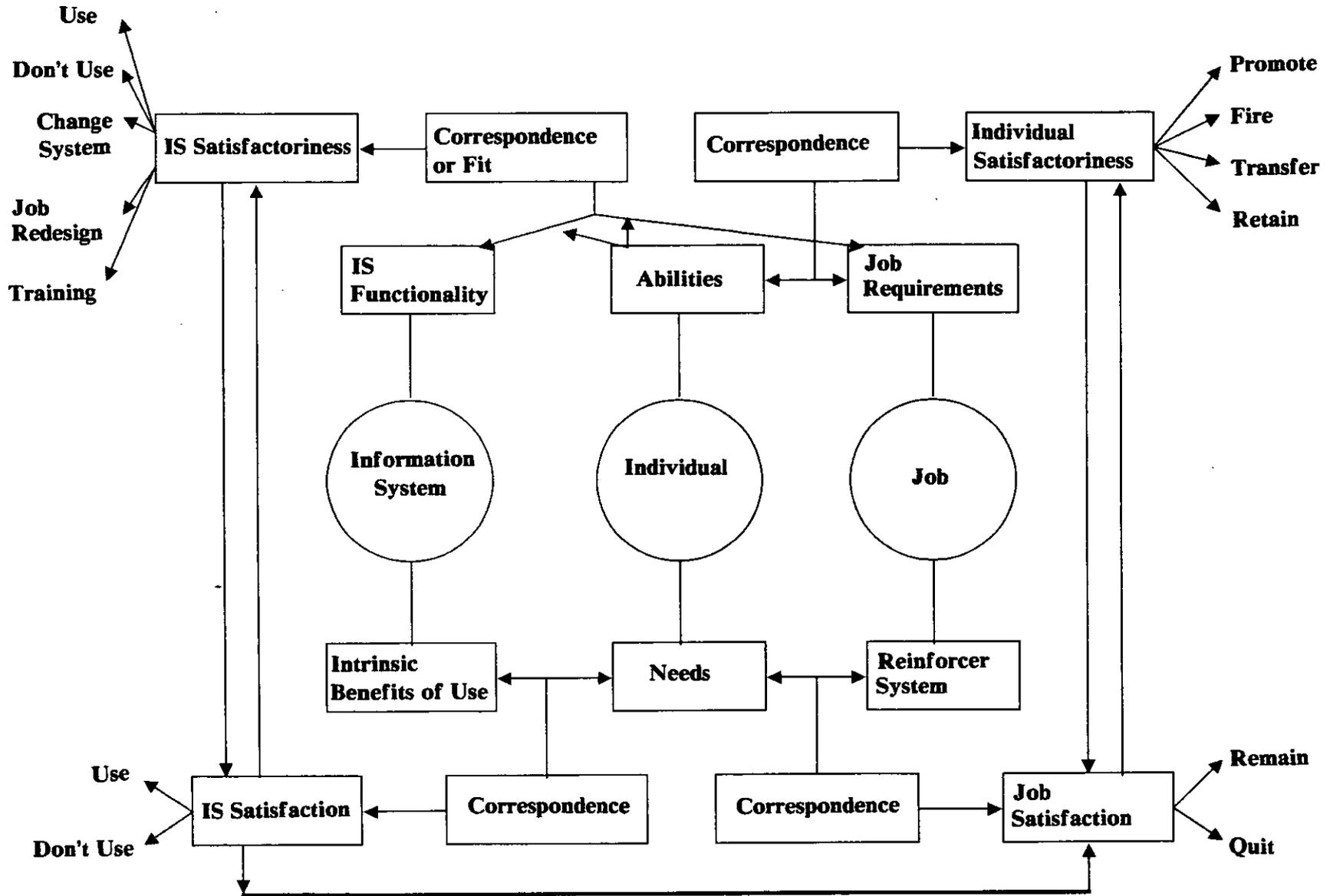
Use

Don't Use

Change
System

IS Satisfactoriness

Correspondence
or Fit

Correspondence

Individual
Satisfactoriness

Promote

Fire

Transfer

Job
Redesign

Training

IS
Functionality

Abilities

Job
Requirements

Retain

Information
System

Individual

Job

Intrinsic
Benefits of Use

Needs

Reinforcer
System

Use

IS Satisfaction

Correspondence

Correspondence

Job
Satisfaction

Remain

Don't Use

Quit

Figure 6. IS Satisfaction and IS Satisfactoriness.

between the information system's intrinsic benefits and the needs of the individual leads to the *attitude* of IS satisfaction for the individual, and presumably could be one factor in the decision of whether or not to use the system. These satisfaction attitudes would best be measured by asking individuals how they "felt" about certain subjective aspects of the system.

The correspondence between job requirements and IS functionality, mediated by individual abilities, leads to an individual's *belief* in IS satisfactoriness. To maintain the parallel with the theory of work adjustment, we would say that the individual rates the satisfactoriness of the system, much as the supervisor rates the satisfactoriness of the individual.

The belief in IS satisfactoriness leads presumably to a number of decisions. One of these is the decision of the individual to use, not to use, or to replace the system, based purely on his appraisal of its functionality for him in his task. Two other decisions would be more managerial in tenor: to redesign certain processes or tasks based on an appreciation of the functionality of the system for potential tasks, or to embark on a training program based on the recognition that abilities of employees were a limiting factor.

IS satisfaction, by this definition, could lead to (or be a component of) greater job satisfaction, since it implies that an individual's needs were met. IS satisfaction could also lead to IS satisfactoriness and vice versa. We might expect these last links to be as weak as the .17 link between job satisfaction and performance. However, since IS satisfaction and IS satisfactoriness are much more specific than job satisfaction and satisfactoriness, the link might be stronger.

An additional appeal of this model is its ability to distinguish between the use of a system because it is fun or satisfying, and the use of a system because it assists in getting the job done. This is important because of the concern of many managers that though their people are buying and using PC's in increasing numbers, there may no business justification or performance increase. This model allows us to discuss that concern in a theoretical context.

IMPLICATIONS OF THE IS SATISFACTORINESS MODEL

By extracting only the constructs relevant to IS satisfactoriness from the model of IS satisfactoriness and satisfaction, we have a new model which relates the fit between task requirements and IS functionality to individual performance, as shown in Figure 4. We can now define IS satisfactoriness as the degree to which an IS environment assists individuals in performing their job related tasks. The model and the associated definition build off the conceptual thinking and the reference discipline of job satisfaction research.

This model of IS satisfactoriness identifies the correspondence between task needs and IS functionality as a prominent feature in the landscape of the system-to-value causal chain. Because of its prominence, it is a strong candidate as a basic and standardized construct around which the field could begin to build a body of research. This correspondence sits between system and policy antecedents (user involvement, % of time in development phases, system characteristics, etc.) and value consequences (perceived value, measured performance, use, etc.). Of course it is not the only construct needed for understanding the system-to-value causal chain. Another, not discussed in this paper, is the organizational/political impact of system success.

The model of IS satisfactoriness is a significant step forward in clarifying what we should try to measure when we want to measure the efficacy of information system characteristics or policies, but cannot measure success directly. It differs from previous conceptions of IS attitudes or satisfaction in several ways. Most importantly, it focuses on the correspondence between task requirements and system functionality as the mechanism by which systems create value. Second, it implies that we should be focusing on beliefs not attitudes of the users.

The emphasis on task has a number of implications. It underlines the fact that systems and functionality have no value in themselves, but only in their relation to tasks. This suggests that IS research should move toward a better balance between emphasis on managers, organizations, and how they operate, on one hand, and characteristics of systems and IS policies on the other. It also suggests that research which attempts to

measure the value of aspects of a system (graphs versus tables, for example), without explicitly considering whether the appropriate task domain has been included, might be far less generalizable than would have been hoped.

The model of IS satisfactoriness is also different in that it clearly focuses on *beliefs not attitudes*. It proposes that we should ask the respondent of a questionnaire to report his *beliefs*, as an expert witness, on the objective correspondence between his task and the system he has access to, rather than eliciting *attitudes* or feelings about the system or its use. Thus we should ask individuals not whether the system has accurate data (a question the individual may not be qualified to answer objectively), but whether it has data accurate enough for his tasks. We should ask not whether data on the system is accessible, but whether it is accessible enough for him in carrying out his tasks.

Several of the questionnaires reviewed in this paper have mixed subjective satisfaction attitude questions with objective correspondence belief questions. For example, Bailey and Pearson (1983) include many questions which appear to tap into objective task and system correspondence:

Currency--The age of the output information (adequate vs. inadequate), and

Accuracy–The correctness of the output information (sufficient vs. insufficient).

They also ask subjective satisfaction questions:

Expectations--The set of attributes or features of the computer-based information products or services that a user considers reasonable and due from the computer based information support rendered within his organization (pleased vs. displeased), and

Job Effects-The changes in job freedom and job performance that are ascertained by the user as resulting from modifications induced by the computer-based information systems and services (liberating vs. inhibiting).

The results of these questions are combined without recognition that they are measuring quite different constructs.

Finally, although the new model does not explicitly state any internal structure of the construct of user beliefs about information systems, it does provide guidance in thinking about that internal structure. The model shows that user beliefs about IS is a function of the fit between the task environment and the IS environment. Thus the internal structure of user beliefs should be related to the structure of the task environment and to the structure of the IS environment. Better understanding of the internal structure of user beliefs should come hand in hand with better understanding of the task environment of users.

CONCLUSION

Our review of IS attitude research points up the lack of a strong theoretical basis for our models relating attitudes with systems and policies on the one hand, and with measures of value or success on the other. The result is the use of inconsistent theoretical constructs in our research, and an inability to interpret across studies or to build a shared theoretical base.

This paper has built upon research on the relationship between job satisfaction and performance to construct a model in which the correspondence between system functionality and task needs leads to individual performance. We also suggest that we can measure that correspondence by questionnaires that ask users for their objective belief in the degree of fit between their tasks and their systems.

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