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TECHNOLOGY AND JOB DESIGN:
AN EXPLORATORY EXAMINATION OF EMPLOYEE
ABSENTEEISM, PERFORMANCE AND WORK SATISFACTION

by

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of Employee Absenteeism, Performance and Work Satisfaction

ABSTRACT

Variance in employee absenteeism, performance, and work satisfaction was examined in relation to two construct models. Technology and not job design was found to be the stronger predictor of absenteeism and performance, while job design accounted for the greatest variance in employee work satisfaction.

Two streams of organizational research have studied employee attitudinal and behavioral responses to characteristics of work processes and activities employed by organizations. From a macro-organization tradition, organizational sociology has influenced an examination of the relationship between the technology employed by a social system (i.e., by the macro-organization and/or by organizational subcomponents) and employee attitudes and work-related behavior. From a micro-organization perspective industrial and organizational psychology has stimulated research that has focused on employee responses to characteristics of the jobs that employees hold inside organizations.

Technology and Employee Responses

Technology in a very generic sense refers to the system of treatment (transformation) performed on some object (animate or inanimate). It refers to the actions that are performed upon the object with or without the aid of tools or mechanical devices (Perrow, 1967) as well as to the linkages that exist between stages in the transformation process. The system can be associated with and/or exercised by a single individual (e.g., blacksmith), a work unit or department (e.g., neuro-surgery department), an organization (e.g., oil refinery), and industry (e.g., aero-space industry), and may even extend to the level of a society (e.g., agrarian society).

Within this definitional context technology is seen as a multi-faceted phenomenon. Reference in the literature has been made to materials hardness (Rushing, 1968), technological complexity (Wordward, 1965), technological specificity and diffuseness (Harvey, 1968), routinization (Hage & Aiken, 1968), manageability (Mohr, 1971), and Freeman's (1973) mechanization to mention only a few. Attempting to infuse some order on this definitional diversity Hickson, Pugh and Pheysey (1969) provide a typology which suggests that there

are three facets to the technology construct. Hickson et al. suggest that: operations technology refers to the equipping and sequencing of the workflow, materials technology refers to characteristics of the materials worked on in the transformation process, and knowledge technology characterizes the knowledge used in the workflow process. While a well codified nomological network linking technology with employee responses appears to be missing from the literature empirical investigations of this interface have been made.

In his study of alienation, Blauner (1964) notes differential levels of alienation among workers exposed to different levels of automation; such that there was greater worker alienation in the mass-production technologies than in either craft production or continuous process technologies. Along the same line as Blauner's research Shepard (1969) and Susman (1972) focused their research on the man-machine relationship.

Shepard's data tends to suggest that there is greater job dissatisfaction for workers exposed to mass production as contrasted with craft and process production systems. It is implied that tasks are more functionally specialized in mass production settings than under craft and process technologies, thus contributing to worker dissatisfaction. Powerlessness and meaninglessness, two alienation constructs were also examined. It was reported that both indices of alienation were greatest for those working under the mass production technology. Susman argues that increasing degrees of automation tends to reduce the amount of discretion that will be exercised by employees in the conduct of their jobs and will expose the employee to less variety. As a consequence one cannot expect the move toward greater automation to reduce worker alienation.

Fullan (1970) found that workers exposed to mass production technologies have lower levels of integration into the organization than workers in

either craft or continuous process industries. That is, workers in mass production technology settings have poorer co-worker relationships, poorer relationships with supervisors and management, engage in more strikes and walkouts, and are less job satisfied and committed to the employing organization than their counterparts in craft and continuous process settings.

Peterson's (1975) work in Norway tends to confirm the findings of weaker job satisfaction in mass production settings. He found that workers in mass production settings were less extrinsic and intrinsic job satisfied than workers in process and small batch settings. Also making a comparative examination of employee satisfaction Rousseau (1977) adopted Thompson's (1967) three-fold classification of technology. She found that employee job satisfaction varied significantly across the three technology groups. The mean level of employee job satisfaction was lowest for employees working under long-linked technologies, followed by those exposed to intensive and mediating technologies respectively.

Concentrating their study on the routinization of work (i.e., a dimension of materials technology) performed by a social system in the people processing industry Hage and Aiken (1969) found a negative relationship between employee morale and the routinization of work. These results suggest that employee morale will be lower when a social system processes/accepts relatively standardized inputs as contrasted with the use of a technology that processes inputs with high variability to its composition.

Trist and Bamforth (1951) focused their attention on a change from the "hand-got" to the "long-wall" method of mining coal in England. In their accounting of this change in mining technology they note adverse changes occurred in production, absenteeism, reported levels of sickness, worker cohesiveness, and job satisfaction. It was not until a further technology

change to the "composite long-wall system" did these conditions reverse themselves.

Empirical evidence exists to suggest that employee attitudes and behaviors are associated with the technology of the employing organization. While employee attitudes have received the greatest attention in this research, evidence linking employee behaviors has also been noted. The thrust of this literature has been a general comparison of criterion mean levels across technology types which leads to the conclusion routine, long-linked and mass production technologies are associated with job dissatisfaction, worker alienation, absenteeism, and low levels of worker integration.

Job Design and Employee Responses

Job design has been defined as the pattern of stimuli that impinges on the role incumbent, as a set of behaviors that are emitted in a given stimulus situation, as a set of behaviors that should be emitted in a given stimulus situation, and in terms of ability requirements required for successful job performance (Hackman, 1969). The vast majority of the contemporary job design research appears to conceptually define job design as that set of cues which the employee perceives as defining his/her job within the organization. Operationally speaking the job is seen as a multi-faceted construct that represents an employee's psychological reactions to that set of stimuli. Most of the current job design research has focused on the degree to which the job: calls for the use of diverse skills and abilities (variety), engages one in exercising decision making processes and personal discretion in carrying out the job (autonomy), involves doing a whole and identifiable piece of work (task identity), is seen as significant/important (significance), and provides the role occupant with knowledge of the results of his/her activities (task feedback).

A number of theoretical models can be found in the job design literature (Scott, 1966; Lawler, 1969; Hackman & Oldham, 1975; Schwab & Cummings, 1976) which attempt to explain employee response to variations in job scope. Hackman and Oldham's (1975) job design model has emerged as the most widely studied and adopted explanation of employee responses to job characteristics. In essence the model suggests that three psychological states (the experienced meaningfulness of work, the experienced responsibility for work outcomes, and knowledge of results of work activities) are necessary for high levels of work quality, internal work motivation, and job satisfaction, and low levels of absenteeism and turnover. The theory posits that three job dimensions (variety, identity, and significance) play a major role in shaping meaningfulness of work that one experiences, while autonomy contributes to the experienced sense of responsibility, and feedback provides for an employee's knowledge of results.

Empirically, the past two decades have seen an enormous amount of empirical inquiry into the job design-employee response relationship. Pierce and Dunham's (1976) review of this literature provides a number of "state-of-the-art" observations. A strong case for a job design main effect can be made. Worker job satisfaction (especially work satisfaction) emerges with the strongest and most consistently positive relationship with the job dimensions. Worker motivational responses have also been commonly linked to job design, while evidence linking the behavioral responses is less consistent and weaker. Some individual differences (employee growth need strength) and situational variables (organization function) have been found to moderate the job design-employee response relationship. However, Pierce and Dunham also note the moderating effect is, for the most part, a matter of the degree of positiveness in the job design-employee response relationship. After

reviewing the role of individual differences as moderators in the job design-employee response relationship, White (1978) notes that "not one of the 73 variables moderated the relationship in the same direction across all 14 research sites," (p. 275). Observations such as this coupled with the fact that there is generally a positive job design-employee response relationship, lead White to suggest that the utility of a continued search for individual differences to moderate the relationship has been greatly reduced.

Technology, Job Design and Employee Responses

The logic of analyzing job design and technology in relation to employee job related attitudes and behavior stems from the fact that the job and the technology housed in a social system interface with each other in defining the work/transformation process. It is hypothesized that demands and constraints placed on the employee that stem from these two sources will account for variations in employee performance, job (work) satisfaction, and absenteeism.

This study can be seen as a confirmation of the Rousseau (1978) study in which the predictive efficacy of job characteristics versus technology characteristics were employed to examine employee job satisfaction. Rousseau found a stronger multiple correlation when employee attitudes were regressed on job characteristics ($R=.77$) than when attitudes were regressed on the technological classifications ($R=.45$). Through a combined technology-job characteristics model, the technology variable added little to the predictions of job satisfactions beyond the relationship with the job characteristics. In addition, this study extends the Rousseau investigation by an examination of two dimensions of employee behavior (performance and absenteeism) as criterion variables. This study also extends the Rousseau investigation in an exploratory sense, by considering technology as a multi-dimensional construct and

not merely as a single faceted classification scheme. An attempt is made to incorporate a measure of a number of different dimensions of technology so as to begin an isolation of the more critical dimensions in relation to employee performance, absenteeism, and work satisfaction.

The following prediction is made for this investigation. Employee work satisfaction, absenteeism, and performance will be more strongly related to job vis a vis technology characteristics. The rationale for this prediction is embedded in the argument made by Pierce (1977), and by Hall, Goodale, Rabinowitz and Morgan (1978) which suggests that the job is "closer" to the worker and is experienced on a more regular and direct personal basis than other organizational properties. Consequently the cues received from the job should be more strongly associated employee work related responses than the cues transmitted by the technology employed in the social system.

METHOD

Sample and Data Collection

This study was conducted in the home office of a 5000 employee multiple-line insurance company. Nineteen distinct work units were selected such that the units included in the investigation spanned the organization's vertical and horizontal hierarchy. Descriptions of the technology employed in each of these work units derived from a key informant inside the host organization. Over ninety percent of the employees working in these nineteen work units participated in this study by completing a paper and pencil questionnaire that was administered on-site while the employees were given job release time. The 398 employees participating were assured of the anonymity of their responses and they were asked to provide descriptions of their jobs and an evaluation of their work satisfaction. Absenteeism and performance data for the employees was provided by the personnel department and was taken from company records.

Research Scales

Technology--Technology is a multidimensional construct. Attempting to categorize the variety of conceptualizations of an organization's technology Hickson, Pugh and Pheysey (1969) identified three facets: operations technology, knowledge technology, and materials technology.

Operations technology refers to the "techniques used in work flow activities...", to the "equipping and sequencing of activities in the workflow" (Hickson, et al., p. 378-379). An operationalization of operations technology included such variables as: automaticity, the degree to which manual sources of energy are replaced by equipment used in the workflow process (Hickson, Pugh, & Hickson, 1970); rigidity denotes the degree of fixedness of the workflow process (Hickson et al., 1969) such that the workflow follows a fixed and predetermined path where a breakdown in one area would immediately stop the work along the entire workflow path; specificity refers to the degree to which exact standards or personal opinion and judgment is employed in assessing the operations that are performed (Hickson et al., 1969); computerized operations focuses on the percent of activities in a work unit's production process that are performed by a computer; and production continuity refers to the continuity of objects of throughout in the work process (Hickson et al., 1969) (operationally speaking the percent of custom versus standardized output for the work unit was assessed). The final dimensions of operations technology examined in this investigation were the degree of interdependence between activities and work units engaged in the transformation process. Intra-unit workflow interdependence measured the percent of work performed within the work unit that was characterized by pooled, sequential, reciprocal, and team forms of interdependence. Inter-unit workflow interdependence measured the degree of interdependence between the focal work unit and other units in the workflow process inside of the host organization. These scales were adopted from Van de Ven, Delbecq and Koenig (1976).

As a construct materials technology derives from the work of Perrow (1967). In his definition of technology reference is made to the characteristics of the object or raw material being focused on in the transformation process. This dimension of technology references the uniformity and stability of the materials used in the workflow. Operationally, Van de Ven and Delbecq's (1974) three item scale to measure work variability was employed to assess the stability/uniformity of the input that is worked on by the focal work unit.

Knowledge technology also stems from the work of Perrow (1967) and characterizes the knowledge used in the workflow process. More specifically Perrow focused on the degree of logical analysis employed when exceptions or problems were encountered in the workflow process. Van de Ven and Delbecq's (1974) four item scale measuring problem difficulty was employed to assess one dimension of knowledge technology. This scale is composed of two variable elements (problem analyzability and thinking time involved in problem solutions, such that low problem analyzability and long thought time defines high problem difficulty). An attempt was also made to determine the degree to which successful performance of the unit's work was a function of (1) formal education, professional or technical training of the unit's role incumbents, and/or (2) work experience. Through an additive model an assessment was made of the level of knowledge needed in order to successfully perform activities in the workflow process. The third dimension of knowledge technology was discretion. A number of attempts have been made to operationalize Thompson's (1967) technological classification (Mahoney & Frost, 1972; Rousseau, 1977). These authors have noted that the major criterion differentiating these three levels of technology is the amount of discretion exercised in the workflow process. This dimension of technology was operationalized by identifying which of

three levels of discretion characterized the workflow in each of the focal work units. Long-linked technologies are characterized by the use of standard operating procedures and the exercise of very low levels of discretions by the people component of the productions system. Under mediating technologies the people component is required to survey the input along a number of prescribed dimensions and subsequently assign the work/object to one of a number of preprogrammed operating procedures. The intensive technology is distinguished by the lack of standardized procedures and by the use of discretionary behavior where the selections, combination, and order of applications of techniques is determined by the consequences of previous operations and not by the applications of a set of preprogrammed activities. The final dimension of knowledge technology represented a measure of the time span on the availability of performance feedback (time span of feedback) to the work unit concerning the effectiveness of its performance activities. The availability of this information is going to affect the level of knowledge pertaining to subsequent operations.

Job Design--Hackman and Oldham's (1975) Job Diagnostic Survey (JDS) was employed as a measure of the amount of variety, autonomy, identity, significance, and task feedback that was associated with each employee's job. The JDS represents a 15 item (three items per dimension) scale that derives its measurement from the perceptions of the job holder. Attempts to examine the degree objectivity of the measurement scale has been assessed via the convergence between the descriptions given by the role occupants with the job descriptions provided by other key informants. These results have produced moderate convergence (Hackman & Oldham, 1975; Hackman & Lawler, 1971) suggesting that these research scales are measuring something other than differences in individual perceptual processes.

Employee Responses--Three variables were employed as criterion variables in this investigation. Employee work satisfaction was measured by the Index of Organization Reactions (IOR) (Smith, 1976; Dunham, Smith & Blackburn, 1977). Absenteeism data was taken from company records. This measure represented the number of days that an employee was absent during the entire calendar year. Absenteeism data was only available for the non-exempt employees (n=244). Performance appraisal data was also taken from company records. The in-house appraisal system represents a supervisor evaluation of the employee's overall job performance. The scale represents an appraisal along the following three anchor points: performing below standard, performing at standard, performing above standard.

Analysis

The first step in data analysis involved an examination of the reliability (internal consistency, stability and inter-rater) and discriminant validity, evidence for the research scales. Secondly, three multiple regression models were analyzed for each of the dependent variables. The first model regressed the dependent variable on the technology variables, the second model employed only the job design variables as predictors, while the third model combined the job design and technology variables into a single regression equation.

Scale Reliability and Dimensionality

Cronbach's (1951) coefficient alpha was employed to assess the internal consistency (scale reliability) and test-retest reliability was assessed by the time 1-time 2 correlation coefficients for the employee self-report measures on job design and job satisfaction. A key informant provided the data pertaining to the assessment of the different dimensions of the technology employed in the 19 organizational work units. The reliability of this

data was examined by having a second key informant provide the same data which permitted an examination of the inter-rater reliability. The reliability coefficients are reported in Table 1, along with other descriptive statistics (the intercorrelations are presented in Table 2).

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 Insert Table 1, 2 about here
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Nunnally (1967, p. 226) suggests that alpha values $> .70$ are necessary for established research scales, and that values of .50's and .60's suffice for measures in the early stages of development. The alpha values reported here meet this criterion and are judged acceptable. The stability coefficients range from .64 (feedback) to .90 (kind of work satisfaction) and based on commonly accepted practices in organizational research these coefficients are also judged acceptable. The inter-rater reliability coefficients range from a low of .43 to .94 with only two values following below .60 (i.e., .43 for interchangeability and .44 for time span of feedback).

While the dimensionality of Hackman and Oldham's (1975) Job Diagnostic Survey (JDS) has been called into question (Dunham, Aldag & Brief, 1977; Pierce & Dunham, 1978), Barr and Brief's (1978) comparative examination of the psychometric properties of a number of indices of task design lead to the conclusion that the JDS remains the most psychometrically sound measure of perceived task design. The instability of the five job design dimensions, however, lead Dunham et al., (1977) to recommend a sample-by-sample examination of this research measure.

As a result of the dimensional uncertainty of the JDS, principle component factor analyses with oblique rotations were performed on the fifteen items. This empirical examination of the theoretical dimensionality of the

JDS suggested a three factor solution (autonomy, feedback, with variety and significance collapsing into a single factor).

Ferrett and Reeve (1977), Ferrett, Pierce and Dunham (1978) have raised concern over the ability of the self report descriptive measures of job design to discriminate from the self report evaluative measures of job satisfaction. Consequently, the underlying factor structure for the 15 item JDS and the 6 item IOR measure of work satisfaction was examined. In accord with Kerlinger's (1973) recommendations (p. 673) oblique rotations were employed in this analysis. The 15 JDS items and the 6 IOR work satisfaction items produced four job design factors and one satisfaction structure with .25 being the largest single cross-loading. Thus, reasonably discriminant validity evidence can be demonstrated for these self-report descriptive and evaluative measures. Even though a common measurement method is employed the empirical dimensionality demonstrates that the JDS and IOR are measuring relatively distinct yet interrelated variables.

RESULTS

Performance--An examination of the coefficient of determination presented in Table 3 (R^2) indicates that 23 percent ($F = 5.54, p \leq .000$) of the variance in employee overall job performance is explained by the various dimensions of the technology.

 Insert Table 3 about here

The major predictors of this relationship, in order of importance, are: automaticity (+), time span of feedback (+), intra-unit workflow interdependence (-), and interchangeability (-). By way of contrast the job design characteristics account for only 12 percent of the variance in the performance

criterion ($F = 11.20$, $p \leq .001$). Each of the three dimensions had significant partial correlation coefficients ($p \leq .001$) ranked in the following order: variety/significance, autonomy, and feedback.

Combining the technology and job design predictors into a single predictive model increases the explained criterion variance by four percent ($F = 5.64$, $p \leq .001$) above that accounted for by technology acting alone. Even in the combined regression model three technology dimensions (automaticity, intra-unit workflow interdependence, and time span of feedback) had stronger partial correlation coefficients than any one of the three job design dimensions. Thus, the hypothesis that employee performance would be more strongly associated with job design was not supported by this data.

Absenteeism--Technology accounted for 11 percent ($F = 2.39$, $p = .005$) of the variance in employee absenteeism while the three job design variables did not produce a significant multiple correlation coefficient with the absenteeism criterion. (See Table 4.) Only three of the technology variables

 Insert Table 4 about here

(automaticity, difficulty, and production continuity) failed to have a significant ($p \leq .01$) partial correlation coefficient with employee absenteeism. Even when the combined technology-job design regression model was employed the shared variance with absenteeism increased by only .4 percent and none of the three job design variables reached acceptable levels of statistical significance ($p \leq .05$). The hypothesized relationship between technology, job design, and employee absenteeism was not supported. That is, it was predicted that job design would emerge as a stronger correlate of absenteeism than technology.

Work Satisfaction--It can be seen in Table 5 that both the technology and job design regression models produced significant multiple correlations

 Insert Table 5 about here

with employee work satisfaction ($F = 2.48$ and 69.20 $p = .003$ and $.000$ respectively). The coefficient of determinations shows that forty-five percent of the satisfaction variance is shared with the three job design variables such that variety/significance is the primary predictor with a $.41$ partial correlation coefficient.

Twelve percent of the criterion variance in work satisfaction is shared with the technology variables. Only two of the variables in the technology regression model reached acceptable levels of statistical significant ($p \leq .05$)-computerized operations (+), and inter-unit workflow interdependence (+).

The combined regression model adds three percent to the explained variance in work satisfaction above that achieved by the job design variables. The three job design variables, computerized operations, and work difficult serve as the primary predictors ($p \leq .05$). Thus, the third hypothesis is supported. Employee affective responses were more strongly associated with job design vis a vis the technology employed in the work units housing the employee and the job.

DISCUSSION

The purpose of this study was twofold. First, the predictions efficiency of two construct models (technology and job design) were compared in relation to employee absenteeism, performance, and work satisfaction. Second, an exploratory attempt was made at operationalizing a number of different

dimensions of technology in an attempt to (a) move beyond a comparative examination of employee responses across technology types, and (b) to begin to isolate dimension of technology (acting alone and in conjunction with job design) as major correlates of employee performance, absenteeism, and work satisfactions.

The results of this study will be discussed by focusing on the three criterion variables separately. Contrary to the hypothesis presented, it was technology that emerged as the strongest correlate with appraisals of employee performance, accounting for 23 percent of the performance variance versus 12 percent of the criterion variance attributed to job design. The combined technology and job design model only adds an additional 4 percent to the examined variance in employee performance explained by technology (or 16 percent to that explained by job design acting alone). No clear pattern among the independent variables emerge. Four dimensions of operations technology (inter-unit workflow interdependence, automaticity, interchangeability and computer operations), two dimensions of knowledge technology (time span of performance feedback and discretion), and the three job design variables had significant partials with the performance criterion.

It appears that the core technology of a social system goes a long way in defining the pace and placing constraints on how rapidly and effectively an employee performs his/her job. While the job per se may have the motivating potential (a la Hackman & Oldham's, 1975 model) for high performance the effort-performance linkage is likely to be zero under conditions of high automaticity, sequential forms of workflow interdependence, low levels of task and person interchangeability, and high levels of computerized operations.

Contrary to the hypothesized relationship, the data suggest that the predictive efficacy of the technology model is far superior to the job design

model in predicting employee absenteeism. The technology variables accounted for a significant 11 percent of the criterion variance, while the job design-absenteeism multiple correlations failed to reach acceptable levels of statistical significance. The inclusion of the three job design variables in the technology model increased the explained variance by less than one-half of one percent. All but one of the technology variables had significant partial correlation coefficients with absenteeism. The three strongest predictors suggest that absenteeism is low when operations are highly computerized, when there is a high level of rigidity in the internal workflow process, and when there is a high level of interdependence between the focal work unit and other work units in the organization. Each of these technology variables represents a dimension of operations technology.

Rousseau's (1978) finding of a stronger job design-satisfaction relationship than a technology-satisfaction relationship is confirmed by these data. Rousseau accounted for 59 percent of the job satisfaction variance while 45 percent of the work satisfaction variance was accounted for by the job design variables in this investigation. Twenty percent and twelve percent of the criterion variance was explained by the technology variables in the Rousseau and Pierce investigations respectively. In similar fashion both studies revealed that the addition of the technology variables to the job design regression model made a very small contribution to the variance accounted for by the job design variables. These findings suggest that job design mediates the technology-employee work satisfaction relationship.

In conclusion, the evidence from this investigation suggests that employee work satisfaction and work related behaviors are not equally influenced from the same factors in the work process. Employee work satisfaction appears to be strongly influenced by characteristics of the tasks that they

engage in as they contribute to the work unit's production process. The actual levels of performance achieved by the employee, however, appears to be largely defined by the technology employed in that system's production process. Finally, employee absenteeism also appeared to be predominately a function of the work unit's technology.

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TABLE 1
RELIABILITY ESTIMATES AND DESCRIPTIVE STATISTICS

<u>Variable</u>	<u>Number of Items</u>	<u>Sample Size</u>	<u>Mean</u>	<u>Std Dev</u>	<u>Alpha</u>	<u>Stability Coefficient^A</u>
Job Design:						
Autonomy	3	398	4.44	1.65	.78	.81
Feedback	3	398	4.77	1.41	.75	.64
Variety/Significance	6	398	4.80	1.33	.80	.81
Employee Responses and Work Outcomes:						
Performance	1	397	1.45	1.89	---	---
Absenteeism	1	262	8.35	9.30	---	---
Work Satisfaction	6	398	3.38	.92	.91	.90
Technology:						
					<u>Inter-Rater Reliability</u>	
Intra-unit Workflow Interdependence	1	19	191.17	50.42		.67
Inter-unit Workflow Interdependence	1	19	239.03	34.53		.65
Workflow Rigidity	1	19	3.81	1.31		.86
Specificity of Evaluation	1	19	3.78	1.07		.74
Automaticity	1	19	3.16	1.60		.71
Input Variability	1	19	6.87	1.84		.87
Difficulty	1	19	10.79	3.18		.80
Interchangeability	1	19	4.93	1.04		.43
Custom Output	1	19	3.27	2.57		.80
Computerized Operations	1	19	3.56	3.43		.94
Time Span of Feedback	1	19	2.48	.59		.44
Discretion	1	19	2.63	1.68		.92
Knowledge Requirement	1	19	6.07	1.59		.64 ^B

A Test-retest reliability estimates were based on a sample of 30 additional employees derived from the host organization for the sole purpose of checking the stability coefficient for the research scales.

B Knowledge requirement is based on the aggregation of two variable elements (a) performance based on education, professional or technical training (reliability estimate .78) and (b) performance based on experience (reliability estimate .50) such that the average reliability is .64.

TABLE 2

Technology, Job Design, Employee Response Correlations

	<u>Performance</u> (n=370)	<u>Absenteeism</u> (n=260)	<u>Work Satisfaction</u> (n=380)
Job Design			
Variety/Significance	41	<u>-08</u>	62
Autonomy	41	<u>-09</u>	50
Feedback	<u>06</u>	<u>-05</u>	40
Technology			
Intra-unit Workflow Interdependence	44	-10	20
Inter-unit Workflow Interdependence	38	<u>-07</u>	17
Rigidity	-52	<u>08</u>	-25
Specificity	-42	<u>07</u>	-25
Automaticity	46	-16	15
Variability	46	<u>-03</u>	22
Difficulty	46	<u>-08</u>	25
Interchangeability	-34	<u>-03</u>	-16
Custom Output	48	-11	24
Computerized Operations	26	-14	14
Feedback	51	-11	24
Discretion	55	-17	29
Knowledge	54	-15	26

Note: The underlined values did not reach acceptable levels of statistical significance, $p < 05$

TABLE 3
PERFORMANCE REGRESSION MODELS

	TECHNOLOGY MODEL (n=383)	JOB DESIGN MODEL (n=391)	TECHNOLOGY AND JOB DESIGN MODEL (n=378)
	<u>Partial Coefficients</u>	<u>Partial Coefficients</u>	<u>Partial Coefficients</u>
<u>Technology Variables</u>			
Intra-Workflow Interdependence	-170**		-167**
Inter-Workflow Interdependence	-042		-057
Rigidity	032		-000
Specificity	002		035
Automaticity	227**		208**
Variability	007		-001
Difficulty	-010		009
Interchangeability	-139**		-109*
Custom Output	033		-005
Computer Operations	-093*		-088*
Feedback	185**		156**
Discretion	108*		101*
Knowledge based Performance	-035		-039
<u>Job Design Variables</u>			
Job Feedback		-173**	-114*
Variety/Significance		267**	130**
Autonomy		248**	125**
Identity			
Multiple Correlation Coefficient (R)	479	343	523
Coefficient of Determination (R ²)	229	118	274
F Value	5.54	11.20	5.64
Significance Level	.000	.000	.000

TABLE 4
 ABSENTEEISM REGRESSION MODELS

	TECHNOLOGY MODEL (n=248)	JOB DESIGN MODEL (n=257)	TECHNOLOGY AND JOB DESIGN MODEL (n=244)
	<u>Partial Coefficients</u>	<u>Partial Coefficients</u>	<u>Partial Coefficients</u>
<u>Technology Variables</u>			
Intra-Workflow Interdependence	-180**		-175**
Inter-Workflow Interdependence	-199**		-199**
Rigidity	-197**		-200**
Specificity	174**		176**
Automaticity	113*		115*
Variability	-187**		-188**
Difficulty	-113*		-116*
Interchangeability	-172**		-173**
Custom Output	014		017
Computer Operations	-193**		-200**
Feedback	162**		164**
Discretion	177**		176**
Knowledge based Performance	-183**		-185**
<u>Job Design Variables</u>			
Job Feedback		-008	-020
Variety/Significance		-037	066
Autonomy		-059	-051
Identity			
Multiple Correlation Coefficient (R)	337	102	344
Coefficient of Determination (R ²)	114	010	118
F Value	2.39	.879	2.000
Significance Level	.005	.453	.014

TABLE 5
WORK SATISFACTION REGRESSION MODELS

	TECHNOLOGY MODEL (n=384)	JOB DESIGN MODEL (n=392)	TECHNOLOGY AND JOB DESIGN MODEL (n=379)
	<u>Partial Coefficients</u>	<u>Partial Coefficients</u>	<u>Partial Coefficients</u>
<u>Technology Variables</u>			
Intra-Workflow Interdependence	019		002
Inter-Workflow Interdependence	092*		042
Rigidity	069		-004
Specificity	-067		017
Automaticity	-063		-073
Variability	049		-008
Difficulty	-003		088*
Interchangeability	043		074
Custom Output	059		-052
Computer Operations	124**		166**
Feedback	-040		-047
Discretion	014		015
Knowledge based Performance	065		-015
<u>Job Design Variables</u>			
Job Feedback		169**	155**
Variety/Significance		411**	400**
Autonomy		205**	232**
Identity			
Multiple Correlation Coefficient (R)	343	672	689
Coefficient of Determination (R ²)	118	452	475
F Value	2.48	69.20	13.51
Significance Level	.003	.000	.000