

**Bringing the Adopter Back Into the Adoption Process:
A Personal Construction Framework of Information Technology Adoption**

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Abstract

This paper proposes an integrative theoretical framework for studying the personal construction processes underlying information technology adoption. Questioning simplistic assumptions of extant theory, we argue that explicit consideration of such processes offers better understanding of technology adoption. An exploratory study provides empirical evidence and motivates insights for future research.

Key words: Personal Construction Theory, Technology Adoption, Innovation Management

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INTRODUCTION

Extant research on information technology (IT) adoption has taken primarily a social constructivist perspective, while giving sparse attention to the related adopter level personal construction processes. However, recent trends in social constructivist analysis (Walker 1996) have effectively abandoned any active or creative role for the individual adopter when considering the nature of social influence (Epting et al. 1996). The social constructivist analysis, operating from the position that the "human mind takes its origin in the social world and especially in the structure of language" (p. 15), has also been criticized for abandoning the active, meaning-making person (Rychlak 1990) in the technology adoption process. Given that the personal construction theory has a much more active role to offer the adopter in the technology adoption process, IT adoption may be understood better by using the lens of personal construction. The intent of this paper is to propose an integrative theoretical framework for understanding IT adoption from a personal construction perspective. Departing from the social constructivist view that considers the adopter as being motivated by external 'stimuli', our framework views the adopter as "basically a behaving organism" (p. 48) and treats individual adoption of technology as a process motivated by the adopter's anticipation of the future (Kelly 1963). In doing so it also offers a contrast to the social deterministic perspective that considers the adopter "as an inert object wafted about in a public domain by external forces" (p. 55). The contrasting view of personal construction, supported by suggestive evidence from the exploratory study, provides insights for developing better understanding of IT adoption besides suggesting other areas of potential contribution in innovation management.

The Contrast and Its Implications

IT adoption, when viewed as a process of fostering and understanding change, may be better understood by using the personal constructivist perspective rather than the social constructivist and the social determinist views (Walker 1996). The personal constructivist view suggests that adopters "differ from each other in their construction of events," however, they can "find common ground through construing the experiences of their neighbors along with their own" (Kelly 1963, p. 55). Kelly called the former assumption as *individuality* and the latter as *communality*. This view admits that individual adopters, through their socialization into, interaction with, and participation in the social context of technology give a certain meaning to the social reality of technology (Orlikowski and Baroudi 1991). Although it accepts the notion that individual adopters in similar situations *may* "enact meanings from it in compliance with the same rules, assumptions, possibilities, and constraints presented by the same social construction" (Lee 1994, p. 154), it posits that these individual level meanings are based on different personal constructions, and they may or may not be shared.

In the social constructivist view, the social situation is used to define the person; the person is considered a more or less passive participant in the flow of events (Epting et al. 1996). Being skeptical of the monistic nomothetic view of a social reality independent of the personal reality of the adopter (cf: Lee 1994), the personal constructivist view argues for individuality and communality to be treated on a more equitable basis (Walker 1996):

"the study of a person's community experience would not be complete unless we attempted to see the background at the neighborhood level through the eyes of the person himself" (Kelly 1955, p. 716).

Hence, within the proposed framework, individual adopter's personal construction of the social construction of technology is as important as the social construction itself.

Also, the personal construction view does not fully accept the assertion that external forces (e.g., situational factors or pressures from powerful individuals) (Markus 1994, Pfeffer 1982) drive adoption behavior. It counters the social deterministic view by proposing that determinism doesn't preclude individual free will or choice (Walker 1996). It views the individual adopter as being motivated by the anticipation of the future, and adoption of technology as an ongoing process of making sense of technology.

INTEGRATIVE THEORETICAL FRAMEWORK

The proposed integrative theoretical framework draws upon three different, but related, personal construction themes: Dewey's (1933) philosophy of reflective thinking and action; Kelly's (1955) personal construct psychology; and Bruner's (1973) schema theory with its focus on the individual interpretive task of going beyond the information given. The three perspectives have been earlier applied together for studying the information seeking behavior of library patrons (Kuhlthau 1993). We use them as three lenses that can provide a richer understanding of the personal construction processes underlying IT adoption. The following discussion provides a delineation of the three theoretical perspectives of personal construction. Integrative understanding resulting from the three perspectives contributes to the depiction of the proposed theoretical framework. This framework is then used for developing an understanding of the technology adoption processes.

Dewey's Philosophy of Reflective Thinking and Action

This theoretical view suggests an active, reflective and interpretative picture of the person when he or she encounters a new technology. Reflective thinking seeks connections between the actions and their consequences to achieve an understanding that is generalizable to other

situations: "the power to retain in one's experience something which is of value in coping with the difficulties in a later situation" (Dewey 1944, p. 44). Reflective thinking involves five "phases" or "aspects": Suggestion, Intellectualization, Guiding Idea or Hypothesis, Reasoning, and Test of the Hypothesis by Action (Dewey 1933, pp. 102-118). In all five phases, the individual plays an active role in the process of converting facts or data into action.

"Mere facts or data are dead" unless given some interpretation by the individual. Faced with a situation, the "pre-reflective" state, which is characterized by perplexity or confusion, sets the problem to be solved. In the Suggestion phase, the "mind leaps forward to a possible solution." Direct or overt action is restrained. Instead, an idea or suggestion, which is "a vicarious or anticipatory way of acting" is generated. The pros and cons of various suggestions are analyzed in terms of "purpose and its conditions, its resources, aids, and difficulties and obstacles." Intellectualization phase involves translation of what is initially an *emotional* quality" or "annoyance" of the situation into a precise conceptualization of the problem from the observed conditions. In the Hypothesis phase, the suggestion is converted into a more definite supposition or a hypothesis by analyzing the problem with respect to the suggestions. Reasoning phase depends upon existing knowledge and involves elaboration of suggestions into consequences and their rejection or acceptance. Reasoning suggests the possible consequences of acting on each idea. The final phase of Testing by Action involves overt action to provide "verification of the conjectural idea." The five phases may occur in any order and may telescope into each other (Dewey 1933, pp. 102-118).

Thus, IT adoption, as viewed by Dewey (1944), is an active individual process involving action and reflection. The Personal Construct theory (Kelly 1963) provides a psychological

interpretation of the potential adopter.

Kelly's Personal Construct Psychology

The fundamental postulate of the Personal Construct theory is that constructs are created from an individual's experience in order to anticipate future events: "a person's processes are psychologically channelized by ways in which he [or she] anticipates [future] events" (Kelly 1963, p. 46). This fundamental postulate suggests the model of a 'human as scientist' - who tries to make sense of the world and tests that sense in terms of its predictive capacity. Individuals use constructs to make sense of the world and anticipate events by "construing their replications" - by erecting constructs of similarity and contrast for the various elements that are construed. The process of construction, which is highly individualized and based on one's existing system of personal constructs, is aimed at finding meaning and thus extending and defining one's system of constructs.

Since constructs are specific to individuals, therefore in the personal constructivist view, unlike the behaviorist perspective, behavior is highly individualized. Contradicting the stimulus-response connection suggested by behaviorist psychology, Kelly suggests that individuals respond to "*what they interpret the stimulus to be*" which is a function of the constructs they detect or impose upon the technology (Bannister and Fransella 1971, p. 21). It is possible for two persons who are involved in the construal of same technology to experience it differently because they construe it differently. Furthermore, because they construe the technology differently, they will anticipate the future differently and will behave differently based upon those anticipations (Kelly 1963, p. 90). Individuals adjust their constructs to better match the environment *to improve predictions of their actions*: "all of our present interpretations of the universe are subject to revision or replacement...there are always some alternative constructions

available to choose among in dealing with the world" (p. 15). Based upon the unfolding events, the individual validates one's [initial] assumptions and revises them in case they do not match the expected outcomes.

Individuals differ from each other not only in the events that they seek to anticipate, but also in their individual approaches to the anticipation of the same events (Kelly 1963, p. 55). The individuals differ in respect of how they perceive or interpret a situation, what they consider important about it, and what they consider its implications to be. Another important difference is in terms of whether different individuals perceive the technology to be threatening or promising, sought after or forced upon them (Bannister and Fransella 1986): "Each of us lives in what is ultimately a unique world, because it is uniquely interpreted and thereby uniquely experienced" (p. 10).

Although, there are individual differences in the construction of events, yet sharing of experiences among persons could occur "through construing the experiences of [one's] neighbors along with [one's] own [experience]" (Kelly 1963, p. 56). In case the persons are guided by different cultural identifications or personal considerations, they could be existing in the same [externally perceived] reality "but in altogether different subjective worlds" (p. 56). However, there may be some shared (common) aspect among the two individuals about which they may construe similarly i.e. "discriminate, interpret, see the implications of events, in similar ways" (Bannister and Fransella 1971): "They are similar in so far as, and with respect to, events which have the same meaning for them" (p. 30). To that extent of commonality of the construction of experience, the psychological processes may be construed as similar between the two persons (Kelly 1963, p. 91).

To play a role in the social process involving another individual, one needs to effectively construe the construction process of another (Kelly 1963, p. 95). It does not imply that the two persons' construction processes should be similar - it only implies that the individual's construct system gives one a meaningful understanding of the other's construct system. This does not "make role a purely social construct, that is, see it as the acting out of a dialogue written for the two persons by the society in which they [are]" (Bannister and Fransella 1971, p. 31). Rather, individual reality is tuned to the socially accepted interpretation and this process of individual's adjustments of one's constructs may entail considerable anxiety and unrest.

The personal construct theory gives explicit recognition to the individual as a whole: comprising *both* rational *and* affective dimensions:

"The classic distinction which separates the two constructs has, in the manner of most classic distinctions that once were useful, become a barrier to sensitive, psychological inquiry" (Kelly 1969, p. 140).

The individual experiences certain predominant feelings during each phase of constructing new information into an individualized system of personal constructs. On encountering an unfamiliar technology, the individual's system of constructs is unable to incorporate it and the individual feels confused and perplexed: "almost everything new starts in some moment of confusion" (Maher 1969, p. 151). The prospect of the unknown may have a threatening effect on the individual. The individual may choose to reject the idea in this phase which is characterized as: "the threshold between confusion and certainty, between anxiety and boredom...[when] we are most tempted to turn back" (Maher 1969, p. 152). Or else, the individual may choose to formulate a hypothesis that can enable one to break through this moment of threat to get on with the task of testing to confirm or reject the hypothesis. The last phase of this "cycle of sensemaking" (Kelly 1963) involves assessing the result of the action and using that information to reconstruct or to assimilate the new

construct in the existing system of constructs.

The process of individual construction may not necessarily rely completely upon the received information. Bruner (1973) emphasizes the individual's ability to go beyond the given information to create a personal meaning in order to make better predictions for action.

Bruner's Perspective of Individual Interpretive Construction

The interpretive task of "going beyond the information given" is central to Bruner's (1973) constructive process. The interpretive task, which is highly personal and based on prior constructs, enables individuals to go beyond the given information to create something individually unique.

Bruner's interpretation utilizes the concept of "schema":

"that integrated, organized representation of past behavior and experience which guides individuals in reconstructing previously encountered material which enables people to go beyond evidence, to fill in gaps, to extrapolate."

The interpretive nature of personal construction is the key element of this perspective: one must "*suspend disbelief*"...in order to construct "multiple perspectives and possible worlds..." (Bruner 1986, p. 51-52). The constructive nature of thinking underlying schema theory treats individuals as actively involved in sense-making. This perspective considers the individual as "one who actively selects information, forms ... hypotheses and on occasion distorts the input in the service of reducing surprise and of attaining [understanding]" (p. 3).

Bruner used the concepts of uniqueness and redundancy of information to suggest the unequal treatment of all new information by the individual. He suggested that the individuals' abilities of recognizing similar patterns, inference and categorization allowed one to go "beyond the information given" by using probability and prediction (1973, p. 218-238). Prediction or expectancy is important in recognizing redundancy:

"Thresholds, the amount of time and input necessary for seeing or recognizing an object or event, are closely governed by expectancy. The more expected an event, the more easily it is seen or heard...The more unexpected the information, the more processing space it takes up" (1986, pp. 46-47).

There is an ongoing tension between uniqueness and redundancy of information which is experienced by the individual as the balance between anxiety and boredom. While uniqueness, within certain limits, keeps the human system on alert, too much familiarity may lead to monotony. While excessive uniqueness may cause uncertainty and anxiety, too much redundancy may result in disinterest and boredom. Feelings play a critical role in motivating and directing learning.

In fact, Bruner (1986) criticizes the existing conceptual split between the constructs of thought, action and emotion. To him the three represent an integrated whole:

"Emotion is not usefully isolated from the knowledge of the situation that arouses it. Cognition is not a form of pure knowing to which emotion is added ... [and] action is a final common path based on what one knows and feels. The three constitute a unified whole...To isolate each is like studying the planes of a crystal separately, losing sight of the crystal that gives them being" (pp. 117-118) .

He further suggests the importance of these linkages for the personal construction of technology: "linkages between emotion, arousal, drive on the one side and learning, problem solving, thinking on the other" (1986, p. 113). Most studies in the social construction of technology have focused primarily on the rational or cognitive "plane of the crystal." By proposing an integrative model that considers the "crystal" of affect, cognition and action, our framework attempts to bring the "unified whole" into perspective.

Summary

In summary, the personal constructivist theories view learning as an active, engaging process driven by feelings interacting with thoughts and actions. Affective experience plays a key role in guiding cognition and action throughout the construction process. The process of personal

construction is driven by a desire to make accurate predictions. This process is moderated by the tension between uniqueness and redundancy of new information. The integrated theoretical framework depicted in Figure 1 and elaborated on below provides the basis for the analysis of psychological processes underlying individual innovation adoption.

Insert Figure 1 about here

The Integrative Theoretical Framework

Based upon an integrated understanding of the three perspectives, we propose a theoretical framework of personal construction processes underlying IT adoption. The framework is depicted in Figure 1. The following discussion explicates how the framework of personal construction provides a more equitable treatment of the personal and social construction processes underlying technology adoption. The framework is further elucidated by the empirical findings from an exploratory study that focused on the adoption of a new information technology in a clinical unit of a metropolitan hospital.

Proponents of social construction theories have argued that members of social units develop shared beliefs about what a technology is good for in the process of using it (Barley 1986). For instance, in institutionalization theory, it is suggested that "[the] concept of 'appropriateness' evolves from the social organization, not from the valence of the behavior of the individual" (Goodman et al. 1980, p. 299). The key argument of social explanation theories is that social organization defines the appropriate behavior and individuals, to a great degree, are [passive] acceptors of the imposed [or coerced] reality. We contend that this explanation is too simplistic

given the dynamic and active nature of personal construction explained earlier. In contrast, the personal construction perspective "keeps open vast areas of social relationships to be explored by adventurous psychologists" (Kelly 1955, p. 179). However, within this framework, people are not necessarily the victims of their biographies or of their cultures (Rychlak 1990, pp. 17-18):

"...you cannot shape an organism that can think to the opposite of what you are shaping that organism to believe; at least you cannot shape it like you shape a lump of clay, or toss a basketball through a hoop... The person is always in the position of adopting the social norm or its opposite."

Another important distinction between the social constructivist position and the personal constructivist framework proposed above is related to the bipolarity of constructs. Both similarity and contrast are inherent in the same construct and the opposite pole of construing ("placing an interpretation") is one's way out of the current situation.

Using Personal Construction to Understand Adoption of Technology

In the proposed framework, the process of adoption starts with a state of uncertainty that exists when the individual first encounters the new technology. Uncertainty might increase if the new information about the technology is not consistent with the individual's existing system of constructs. This initial stage of the adoption is generally marked by "confusion, doubt, frustration, and threat" (Kuhlthau 1993) as the individual tries to resolve the differences between the new experience(s) and the existing system of constructs. New experiences are interpreted with reference to the existing system of constructs, which is in turn modified by newer experiences. At the individual level, this process involves an interaction between the affective (feelings) and cognitive (thoughts) aspects toward constructing the meaning of new technology, anticipation of future events by "construing their replications," and action based upon the anticipated implications. The individual tries to make sense of the technology and tests this sense in terms of its predictive

capacity. During the process of personal construction, the adopter chooses the construction which will extend and define one's existing system of constructs.

This view of psychological processes underlying individual adoption of innovation represents a contrast to commonly held assumptions about adoption. Using the theory of personal construction as a lens, we can begin to focus on the psychological *processes* underlying adoption behavior, which adds to the knowledge gained from studies that employ a variance theoretical perspective. Specifically, our view affords a richer understanding of the contextual and temporal factors that influence individual adoption. The contextual factors are related to the individual's existing system of constructs and the dynamics of the various stages in the assimilation of the new construct of innovation. The temporal dimension is related to the phased nature of the personal construction process in which outcomes are determined by "necessary conditions occurring in a sequence" (Markus & Robey 1988).

The theoretical framework suggests that typologies based predominantly upon *physical* interaction with innovation (e.g. 'early' and 'late' adopters), ignore the *psychological* processes of personal construction. Instead, from a PCT perspective, a typology that incorporates psychological acceptance with usage would be more useful. We therefore propose such a typology based on a construct we call *psychological acceptance*, which represents the *psychological* level assimilation or rejection of an innovation by the individual. This construct distinguishes the *physical* act of usage of an innovation from the *psychological* act of reconciling that innovation with one's existing system of constructs. We define *willful acceptance* as the assimilation of the new construct into the existing system of constructs and *coerced acceptance* as its opposite. *Willful acceptance* implies that the individual realizes a 'personal' meaning that he/she ascribes to the

innovation, thus leading to lesser inconsistency between the new concept and the personal system of constructs. The adoption process entails lesser uncertainty and confusion on the part of the individual who is more cognizant of the anticipated result of the action. In contrast, *coerced acceptance* would occur if the externally imposed concept is inconsistent with the individual's personal system of constructs. The adoption would only be superficial: at a deeper level, the individual is still unable to resolve the inconsistencies of the new construct with one's existing system of constructs. Alternatively, the individual resolves such inconsistencies by finding means of 'getting by' with the imposed construct or by indulging in what is generally perceived as deviant behavior.

The proposed theoretical framework highlights some of the key characteristics of the personal construction processes and the discussed contrast between the personal construction theory and the social constructivist explanations. Within this framework, adoption of technology is viewed as a dynamic process of sense-making in which the individual tries to assimilate the new construct in one's existing system of constructs. The process is driven by the model of man-the-scientist and rejects the split between affect, cognition, and action. The process of meaning creation is driven by the individual's personal construction, though the process of construing is socially constrained. The proposed framework rejects the monistic nomothetic views of social determinism and social constructivism, and attempts to consider the personal and social construction processes on a more equitable basis by encompassing both individuality *and* communality.

Put in more specific terms, the key propositions of this research program are the following.

Proposition 1: Information technology adoption, when viewed as a process of fostering and

understanding change, can be better understood as a function of social constructivist processes and personal constructivist processes.

Proposition 2: Effectiveness of information technology adoption, in terms of resulting performance, can be better understood as a function of the adopter's overt physical behavior manifested in technology utilization and his or her psychological acceptance underlying technology utilization.

METHOD

The empirical investigation was designed as an exploratory qualitative study to generate insights based on the processes outlined in the theoretical framework. Since not much is known about the personal construction processes underlying the adoption of information technology, an exploratory strategy was determined as the strategy of choice. The intent of the study was to gather exploratory evidence that reflects upon the preliminary assertions based on the theoretical framework and to motivate insights that contribute to a better understanding of the processes underlying technology adoption. Since the primary emphasis of the study was to understand the contextual and processual issues relevant to technology adoption, qualitative theory driven case study methodology (Benbasat *et al.* 1987, Eisenhardt 1989, Yin 1993) was the chosen methodology. Given that the focus is on how personal construction of an individual influences adoption, the appropriate unit of analysis is the individual actor. Although our empirical investigation focused on a "single setting" [of the information system implementation]...it is a multiple-case study, "relying on the comparative multiple-case logic of replication and extension [across various actors] for [its] theoretical insights" (Eisenhardt 1991, p. 622). Multiple case studies at individual level of analysis were done to facilitate "analytic generalization" (Yin 1994,

p. 30) by providing for a replication logic. Evidence from multiple case studies at the individual unit of analysis was expected to result in a more robust study (Herriott & Firestone 1983). The data was analyzed through "pattern matching," in which empirically based patterns were compared with predicted ones (Yin 1994). The data from the individual respondents was mapped on the process-based theoretical framework in terms of the categories listed under Results and outlined in the related tables.

External validity of the study was ensured by using "analytical generalization" (Yin 1994), i.e., by replicating the findings in several cases across three different categories of informants. Reliability of the study was ensured by using questionnaires and interview transcripts (Yin 1994). Literal replication across various cases enhanced the internal validity of the findings of the study.

Site Selection and Description

The context of the empirical study was the implementation of a newly computerized [patient] functional assessment information system in a clinical unit of a metropolitan hospital. The computerization essentially consisted of a distributed database system that has strategic and functional implications for the clinical unit as well as the medical center.

The investigation focused on the period immediately following the installation of the information system. The majority of IS users in this study did not have any prior experience with computers. For most users, [mandatory] computerization of a significant aspect of their jobs represented the introduction of a novel construct. Mandatory computerization of a significant aspect of the novice users' jobs offered a rare opportunity to understand their processes of personal construction.

The field study context of this research was based on the knowledge of the background of

the selection of the specific system, the organizational context of innovation adoption, the social and personal constructive processes operative in system implementation as well as the timeframe of initial adoption crucial for understanding the dynamics of the focal processes. Based on initial investigation, the researcher had made the following observations that provided the justification for selecting the site and the sample for this specific research study.

The implementation primarily affected a small group of persons -- including technology champions, primary information system designers, and the end users of the information system. The limited number of individuals involved in the innovation implementation suggested that both social construction processes and the individual construction processes could be well understood using the individual level case studies guided by interviews and observations. Given that the initial implementation of technology was relevant for understanding the *transitions* in usage behavior based on *initial exposure* to the new information system, the timing of the study as well as the total time involved in the study were relevant factors. Given that most users were novice computer users, although both supervisors were relatively familiar with the use of computer systems, the sample of respondents offered the potential for understanding the variance in adoption behavior. The technology champions, who were also senior physicians, were the formal administrative heads of the focal organizational unit. The champions, along with the system designer, offered the contrast of the social construction vis-a-vis the personal constructive processes of end users. Preliminary investigation had suggested the potential of observing the variance in unique personal sense-making processes as the novice computer users became familiar with the use of the new graphical user interface. As noted by one of the supervisors, the transition from a manual paper-based system to a computerized system that tracked all changes made in the patient records,

and needed superior's password access for making any corrections, was interpreted by a couple of users in terms of a personal integrity issues. What represented a data security issue to the champions and the system designer, became an issue of personal integrity and trust for a couple of users. Such preliminary observations justified the selection of the site and the sample for understanding the contrast between the social construction processes and personal construction processes, as well as the physical adoption behavior and the underpinning psychological acceptance of individual adopters.

The Field Study

Primary data collection was through semi-structured interviews, supported by inspection of archival records and participant observation in simulated settings. Preliminary information about the system was gathered through informal discussions with a manager familiar with most aspects of the implementation of the system. The system progress report containing key information about the computerization was reviewed to develop an understanding of the implementation process. Key user groups affected by the system were identified from the distribution list appended to this document. These inputs were used in the selection of specific individuals from different groups to be interviewed for the case studies.

Focused interviews (Merton, Fiske and Kendall 1990) of ten respondents directly involved in the adoption of the new technology were conducted. Most interviews lasted between one and one-and-half hours while some exceeded two hours. All interviews were tape-recorded with the permission of respondents who were assured of complete confidentiality and anonymity. Respondent-specific problems - such as bias, recall, inaccurate articulation and reflexivity (Yin 1994, p. 80) - were minimized by corroborating evidence from various informants about the same

context. Standard guidelines for composition of questions (Dillman 1978; Warwick and Lininger 1979) were also observed to minimize problems related to questions and their construction. The interview data was supplemented by 'online' demonstrations presented to the investigator by the system designer and two different users. Construct validity was further enhanced by having a draft of the paper reviewed by the users familiar with most aspects of the implementation (Yin 1994, p. 145-46).

While general cross-case comparison was done to elicit any contrasting insights between the ten cases, six out of ten individual cases were chosen for in-depth comparative analysis. These cases were chosen because they represent extreme situations and polar types in which the process of interest is "transparently observable" (Eisenhardt 1989, Pettigrew 1988). These cases comprised archetypes of both the social constructivist perspective and the personal constructivist framework. The cases of the IS champion and the system designer represent archetypes of social constructivist theories (Markus 1994) against which personal constructions of four different IS users are contrasted and compared. The four 'polar' user cases are also compared across themselves.

The following discussion provides an analysis of the findings based on the proposed theoretical framework and insights for motivating future research based on the framework.

RESULTS AND DISCUSSION

A comparison across the ten cases suggests that the personal constructions underlying adoption of technology were clearly distinguishable from the socially mandated constructions. Specifically, while the social construction imposed the *meaning* of improved efficiency on adoption of new technology, not even a single user's personal construction realized this meaning. While the managers had tried to "sell" the technology to the users suggesting that it would improve

their work performance, *every one* of the interviewed users denied the actual realization of that social construction. In-depth analysis of the polar cases suggests that each of the actors was able to impose one's own personal construction on the new technology. For each of them, the new technology represented a *unique personal meaning* that derived from one's existing system of personal constructs.

The objective of the following discussion is to elucidate issues pertinent to the proposed theoretical framework and provide an appreciation of the personal construction processes underlying technology adoption while delineating the contrast with the social constructivist view.

Cross-Case Comparison of Personal Constructions

A comparison of the characteristics of the four 'polar' users discussed in this study is given in Table 1. The comparison is expected to suggest the contrast between their personal constructions and the social constructivist view of adoption. In the social constructivist view, the users are *expected to adopt* the socially enforced norms and such adoption would be influenced by their indoctrination in the specific social setting. In contrast, the personal constructivist view suggests that the users retain the *choice to adopt or reject* the socially enforced norms of the specific social setting. Further, they also retain the choice of alternative interpretations of whatever they make sense of, the philosophical position termed *constructive alternativism* (Kelly 1955).

Insert Table 1 about here

User 1 and User 2 have no direct interface with the idea champion or the system designer. User 3 and 4, being higher in the hierarchy, have direct interface with the idea champions and the system designer. Although User 1 has joined the clinical unit only recently and could be considered a late adopter, yet according to our framework she is a 'willful' adopter. On the other hand, User 2, having used the computerized system for a fairly long duration, could be considered an early adopter. However, according to our framework, she is a 'coerced' adopter who is slowly realizing the benefits of the system. Although User 3 and 4 are comparable in most regards including the duration of new system usage, yet User 3 is a 'willful' adopter while User 4 is a 'coerced' adopter who would rather prefer the older manual system. Our reasoning is that the differences in the adoption behavior of these users may be better explained using the personal constructivist framework proposed in this paper. Our argument is further supported by the comparison of various individual users delineated in Table 2 and Table 3. Selected quotes from various actors have been restricted to these tables because of space constraints, however the interesting observations and insights are summarized below.

Insert Table 2 and Table 3 about here

Personal Construction of the Social Objective of Adoption: The idea champion and the designer emphasized the strategic implications of the system and the benchmarking and research capabilities offered by it. While User 3 is closest to this aspect of social construction, the individual constructions of User 1 and User 4 seem to suggest otherwise. This could be attributable

to their expectations about the efficiency considerations, specifically the time-savings. Some users seem to have considered the time-savings factor as the primary potential benefit of the system and yet have to perceive its realization.

Personal Construction of Benefits Accruing From Technology: The idea champion recognizes the imperative need for the various users to "become invested" in the computerized system. Although User 3 and User 4 had both been involved in the system development process, they have differing perspectives of their "investment" in the system. Whereas User 3 clearly recognizes the potential of the system even though she hasn't experienced any immediate benefits in terms of efficiency or productivity gains, User 4 doesn't perceive the system to hold any benefits at all. User 1, although having little experience with the computerized system, is positively invested in the system, given her existing system of constructs that can relate with her prior experience. Furthermore, this person seems to be motivated by her sense of "entering into a world of tool use which was sort of vital to my own well-being and survival in a sense...for [remaining] years of my life."

Personal Construction of the Contrast between Computerized and Prior Manual System: In consonance with the idea champion and key designer, User 2 recognizes the 'neat' and 'organized' presentation of the computer interface compared with the 'bunch of transparencies' used earlier. However, User 4 finds the system more cumbersome for doing tasks that she could do with transparencies. These interpretations of the two users are consistent with their existing system of constructs.

Personal Construction of the Social Construction (Management's Normative View): The intent of the new system, as suggested by the idea champion, was to reduce the routine paperwork done

by the users and to improve the productivity of patient-treatment. Surprisingly, most users indicated that they have not experienced productivity increase by computerization. Some of them noted that the computerized system is less efficient than the manual system because they perceived it as having built in inefficiencies that did not exist in the manual system. Given the explanation provided by User 4, it can be argued that such interpretations could very well be a result of their own personal constructions.

Contrasting the Social Construction and Personal Constructions

It was earlier noted that the case of the idea champion and the system designer together provide the context of social construction (Markus 1994) against which individual constructions of various users can be compared. The following issues are anticipated to highlight the contrast between the social construction of technology and the corresponding personal constructions of the IS users.

Willingness of the Users to Adopt the Computerization: The social construction view provided by the designer is that users would not want to learn the new technology if they can survive without doing so. This could be true about the first reaction of some users who had never interacted with computerized systems. Although users had difficulty in learning the new technology, most of them did not seem to be 'not wanting' to learn if given a choice. Even 'coerced' adopters such as User 2, expressed their realization of this occasion [of implementation of the computerized system] as a rare 'opportunity' despite their frustration associated with the learning process.

Data Integrity versus Individuals' Integrity: The security and controls built into the system reflect the social construction perspective for maintaining data integrity. Some users recognize the broader implications of the security and controls built into the system. However, a few users are *probably* not cognizant of the importance of these implications and consider it as an issue that

reflects on their trustworthiness. In the computerized system, they cannot correct any erroneous data that is entered once and they treat this as an issue about 'honor system.' Perhaps, in absence of correct information, individuals try to formulate their own hypotheses to reduce surprise and attain understanding (Bruner 1986). For instance, the personal construction of some coerced users [such as User 4], however, motivated them to circumvent these controls for achieving their expectations of efficiency gains from the computerization.

The System is Too Easy to Use: From the social construction context provided by the designer's and idea champion's perspectives the system is pretty easy to use. Given their extensive familiarity with the Windows-based interface and peripherals, this is not at all surprising. However, from the perspective of most users, the system entails complexities that are not apparent to a user well versed with the system. The rational assumption of simplicity of the system implicit in the construction of the system designers and trainers is not shared by most users. Such users, who had never been exposed to a computerized interface were 'overwhelmed' on their exposure to a multi-tasking environment [such as Windows].

Utility of Training Imparted to Users: Based upon the assumption of simplicity, a very brief training session (lasting approximately fifteen minutes) was conducted for most users. Not surprisingly, most users noted the inadequacy of the training provided to them. The social construction context provided by the idea champion and the system designer seemed to view the training in Windows and some applications (such as WordPerfect) as "additional advantages" that users would achieve from the training. The individual construction of most users, however, presented a different picture. The training in applications peripheral to their tasks was perceived as an additional burden irrelevant to their tasks.

Findings from these cases suggest that various facets of technology adoption can be better explained by taking into consideration the personal construction framework while suggesting that the extant social constructivist views are limited in their explanation of the technology adoption process.

CONTRIBUTIONS AND FUTURE RESEARCH

The proposed theoretical framework and the evidence from the exploratory study suggests that the adoption of a specific technology is dependent upon the extent to which the adopter finds it personally relevant or meaningful. Existing research in IT adoption suggests that most extant measures of *adoption* have used the term synonymously with *usage* of technology. Furthermore, the personal construction view, by treating IT adoption as a process influenced by the assignment of a personal meaning by the adopter, attempts to fill the existing void of research on 'intrinsic motivation' (Davis 1989). Lessons are also drawn for the related issue of management controls for technology adoption. Given the dependence of technology adoption on the meaning making activity of potential adopters, 'management of meaning' seems to be a necessary ingredient of management control.

Reassessment of the Construct of Technology Adoption

We observed that use of a new technology doesn't necessarily correlate with the personal meaningfulness assigned to it by the adopter. This insight suggests the need for theory development and empirical research that can address the confusion caused by treating *adoption* as synonymous with *usage* of technology. We found that the users who are able to assign a personally meaningful construction to the technology demonstrate greater affinity for using it. In this view, measures such as 'early' and 'late' adopters and 'duration of adoption', need to be qualified by

determining *psychological acceptance*, i.e., personal meaningfulness of a specific technology. Our framework emphasizes that the construct of *innovation adoption* is incomplete, and would benefit from considering the adopter's overt behavior together with the underlying psychological commitment to innovation use. The distinction between coerced and wilful adopters observed in our study offers one starting point for future work on this issue.

The distinction made between *willful* adopters and *coerced* adopters may be viewed in terms of *compliance*, "the acceptance of influence in order to gain specific rewards and to avoid punishments," and *internalization*, "the acceptance of influence because it is congruent with a worker's values" (Sussman and Vecchio 1991, p. 214). While the former relates to the mainstream social constructivist and social determinist views, the latter is consonant with the personal construction framework. Our argument is that the employees who are able to assimilate the new construct of technology with their existing systems of constructs and thus able to generate a personally meaningful construal of the innovation, would be committed and enthusiastic. In contrast, those who perceive technology use merely as a means of avoiding punishments are likely to be compliant -- "proforma and uninvested" (Klein and Sorra 1996, p. 1061).

Social Constructivist View and 'Freedom to Choose'

Although, extant social constructivist views (cf: Markus 1994) suggest that "members of social units..develop shared beliefs about what a technology is good for in the process of using it" (p. 508), the proposed theoretical framework provides a different perspective. Rejecting the social deterministic view of adoption, it suggests that individual adopters are *free to choose* whatever will extend and define their existing system of constructs. Our reasoning is that the degree to which the beliefs of individual users are shared is not only a function of the social processes, but also the

individual's personal construction based on one's existing system of constructs. Based on this argument, the extant research using social constructivist and social determinist views for studying technology adoption needs to be informed by the consideration of personal construction processes. The proposed theoretical framework of personal construction processes could be considered as a bridge for crossing the existing chasm between communality and individuality as applicable to technology adoption.

Management of Innovation versus Management of Meaning

The theoretical framework suggests that the current notions of management control and social control of organizational initiatives need to be reconsidered with regard to the personal construction framework. This framework suggests that besides studying such controls, it is important to also develop theory and research on such controls as they are 'seen through the eyes of the adopters.'

The social determinist and social constructivist views suggest that (Markus 1994, p. 508):

"sponsorship of a behavior by key members of an organization legitimizes the behavior and promotes its diffusion...behavior is perpetuated through...**socialization** of new members and the **social control** of deviants."

However, the personal constructivist view points out that such controls are as effective as their *construal* by the potential adopters of technology. Most IS research on innovation adoption and diffusion has been concerned with job performance as a consequence of innovation use (Fichman 1992, Mathieson 1991, Moore and Benbasat 1991). However, it has been suggested that people are sometimes unwilling to use information systems even if those systems could increase their job performance (Nickerson 1981). Our results suggest that the literature on management control needs to be informed by the *management of meaning* as underscored by the personal constructivist view.

Rethinking the Control of Deviant Behavior

Most social explanation theories discuss the technology adoption process in terms of 'sponsorship' of a behavior by key members and the 'social control' of deviants (Goodman et al. 1980, Markus 1994). In our view, these theories focus on the *apparent* or *manifested* behavior of individuals, which may be different from *covert* behavior. The behavior that is legitimized by the social structure would be the socially appropriate behavior. Individuals who do not wilfully accept that behavior may make attempts to simulate it while overtly deviating from it. There may in fact be no true adoption, but passive acceptance coupled with active resistance at the personal construction level. An example would be an individual's manifested acceptance of a new information system [such as e-mail or Internet] to adhere to the social norm, but making its minimal use in real life, often observed in some academic circles. In similar cases, it might be worthwhile to understand the 'deviant behavior' from the perspective of the deviant. With its historical tradition in the clinical study and psychotherapy of deviants, the personal construct theory may also provide a useful basis for studying such issues related to technology and innovation management.

Methodologies for Future Research

For operationalizing the issues mentioned above, one could either pursue more extensive case based methodology at multiple levels and attempt to generalize across different contexts of technology adoption. However, for multi-method validation of the above issues using quantitative methods, some existing research streams can provide the bases needed for further development. For developing the notion of compliance and internalization in the context of adoption of new

information technologies, one can conduct longitudinal analyses of such issues by using measures for psychological commitment in the context of adoption of new information technologies. Some research programs that have used this approach (cf: Malhotra 1997; Malhotra 1998), have found that *coerced acceptance* of new technologies may beget temporary compliance, however over time it may negatively influence performance resulting from technology use. Alternatively, one may use the framework of control issues to understand the self-determination of the individual underpinning the innovation adoption behavior. In this case, theory, methods and measures used by some other studies (cf: Kirsch 1996; Malhotra & Kirsch 1996) could help understand if the origin of the adopter's behavior lies internal or external to him or her. This approach provides another methodology for developing empirical understanding of psychological acceptance.

An alternative approach could involve using Kelly's (1955) repertory grid technique (repgid) for eliciting the qualitative and quantitative representations of the user's frame of reference. For instance, Kearns (1989, 1992) elicited twenty-five attributes of innovation including the five attributes suggested by previous research (Rogers 1995). He suggests that the explanatory power of this approach for predicting innovation adoption could be demonstrated by comparing the Innovation Preference scores [defined as the perceived relative desirability of each innovation with respect to all constructs] based on the elicited constructs with the scores for the pre-specified "imposed" constructs.

LIMITATIONS

The primary contribution of this paper is in terms of the theoretical development to explain existing gaps and inconsistencies in the extant research on social constructivist and social determinist views of innovation adoption and diffusion. In addition, we offered some illustrative

evidence in terms of a field study that focused on understanding the personal construction processes underlying the adoption of a new technology in a metropolitan hospital clinical unit. We realize that the case study methodology used by us is exposed to the limitations that are inherent in such an 'uncontrolled' methodology. However, given that the focus of our research was on understanding the processes underlying adoption and the relevant contextual factors, case study methodology is preferred over other research methodologies. The limitations of the case study were minimized by using a theory-driven approach that motivated clear theoretical questions and by using the generally recommended norms for ensuring reliability and validity in such an approach.

CONCLUSION

Extant research on IT adoption is constrained by its overemphasis on the social constructivist and social determinist views in which the adopter has been generally treated as a passive observer. The contrasting view of personal construction, supported by suggestive evidence from the exploratory study, provides insights for developing better understanding of IT adoption besides suggesting other areas of potential contribution in technology and innovation management. This view considers the individual adopter as being motivated by the anticipation of the future, and adoption of technology as an ongoing process of making sense of technology. The theoretical framework presented in the paper and findings from the exploratory study suggest that a *reconstruction* of the mainstream notion of *adopter* is necessary for developing a fuller understanding of IT adoption. Essentially, the active, dynamic, and sense making role of the adopter needs to be explicitly addressed in innovation and adoption research and practice. Implications of the theoretical framework and related findings are outlined in terms of contributions to the theory and

practice issues relevant to adoption behavior, social constructivist view, management control, and deviant behavior.

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**Fig 1. Personal Construction Processes in Technology Adoption:
An Integrative Model of Personal and Social Construction of Technology**

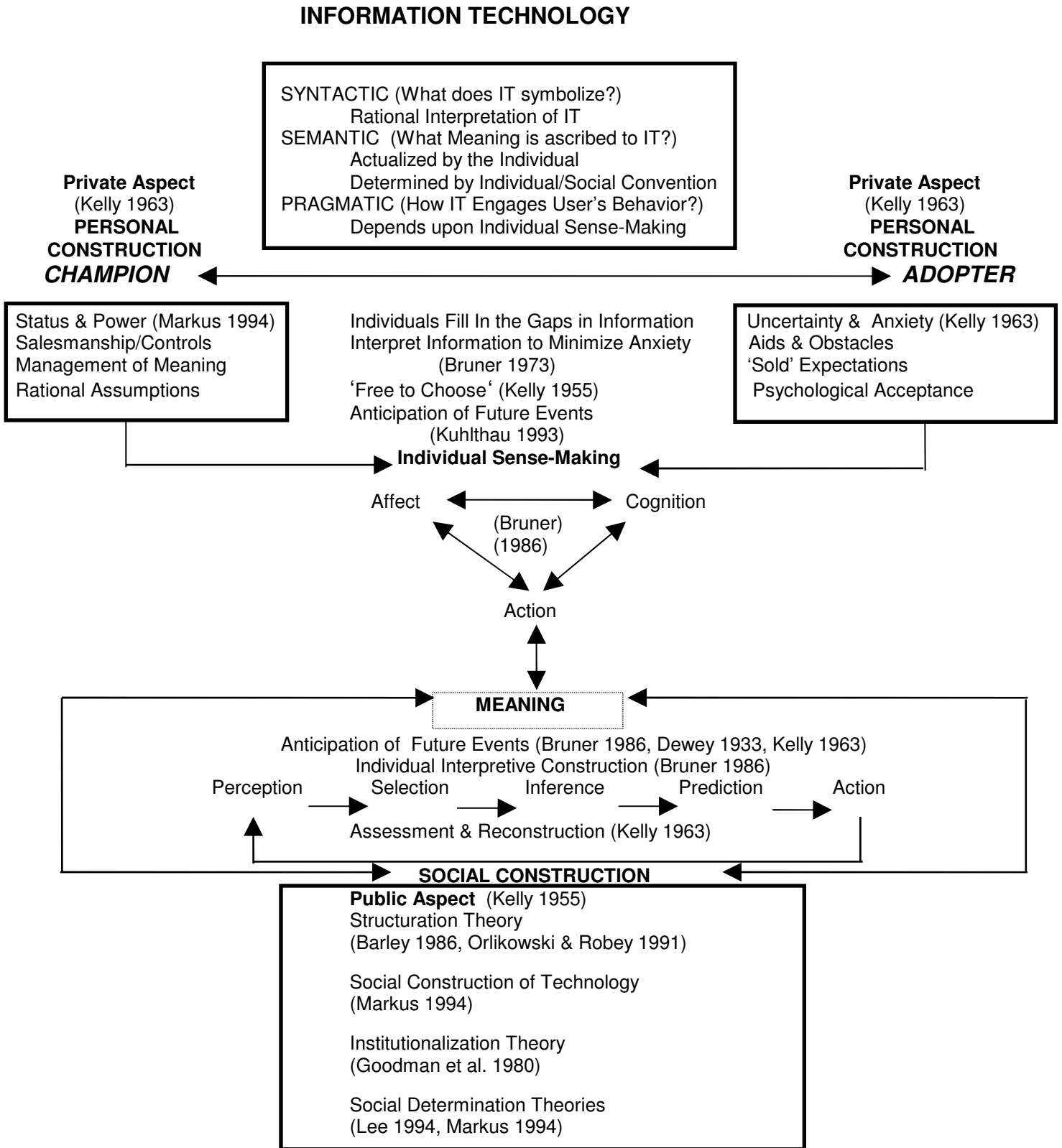


Table 1. Comparing the Social Constructivist and Personal Constructivist Models of Adoption

Users Characteristics	User 1	User 2	User 3	User 4
Attributes of the Individual Users (Correlates of Existing System of Personal Constructs)				
Position in the Unit	Staff	Staff	Supervisor	Supervisor
Nature of Work	Direct Patient Treatment	Direct Patient Treatment	Patient Treatment & Supervision	Patient Treatment & Supervision
Participation in System Planning	No Direct Participation	No Direct Participation	Indirect Participation	Indirect Participation
Prior Experience with Computers	Rudimentary	None	Negligible	Rudimentary
Prior Exposure to Similar Systems	None	Negligible	None	None
Exposure to Old (Manual) System	None	About six months	About six months	About six months
Training Imparted	Instructions from Supervisor	Brief formal orientation	Formal orientation	Formal orientation
Perceived Usefulness of Training	Little	None	Negligible	No comment
Correlates of Adoption and Adopter Categorization				
Used the Computerized System For	Six weeks	About six months	About six months	About six months
Adopter Category (Extant)	Late	Early	Early	Early
Acceptor Category (Proposed)	Willful	Coerced (rationally willing)	Willful	Coerced
Predicted Adoption Behavior Based on the Extant Social Constructivist View				
Attitude towards the Innovation	Less Positive	More Positive	More Positive	More Positive
Actual Adoption Behavior Based on the Proposed Personal Constructivist Framework				
Preference of System if given option	Want 'More' Computerization	'Doesn't want' the option	'Definitely' Computerized system	Can live with Computerized system, but can live without it.
Attitude towards the Innovation	Positive	Neutral	Positive	Somewhat Negative