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XI ● HUMAN COMMUNICATION TECHNOLOGY

- 34 ● The Case of the Intelligent
Telephone: The Relationship
of Job Category to the Adoption
of an Organizational
Communication Technology

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Instead of a one-to-one relationship between the technology and a particular organizational unit, the one-to-one relationship is between the tools and an organizational role. (Mohrman, 1982, p. 10)

Researchers are finding that the traditional process models of diffusion and implementation of computer-mediated communication technologies are occasionally inadequate for explaining why some innovations are adopted by the intended user community and others are rejected (see Berman & McLaughlin, 1978; Johnson & Rice, 1984, 1986; Rice, 1984; Rice & Rogers, 1980; Rogers, 1983; Yin, Heald, & Vogel, 1977). Thus, the search for a comprehensive adoption model continues.

The findings of a recent study by Manross and Rice (1986) involving the introduction of an "intelligent" telephone system at the West Coast offices of a Fortune 500 firm were yet another example of limitations in the traditional

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model of diffusion (Rogers, 1983). Results of the prior study showed that technical and political factors were more powerful explanations of different levels of adoption than were traditional measures of attributes of the innovation and organizational innovativeness. Further, both the level of adoption and the perceived benefits of the innovation differed according to job category—whether a potential user is a manager, technician, or administrator. This chapter looks more closely at the influence of job category on perceived benefits and level of adoption of the intelligent telephone system.

RELATING ORGANIZATIONAL ROLE TO THE ADOPTION OF THE INTELLIGENT TELEPHONE

Tushman (1979) argues that in order to be effective in their respective missions, subunits within organizations must be able to attend to and deal with work-related uncertainty. To do this, subunits must be able to gather, process, and export information as well as receive feedback from different information sources (see also Driver & Streufert, 1969; Katz & Kahn, 1966; March & Simon, 1985; Thompson, 1967).

The types of information one needs and the manner of gathering this information differ, however, according to the role one plays within the organization. Individuals in different roles and jobs will use different media to accomplish their tasks, and use the same media differently.

The intelligent telephone may have inherent characteristics that make it one of the most appropriate communication technologies for studying differences in adoption patterns among job categories. Ithiel de Sola Pool (1983, p. 68) said the telephone "permits the operation of a complex division of labor." By this he meant that the telephone made it possible for people to stay in touch with one another without having to be in the same physical location. Perhaps of equal importance, however, is the fact that the telephone is so simple to use that it requires no special training or skills to operate. This cannot be said of such office automation technologies as a dumb terminal hooked to a mainframe computer, a personal computer, or even an electronic typewriter. An individual's job category is likely to influence the use and adoption of a new computer-mediated telephone system. Managers are likely to use a telephone to accomplish certain tasks (for example, keeping informed and maintaining control over subordinates), and clerks and secretaries use the same system to accomplish different tasks (for example, clarifying orders and staying in touch with coworkers and friends). Other types of personnel (for example, technical staff) might find the telephone an intrusive device, causing more interruptions than any other aspect of office life (Uhlrig, Faber, & Bair, 1979).

Thus one's attitudes toward and usage of a given organizational medium may differ greatly for individuals in different job categories. Kerr and Hiltz

(1982) point out that although the ultimate impacts of new communication systems within an organization may be functional, dysfunctional, or neutral, they will be very different for different subgroups. They stress, therefore, that relationships between subgroups and impacts should be identified in order to ensure beneficial adoption by the intended users of such communication systems.

The next section identifies some of the aspects of innovations and organizations that influence to what extent users adopt the innovation. The subsequent section will consider how job categories and attributes of the innovation affect the levels of adoption of an intelligent telephone system.

VARIABLES INFLUENCING THE ADOPTION OF AN ORGANIZATIONAL INNOVATION

Diffusion theory, in its most familiar form, argues that potential adopters assess an innovation in order to reduce their uncertainty about the consequences and costs of adoption (Rogers, 1983). This assessment comprises five criteria: (1) its perceived relative advantage, (2) compatibility, (3) complexity, (4) trialability, and (5) observability.

Relative advantage is the degree to which a new idea is perceived by the user as being superior to the practice(s) it replaces; *compatibility*, the degree to which a new idea is perceived as being consistent with a potential adopter's prior experience, beliefs, and values; *complexity*, the degree to which an innovation is perceived by the user as being difficult to understand; *trialability* or *divisibility*, the degree to which a new idea can be given small scale trial by a potential adopter, or the extent to which parts of the innovation may be tried; and finally, *observability* or *communicability*, the degree to which a new idea is visible to potential adopters.

Evidence about the innovation's attributes often come from observing others' uses of the innovation, and by learning more about it through various communication channels including the interpersonal channel (see Coleman, Katz, & Menzel, 1966) or mass media (see Rice & Paisley, 1981). "A system is likely to succeed if the people involved associate with it favorable—and realistic—meanings and expectations of the benefits" (Lippitt, Miller, & Halamaj, 1980).

In short, innovations that are perceived as high in relative advantage, low in complexity and high in compatibility, communicability, and divisibility have a more rapid rate of adoption. There are several additional factors that influence the ultimate success or failure of a new communication system within its intended user community.

Key actors are important factors in the adoption process. These include gatekeepers, opinion leaders, change agents, and the intended user com-

daily work pattern—are indicators of the *level of adoption* (as measured by number of functions used) immediately following introduction to the enhanced telephone system and users' *perceived benefits* of the new system. The hypothesized path model is shown in Figure 34.1. More generally stated, perceptions of benefits and use of the innovation are predicted by attitudes and behaviors. The behavior of using the phone in one's daily work is an indirect measure of information needs satisfied using that particular channel. Job category is hypothesized to play a separate part, over and above attitudes and behaviors, in explaining outcomes of the implementation process.

DATA

A high-technology Fortune 500 firm recently installed an enhanced telephone switching system—commonly known as the “intelligent telephone”—at two of its office complexes located on the West Coast near Los Angeles. Both complexes employed about 700 employees and were similarly organized and staffed. These two sites are the first of many units within the company that will eventually use an intelligent system. The firm's implementation strategy is consciously incremental. This will allow results from the early adoption efforts to be used to guide later implementation efforts. The particular intelligent switch installed in this situation provides up to 200 different functions, which is standard for most current on-site telephone switches. Some of the functions include do not disturb, executive busy override, distinctive ringing, digit translation, and automatic call distribution.

From an engineering viewpoint, of course, the intelligent telephone switching system is radically different from the regular business telephone service generally available from the local operating company. Besides the capabilities noted above, the intelligent system is capable of transmitting both voice and data simultaneously over a single pair of standard telephone wires by converting analog voice signals to digital signals (White, 1985). The intelligent switching system can also serve as a digital interface between a desktop terminal (for example, personal computer or word processor) and a mainframe computer (for example, mini-computer). As a result, data can be transported among computers via existing phone wire in order to access individual, corporate, and outside data bases, as well as communicating via electronic mail.

For individual users, these capabilities include such functions as call-forwarding, call-holding, automatic redial, conference calling, and even a “do not disturb” feature.

In addition to the user-oriented functions of the enhanced switching system, it has features designed for the system's manager. The “message reporting” feature keeps a record of each and every call, for example; “outward toll dial” tracks and records outgoing long distance calls for each

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community (Lucas, 1981; Tornatzky et al., 1980), as well as management, technical personnel, and administrative staff (Bikson, Gutek, & Mankin, 1982; Driver & Mock, 1975). Organizational forces such as power, politics, and the symbolic use of the innovation are often used or channeled by these key actors (Danzinger, Dutton, Kling, & Kraemer, 1982; Dutton, 1981; Feldman & March, 1981; Keen, 1981; Kling, 1980; Markus, 1981). The nature of one's job is likely to affect not only how influential one can be in influencing others to adopt, but also how important it is for the job incumbent to adopt the innovation.

Potential users are now recognized as a major influence on implementation efforts. Influences on adoption include the role perceived needs play (technology pull versus technology push) in the successful adoption of new technologies (Ackoff, 1967; Hopelain, 1982; Rogers, 1983); potential users' attitudes toward the system (Coe & Barnhill, 1967; Danzinger, Dutton, Kling, & Kraemer, 1982; Keen, 1981; Kling, 1980; Rice, 1980; Rice & associates, 1984); users' allegiance to some entity other than the organization (Kole, 1983; Rudawitz & Freeman, 1981); information workers' stress (Keen, 1981; Zuboff, 1982); and their amount of actual use of the new system (Hiltz & Turoff, 1981; Mohrman, 1982).

In general, in order for an office information system to be adopted by intended users, a process of “mutual adaptation” must take place. On the one hand, the work unit must understand and respond to the system's requirements. On the other hand, the information system must meet the needs and desires of the work unit and the organization. The key to this mutual adaptation is an interaction of four factors: design of the system, management support, user participation, and training.

More thorough discussions of the literature regarding the diffusion and implementation of computer-based communication technologies can be found elsewhere (Ives & Olson, 1984; Lucas, 1981; Mankin, Bikson, & Gutek, 1982; Tornatzky et al., 1983). However, this brief outline of some of the factors influencing attitudes toward and adoption of innovations such as the intelligent telephone should serve as a useful context in which to place the findings that follow.

HYPOTHESIZED MODEL OF THE INFLUENCE OF JOB CATEGORY ON PERCEIVED ADOPTION AND BENEFITS OF THE INTELLIGENT TELEPHONE

The prior discussion leads to the general hypothesis that three factors—organizational role (as measured by *job category*), *attitudes* toward the technology (as measured by perceived appropriateness of the intelligent telephone), and the amount of time one spends using *the telephone* in one's

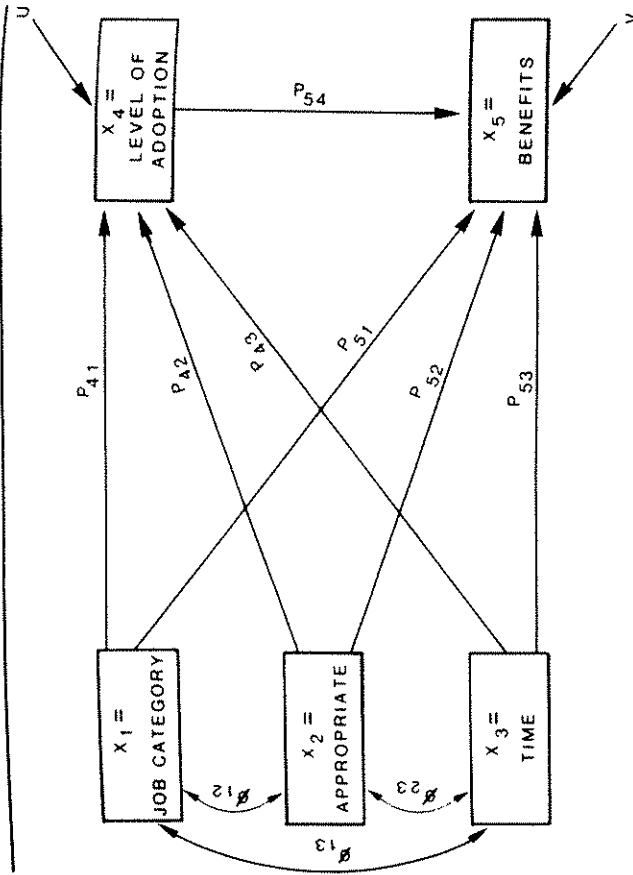


Figure 34.1

station; and "automatic billing" not only keeps a record of usage, but automatically invoices the appropriate division or department within the organization. And although the company has not yet done so, management can purchase additional software that allows telephone activity records to be stored electronically for use in preparing other kinds of reports. In short, the intelligent switching system literally turns the telephone into a hand terminal linked to a mainframe computer.

The sample for this study consisted of 7 key informants and 100 employees who had been introduced to the intelligent telephone when it was originally installed for use in the 2 office complexes. There were 50 names randomly selected from each building. Some of these individuals were no longer located in the building where they first used the enhanced phone system. However, they were still requested to participate in the study and were asked to base their input on their best recollection of their initial experience.

METHOD

Open-ended interviews were conducted with six managers involved in the decision to implement the intelligent telephone and one other person.

These seven people included the person who conducts a major portion of the user training on the new intelligent telephone system; a Senior Communications Analyst who had been watching over this project from its inception and is committed to its ultimate success; a Senior Communications Analyst who came to the corporation from one of the telephone companies, and who approaches the introduction of telephony from a more technical viewpoint; a Manager of Research; the Manager of Communications; the Operations Supervisor, who was the highest person in the management hierarchy we interviewed and who was extremely knowledgeable about the history and growth pattern of the telephone in society; and one additional person who was chosen because she had undergone the training phase of learning to use the intelligent telephone.

The 100 respondents were asked to complete a questionnaire and return it to the Communications Department (via interdepartmental mail) within 48 hours of receipt. A cover letter informed them that the study was part of an effort to analyze the intelligent telephone in order to determine whether or not it was a useful instrument for the majority of the employees at this firm. This message was personally reinforced by the respondents' immediate supervisor. All respondents were assured of the complete confidentiality of their responses; their responses were anonymous. A total of 42 people returned their questionnaires from the first of the 2 facilities and 40 employees participated from the second facility, representing an 82% response rate.

Respondents were asked to recall the number of functions used at two separate points in time.¹ The times were (1) time 1, immediately after being trained in the use of the new telephone system or about a year before; and (2) time 2, the present.

The number of functions from among the 200 that were available to the user was chosen as an indicator of "level of adoption" of the enhanced telephone system. It is these features that set this particular technology apart from the traditional business phone, as they are made possible by the computing power of the in-house telephone switching system. It seems reasonable to assume, therefore, that the greater the number of functions one uses from among those that are available, the more one has adopted the new technology.²

Respondents were also asked the percentage of time in an average workday they spent using the telephone. Other variables that compose the scales used in this analysis resulted from a series of questions designed to help identify and understand the attributes that contribute to the acceptance or rejection of the intelligent telephone. For example, several questions asked respondents to rate the system on specific measures of relative advantage, complexity, compatibility, communicability, status, reliability, innovativeness, productivity, and impacts. Finally, the measures of impacts on communication activities were variables used in a previous study of an

electronic mail system (Rice & Case, 1983), which in turn were developed to replicate earlier studies (as reviewed in Rice, 1980).

The exogenous and endogenous variables were combined in a path analysis to identify significant paths corresponding to the hypothesized relations.

Path analysis is useful in making explicit the rationale of conventional regression calculations. Although path analysis is not a method for discovering causes, it is an analytical technique that can be applied to a causal model formulated by the researchers on the basis of knowledge and theoretical considerations (Duncan, 1966; Pedhazur, 1982). "It is intended to combine the quantitative information given by the correlations with such qualitative information as may be at hand on causal relations to give a quantitative interpretation" (Wright, 1934, in Pedhazur, 1982, p. 580).

RESULTS

In order to identify the underlying factors that accounted for what the users perceived as being the *attributes* and *impacts* of the enhanced telephone system, the attribute variables and the impact variables were each subjected to factor analysis. The findings, along with brief descriptions of the items, appear in Tables 34.1 and 34.2.

Perceived attributes of the intelligent telephone and the organizational context produced five factors explaining 68.4% of the variance. They were labeled (1) appropriateness, (2) complexity, (3) functionality, (4) good system, and (5) status. Perceived impacts of the new technology produced three factors explaining 66.2% of the variance. They were labeled (1) task benefits, (2) usefulness, and (3) traffic. Scales were created from these results, as explained in the notes to Table 34.1. The created scales "Appropriateness" and "Task Benefits" were used in subsequent analyses to represent attitudes and impacts.

The managerial change agents indicated in the open-ended interviews that they anticipated some differences in the acceptance level among the three categories of employees. For example, many of the firm's management and technical personnel are also scientists who operate in what some there call an "Einstein environment" (a think tank). These individuals apparently see the telephone as a necessary evil that interrupts their "think time"; thus no automated system would be seen as an improvement. Our interviewees believed that managers were therefore less willing to use the phone than other people.

The questionnaire data show lower levels of telephone usage for managers and technical personnel than for administrative personnel (14%, 11%, and 28%, respectively, of an average working day) ($F(2,78) = 12.2, p <$

Table 34.1
Factor Analysis of Impacts of Enhanced Telephone System

Variables*	Factors			Good System	Status
	Appropriateness	Complexity	Functionality		
Status:					
Having	-0.11387	-0.04992	0.79491	-0.24610	0.29745
Knowing how to use	-0.06254	-0.08746	0.09005	0.23007	0.79820
Difficult/easy:					
System features	-0.11431	0.85394	0.13960	0.05279	-0.00440
Remembering codes	0.02876	0.72619	-0.03021	0.30168	-0.13711
Help from monitors	0.13873	0.69740	-0.10236	-0.00721	0.16377
Help from co-workers	0.09217	0.51615	-0.04068	-0.06321	0.64052
Reliability	0.09581	0.02649	-0.00322	0.77803	0.24453
Innovative system	-0.01949	0.11091	0.05228	0.79771	-0.00700
Appropriateness for:					
Exchanging info.	0.29036	0.32897	0.48333	0.56503	-0.06889
Bargaining/negotiating	0.71287	0.09608	0.16368	-0.03373	0.06492
Getting to know people	0.67366	0.10046	-0.12522	0.15522	-0.17640
Asking questions	0.38153	0.14600	0.73087	0.31935	-0.12568
Staying in touch	0.45463	-0.17978	0.70987	0.25432	-0.08192
Generating ideas	0.79065	0.05985	0.13268	0.07326	0.03109
Solving disagreements	0.78752	-0.15148	0.16252	-0.00950	0.05008
Eigenvalues	3.81	2.36	1.57	1.38	1.14
% Variance explained	25.40	15.73	10.46	9.22	7.61
Alpha reliability**	.76	.69	.68	.66	—
Nonmissing N of scale	69	67	70	79	82

* All items five-point scale except Status: Having (1 = yes, 2 = not sure, 3 = no) and Appropriateness items (1 = appropriate, 2 = not, "5" indicated "very easy," "significantly increased" or similar scale anchor on all other items).

** Scales representing factors were constructed by taking the average of variables loading at least .6 on one factor and no more than .4 on any other factor. The scale value was set to missing if more than 15% of the constituent variables had missing values. Several exceptions were intended to keep conceptually similar variables together. For example, although "exchanging info," "asking questions," and "staying in touch" loaded on a separate factor, they were added in the "Appropriateness" scale. The alpha for the four-item scale was .76; adding the three other appropriateness items raised the alpha to .83. Scale items are italicized. The status scale is only one variable, so no alpha is reported.

.001). This differential usage of the business phone—implying differential needs for the innovation (the intelligent telephone)—was associated with different levels of adoption ($r = .53, N = 74, p < .0001$). The number of functions adopted was also lower for managers than technical personnel (2.5, 3.0 and 4.2, respectively) ($F(2,71) = 4.7, p < .01$). However, level of perceived benefit did not differ significantly by job category (3.22, 3.14, and 3.03, respectively) ($F(2,75) = .83, p < .45$). Nor did the perceived

category, because job category differences are embedded in the "appropriateness" and "time using the telephone" variables. Managerial personnel show a relationship between attitude and benefits. Administrative personnel show a relationship between time using the phone and level of adoption. This analysis indicates that managers' responses to the innovation are strictly oriented toward attitudes and outcomes, and administrators' responses to the innovation are strictly oriented to needs and adoption behavior. Technical personnel show an interrelationship of attitudes and needs to outcomes and adoption behavior. Technical personnel are the only ones who "behave" as the general model predicted respondents would.

There is only one main factor that is independent of job category in influencing use and benefits of the system. Use of the regular business telephone—a clear basis on which to judge the relative advantage of the new system—is related to the level of adoption of the new system. That is, need leads to use. Attitudes about the appropriateness of the system, except in the model using managers only. That is, subjective assessments of the attributes of the innovation do not lead to perceived benefits of the innovation. Throughout, these two sets of relations are independent (except for the model for technical personnel only). It seems that assessments of *attributes* or *benefits* of the system do not interact with *needs* and *use* of the system. Thus, evaluations of implementation strategies, adoption criteria, adoption level, and user satisfaction cannot ignore either the instrumental or the affective components. For managers and administrators, positive attitudes here are not related to adoption; real task needs are not related to subsequent perceived benefits.

Job category moderately influences the two outcome dimensions. Management and technical personnel discriminate among adoption levels (they adopt the system less) and administrative personnel seem to discriminate among the evaluation levels (they perceive fewer benefits). Perhaps management's secretarial gatekeepers decrease their direct use of the system, or management's communication norms preclude higher adoption of such an innovation. Technical personnel, taken separately, show the most relations of attitudes and needs to adoption and benefits. Perhaps due to the detailed and skeptical attitude of technical personnel toward the new system, positive attitudes and needs were far more influential than for the other positions. Administrative personnel, who use the phone twice as much as the other two positions, use the new system accordingly more, but derive significantly less benefit from the system. They "adopt" the system but do not really "accept" it. They may have more sensitive thresholds for perceived satisfaction with such innovations.

The results were then compared with the qualitative interviews with the change agents. The change agents were partially correct when they predicted differences in behavior and attitudes among the three categories of

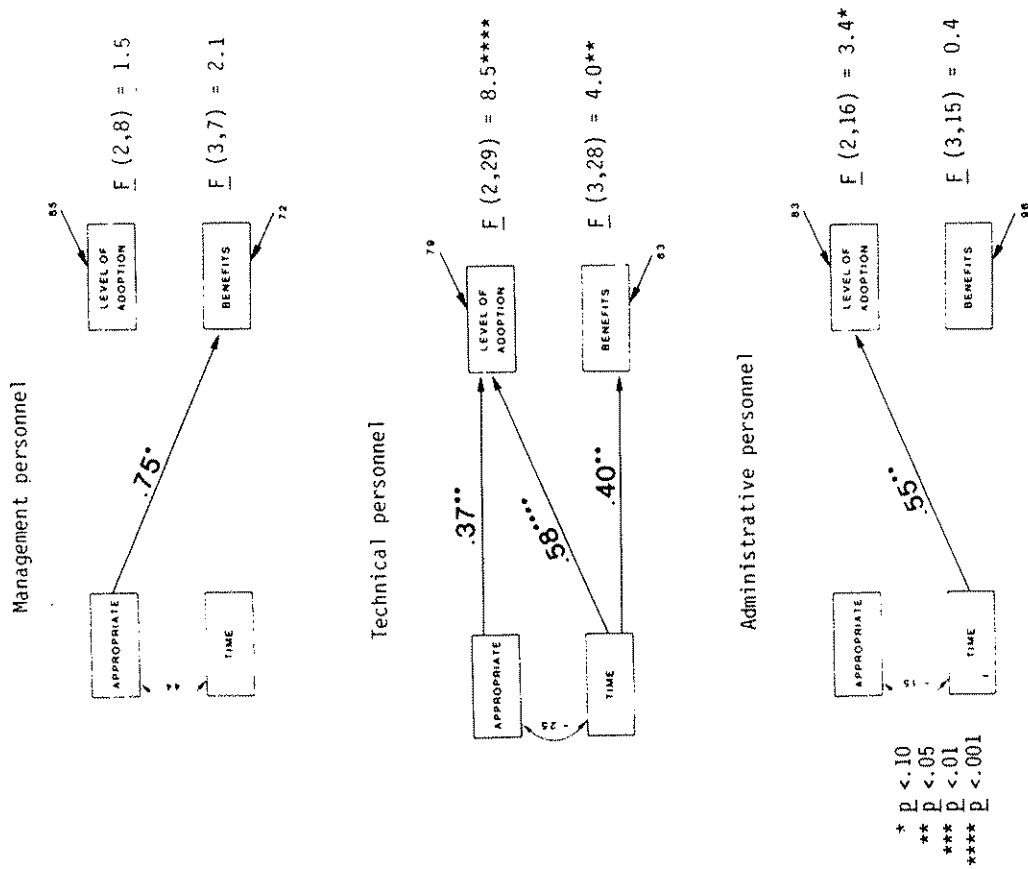


Figure 34.3 Path analysis of influence of appropriateness and time spent using the telephone, on level of adoption and perceived benefits of using an intelligent telephone system, for each job category.

category is useful in predicting only the level of adoption of the intelligent telephone by administrative personnel, who paradoxically do not report as high a level of benefits as managerial or technical staff do.

Another way of looking at job effect is to compare the model across job category samples (Figure 34.3). Clearly, the models do vary by job cate-

Table 34.2
Factor Analysis of Impacts of Enhanced Telephone System

Variables*	Factors		
	Task Benefits	Usefulness	Traffic
Decrease/increase in: phone usage	0.50427	0.07882	0.55844
calls received	0.35155	0.05320	0.67471
quantity of work	0.79387	-0.14944	0.12197
quality of work	0.65404	0.48689	0.20786
rate of handling info.	0.21479	0.77524	0.31791
contacts you initiate	0.67776	0.39178	0.32962
contacts others initiate with you	0.54719	0.34312	0.43838
communications from superiors	0.75016	0.29679	0.18203
communications to superiors	0.82305	0.30263	0.22549
communication with other divisions	0.74091	0.24117	0.30368
number of times leave desk	0.28830	0.53010	-0.44424
amount of after-hours work	0.72616	0.28410	-0.00862
New system helps avoid busy signals	0.09793	0.20894	0.77705
Difficult/easy to do without new phone	0.13136	0.77723	0.10412
Eigenvalues	6.72	1.41	1.14
% variance explained	47.99	10.06	8.16
Alpha reliability**	.92	.63	.68
Nonmissing N of scale	77	76	77

* All items five-point scale: "5" indicated "very easy," "significantly increased" or similar scale anchor.

** Scales representing factors were constructed by taking the average of variables loading at least .6 on one factor and no more than .4 on any other factor. The scale value was set to missing if more than 15% of the constituent variables had missing values.

appropriateness of the system vary by job category (1.55 for each) ($F(2,67) = .01, p < .99$).

Three path models were analyzed³ in order to compare the effect of each of the three job categories, telephone usage, and attitudes toward the innovation. Figures 34.2 and 34.3 show the results of the models, the first with job category as a separate, dummy variable, and the second with separate path models run for each job category.

Looking at job category separately (Figure 34.2), there is no effect of "appropriateness" and there is little effect of job category. Further, the only strong and consistent relationship was between time spent using the telephone and number of functions used (standardized beta coefficient = .53, .55, .51, respectively, $p < .0001$). Only the administrative position had a significant effect: Administrative personnel were significantly likely to report a lower level of benefits ($\beta = -.32, p < .05$). Thus knowing one's job

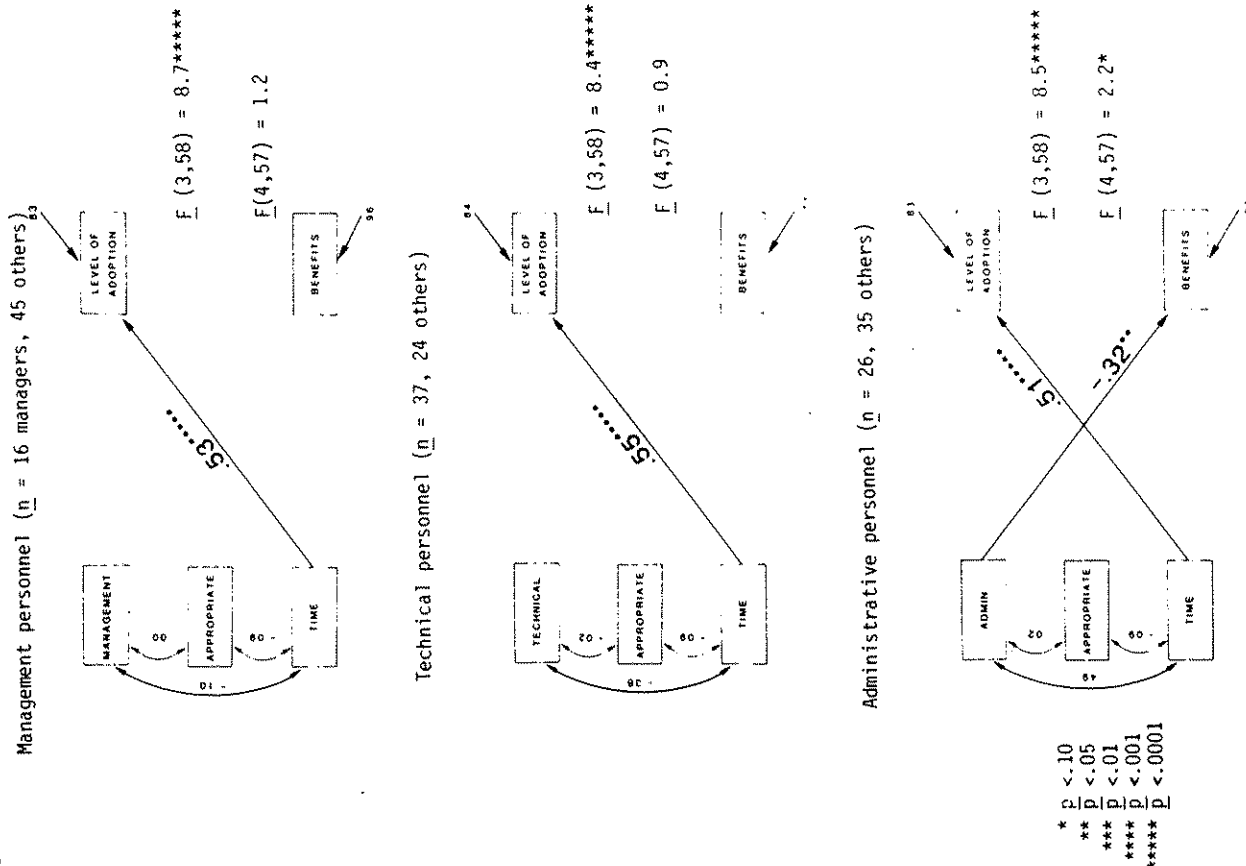


Figure 34.2 Path analysis of influence of job category, appropriateness and time spent using the telephone, on adoption and perceived benefits of using an intelligent telephone system.

employees. They were correct when they predicted that both managers and technical personnel would probably not use the enhanced telephone system very much.

SUMMARY

The most general finding of this study was that political factors interacted with technical factors in determining the outcome of an attempt to implement an intelligent telephone system in two large divisions of a Fortune 500 company. Traditional diffusion variables such as attributes of the innovation and organizational innovation did not distinguish between the "success" and the "failure" buildings.

Job category plays a moderate part in explaining levels of adoption and perceived benefits of the intelligent telephone system.

The concept of job category as one indicator of organizational role should be included and expanded in future models of the adoption of organizational computer-based information technologies. In particular, it would help to understand just what components of job categories lead to these different outcomes, and in what ways these are separate from attitudes and use of current, related media.

Of importance to the study of the adoption of new communication technologies is that affective aspects studied in the present research — attitudes toward and benefits of the innovation — are independent of behavioral aspects — phone use and level of adoption. This absence of linkage could mean unsuccessful and unjustified implementation efforts and dissatisfied or uninterested users. Job category does not influence the relationship of affective and behavioral aspects of adoption directly, but does affect each aspect differentially. Therefore, it seems important and useful to identify this relationship, explore it further, and apply this understanding to managing the process of adopting organizational communication systems.

NOTES

1. That bias and estimation problems are present in measures of system usage based on recall is undeniable. The problem of inaccuracy in respondents' reports of their use of information systems is discussed, along with some suggested solutions, in Rice & Associates (1984, p. 208). Ideally, computer-monitored usage statistics should be used (Rice & Borgman, 1983). However, such records were not available to the authors. The authors realize that the reported number of functions used nearly a year before is a weak and suspect measure of initial adoption. Further, reports of adoption at time 1 and time 2, collected at the same time, are likely to be correlated due to halo effects. The likely effect, for our purposes, is (a) to introduce measurement error, and (b) to bias time 1 reports to match time 2 reports. Both effects will operate against finding significant differences or correlations.

2. Although a more detailed measure of adoption would be the frequency of using specific functions such as reported, recalled measure would be even less reliable than the current indicator of adoption. Of course, the danger here is in not counting extensive use of one new function as being "adoptive" behavior.

3. The organizational role variables (job categories) are nominal and not hierarchical in nature. Therefore, in order to produce a usable path coefficient, they were each entered into the appropriate regressions in the path models by creating dummy codes for each job category. Separate path models were then run for each category. Results are shown in Figure 34.2. The alternative approach is to run each regression separately for each category. Results are shown in Figure 34.3. The disadvantage of the first approach is that for each dummy variable the joint effects of the other two categories are merged in the "0" value, possibly masking true effects of the job category being analyzed. Further, the regressions are not strictly independent as any two dummy variables share the third job category cases in the "0" value. The advantage is that the separate effect of job category can be determined. The disadvantage of the second approach is that the sample size drops drastically, reducing the possibility of significant results. Further, the effect of the particular job category is revealed only through the "appropriateness" and "time spent using the telephone" variables. The advantage is the strict independence of models.

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