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# **Productive Work-Unit Environments: What Are They and Are They Different for Information Systems and Non-Information Systems People?<sup>1</sup>**

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## **ABSTRACT**

This study identifies two productive work unit environments, where work unit environment is based on three dimensions: (1) job enrichment, (2) attending to interpersonal relations, involving employees, and positively reinforcing work behavior, and (3) attending to production, providing negative feedback, and targeting work behavior. One productive work unit environment is relatively high on all three dimensions for both clerical and technical-professional employees. The other productive work unit environment has a mid-range pattern with the third dimension being low relative to other dimensions. The results of both linear and non-linear analyses indicate that productive work unit environments are not different for IS and non-IS people.

These findings are based on a field survey methodology with seven different samples involving 1005 employees from the insurance industry in the midwest U.S.

Should information systems (IS) and non-information systems (Non-IS) people be managed in different ways? Some writers suggest they should (e.g., Couger and Zawacki (1980)). These suggestions are based on reported differences in the motivations of IS and non-IS employees. Bartol and Martin (1982) caution that these reported differences may result from the methods used to measure motivation rather than real differences. Recent research (Ferratt and Short, 1985), using a different method of measuring motivation, seriously challenges the existence of motivational differences between IS and non-IS people.

The suggestion that IS and non-IS people be managed in different ways should be examined directly rather than inferred from an investigation of motivational differences. Many different ways of managing could be considered in a direct examination. The scope of this investigation is limited to an examination of the relationship between the environment established by managers at the work unit level and employee productivity. This scope excludes other management determined factors and employee behavior, such as the relationship between organizational level policies (e.g., pay and promotion) and employee turnover.

## Relevant Literature, Purpose, and Hypothesis

The management literature has several streams of writings on various managerial behaviors at the work unit level that affect employee behavior. For example, enlarging or enriching a job is a managerial behavior that has been extensively discussed and reviewed (Roberts and Glick, 1981; Pierce and Dunham, 1976; Hackman and Lawler, 1971; Turner and Lawrence, 1965; Herzberg, Mausner, and Snyderman, 1959). Showing concern for performance and concern for employees as well as initiating structure and consideration are additional examples of managerial behaviors that have been extensively discussed and reviewed (Bass, 1981; Barrow, 1977; Kerr, Schriesheim, Murphy, and Stogdill, 1974; Fiedler, 1967; Black and Mouton, 1964; Stogdill and Coons, 1957). Other managerial behaviors, such as setting goals (Kim and Hamner, 1976; Ivancevich and McMahon, 1982; Locke, Shaw, Saari, and Latham, 1981; Latham and Yukl, 1975; Locke, 1968), using participatory decision making (Locke and Schweiger, 1979; Lowin, 1968), and providing feedback (Ammons, 1956; Ilgen, Fisher, and Taylor, 1979; Luthans and Kreitner, 1976), have also been studied extensively.

Practicing managers may conclude that they should do all of the above to establish a productive work unit environ-

ment. We suggest that such a conclusion is premature. While prior research studies have examined these factors, they have tended to examine them separately. Reviews of the literature on various managerial behaviors have typically concluded that more comprehensive models are needed (Kerr et al., 1974; Barrow, 1977; Latham and Yukl, 1975) and that research is needed to combine variables that have not been studied in relation to each other (Bass, 1981).

In designing this study six managerial behaviors based on those just cited were used to conceptualize a new variable: work unit environment. Two of these behaviors—enriching the job and involving the employee in the work—establish and maintain the sociotechnical setting within which work is performed. Two behaviors—attending to production and attending to interpersonal relations—establish and maintain the task-social orientation of the workers and their supervisor. The final two behaviors—targeting work behavior and reinforcing work behavior—provide pre- and post-performance guidance to workers about what they should be doing to be most productive.

The purpose of this study is to identify productive work unit environments and determine if the relationship between the work unit environment and employee productivity differs for IS and non-IS employees. If the relationship between work unit environment and productivity is different for IS and non-IS people, the productive work unit environments will be different for IS and non-IS people. The null hypothesis for investigating whether IS and non-IS people should be managed in different ways is the following:

HO: No significant interaction effect occurs between work unit environment and individual status (i.e., IS or non-IS employee) when their relationship to productivity is examined.

Since the relationship between this newly conceptualized work unit environment and productivity has not been investigated previously, both linear and non-linear forms for the relationship are investigated.

The appropriateness of this null hypothesis can be demonstrated by examining a simple linear model. The reasoning for this simple model can be extended to a linear hypothesis with a more complex representation of work unit environment as well as to simple and more complex non-linear hypothesis.

In the simple linear model let X1 represent the work unit environment based on an average of the underlying dimensions as measured on continuous scales; let X2 represent a dummy variable for individual status with 0

meaning non-IS and 1 meaning IS; and let  $Y$  represent productivity as measured on a continuous scale. The model is as follows:

$$(1) \quad Y = a + b_1X_1 + b_2X_2 + b_3X_1X_2.$$

Notice that this equation reduces to the following equation if  $X_2$  is 0, i.e., for non-IS employees:

$$(2) \quad Y = a + b_1X_1.$$

Notice also that equation 1 reduces to equation 3 if  $X_2$  is 1, i.e., for IS employees:

$$(3) \quad Y = (a + b_2) + (b_1 + b_3)X_1.$$

The null hypothesis above states that  $b_3$  is zero. If  $b_3$  is zero, the slope of  $X_1$  if  $b_1$  for both IS and non-IS employees (see equations 2 and 3). Under this condition, the change from one work unit environment to another has the same effect on the change in productivity for both IS and non-IS employees.

The null hypothesis that  $b_2$  is zero, i.e., that the main effect of individual status is not significantly different from zero, is of little interest in answering the question of whether IS and non-IS people should be managed in different ways. If no significant interaction effect exists (i.e., if  $b_3$  is zero) but a main effect exists (i.e., if  $b_2$  is not zero), there is a difference in the general level of productivity for IS and non-IS people. (See the constants  $a$  and  $(a + b_2)$  in equations 2 and 3.) However, the relative productivity of any two work unit environments will be the same within IS and non-IS groups.

## Methodology

### SAMPLES

This study used field surveys to collect data from seven independent samples. These samples provide a broad base of 1005 employees. The participants range from clerks to managers and represent over 100 insurance companies in the midwest. The characteristics of various groupings of participants are shown later in Table 1.

The authors administered a survey instrument on company time to 542 employees (personnel primarily in non-supervisory clerical and technical-professional occupations) in six insurance companies, explaining that responses would remain confidential and that the survey was part of a research study to identify the most effective methods of managing in the insurance industry. Only

employees who were employed long enough to observe their manager's general pattern of behavior were asked to participate in the study.

A similar procedure was used in these six companies to administer a survey to each employee's immediate superior to measure the productivity of the 542 employees participating in the study and to obtain data for classifying employees (status: IS or non-IS; occupation: clerical, technical-professional, or managerial).

The employee survey instrument with slight modification (to obtain the data for classifying individuals as to status and occupation) and a cover letter that explained the same purpose and confidentiality, was sent to a one-third systematic random sample of insurance industry employees (personnel primarily in technical-professional and managerial occupations) in eleven midwestern states who had earned the FLMI (Fellow of the Life Management Institute) designation. Over 52%, specifically 463 of 888 potential respondents, voluntarily completed and returned the survey. It was not feasible to obtain productivity data for this sample.

### SURVEY INSTRUMENT

The survey instrument asks questions about the work unit environment, the organizational environment, and the individual. The instrument is designed to be administered in 45 minutes or less to facilitate the cooperation of employers. Some items were adopted from standardized instruments, e.g., variety and autonomy from Hackman and Oldham's JDS (1975), while other items were developed specifically for this study.

Thirty-three items formed the original pool of items from which the measure of work unit environment is developed. (These items are available from the authors but are not included here because of space limitations.) Items are based on enriching the job, involving employees, attending to production, attending to interpersonal relations, targeting work behavior, and reinforcing work behavior. The items are designed to elicit a description of the work unit environment not an evaluation of how good or bad the employee thinks it is. All questions about the work unit environment are on seven-point scales, where one represents a low amount of the item and seven represents a high amount. An example of an item follows:

How much autonomy is there in your job? That is, to what extent does your job permit you to decide on your own how to go about doing the work?

**Table 1**

## Sample Characteristics

*First Sample*  
(Odd Numbered Cases)

	CLERICAL		TECHNICAL- PROFESSIONAL		MANAGERIAL	
	<i>IS</i>	<i>Non-IS</i>	<i>IS</i>	<i>Non-IS</i>	<i>IS</i>	<i>Non-IS</i>
Sample Size	43	154	48	55	38	157
Age	33.9	32.3	33.2	38.6	41.4	42.1
Tenure with Company	4.7	4.4	7.9	11.8	15.5	14.8
Percent Women	93	95	48	42	18	22
Percent with Pay:						
\$15,000 or less	100	100	8	0	5	10
\$15,000-\$30,000	0	0	83	84	30	38
\$30,000 or more	0	0	8	16	65	53
Percent with College Degree	7	12	65	67	63	75

*Second Sample*  
(Even Numbered Cases)

	CLERICAL		TECHNICAL- PROFESSIONAL		MANAGERIAL	
	<i>IS</i>	<i>Non-IS</i>	<i>IS</i>	<i>Non-IS</i>	<i>IS</i>	<i>Non-IS</i>
Sample size	40	153	55	66	39	144
Age	33.3	32.8	32.7	36.6	41.1	43.6
Tenure with Company	5.0	3.9	5.6	8.7	12.0	15.8
Percent Women	93	94	49	41	23	22
Percent with Pay:						
\$15,000 or less	100	100	5	0	11	7
\$15,000-\$30,000	0	0	87	85	34	40
\$30,000 or more	0	0	7	15	55	53
Percent with College Degree	10	11	63	70	69	76

I have almost no personal say about how and when the work is done.	Many aspects of my work are standardized and not under my control, but I can make some decisions about the conduct of my job	My job gives me almost complete responsibility for deciding how and when the work is to be done.
--	--	--

1-----2-----3-----4-----5-----6-----7

The measure of the dependent variable, employee productivity, is based on five items. (These items are also available from the authors.) Specifically, these items describe the amount of work the employee completes, the amount of time it takes the employee to complete assigned work, the quality of work, the employee's record of meeting assigned deadlines, and the employee's overall contribution to the welfare of the company. All items are on seven-point scales where one represents less than acceptable behavior and seven represents outstanding behavior. An example of an item follows:

The amount of work this employee completes is

less that it should be	completely acceptable	outstanding
------------------------	-----------------------	-------------

1-----2-----3-----4-----5-----6-----7

### ANALYTIC PROCEDURES

Given that this study is using new instruments and investigating linear and non-linear hypotheses about the relationship between work unit environment and productivity that have not been studied before, the sample is divided into two random halves. The first half sample is the exploratory or pilot sample while the second sample is the test sample. More specifically, the first sample is used to develop valid, reliable scales and to generate starting points for non-linear hypothesis testing. The second sample is used to examine the validity and reliability of the scales developed in the first sample (to check that the determination of the scales is not based on sampling error) and to test the linear and non-linear hypothesis about the relationship between work unit environment, IS versus non-IS status, and productivity.

The scale analysis is conducted on all clerical, technical-professional, and managerial level employees combined since we want the scales to be applicable to all occupational levels. The clerical group includes such IS jobs as data entry and computer operator and such non-IS jobs as secretary, accounting clerk, and policy service representative. The technical-professional group includes such IS

jobs as computer programmer and systems analyst and such non-IS jobs as underwriter, actuary, and accountant. The managerial group includes jobs within IS and non-IS areas from first-line supervisor to top management. Characteristics of the IS and non-IS employees in each of the three occupational groups in each half sample are presented in Table 1.

The hypotheses are investigated using clerical and technical-professional employees since productivity data are available for a sizable number of employees in these occupational groups but not many in the managerial group. Given that previous studies have found it useful to analyze clerical, technical-professional, and managerial employees separately (e.g., Couger and Zawacki (1980)), the hypotheses are tested separately for clerical and technical-professional groups.

## RESULTS

### SCALE ANALYSIS

Based on the iterative use of factor analysis and scale reliability analysis with the first random half sample, the pool of thirty-three items designed to measure the work-unit environment was reduced to twenty items. These items are grouped into three scales rather than the six *a priori* managerial behaviors. The first scale represents job enrichment, including feedback from coworkers or clients. The second scale represents a combination of attending to interpersonal relations, involving the employee, and positively reinforcing work behavior by the manager. The third scale represents a combination of attending to production, providing negative feedback, and targeting work behavior. Given that the six *a priori* managerial behaviors are likely to be interrelated and that they were measured by a restricted number of items, this reduction to three scales is not an unusual result.

Scale and item means and standard deviations as well as scale reliabilities, for both the first and second samples are shown in Table 2. Factor analysis of the twenty selected items in the first sample (the details of which are available from the authors) shows three factors with eigenvalues greater than 1.0. All twenty items have factor loadings greater than .30 on only one of the three factors. These loadings range from .54 to .84 with a median of .68. The reliabilities for the three scales comprised of these high loading items range from .77 to .89.

Factor analysis of the same twenty items in the second sample also shows three factors with eigenvalues greater than 1.0. All twenty items have factor loadings greater than .30 on factors comprised of the same high loading items as in the first sample. Three items have factor loadings greater than .30 on one additional factor. The magni-

**Table 2**

**Item and Scale Characteristics\***

	<i>First Sample</i>		<i>Second Sample</i>	
	<i>Mean</i>	<i>S.D.</i>	<i>Mean</i>	<i>S.D.</i>
Enriching the Job	5.04	0.97	5.05	1.02
Reliability (Cronbach's Alpha)	.78		.78	
Variety	5.19	1.63	5.11	1.71
Autonomy	5.19	1.30	5.22	1.37
Identity	5.18	1.39	5.15	1.47
Significance	5.43	1.46	5.49	1.49
Dealing with Others	5.61	1.42	5.55	1.43
Job Specificity	5.21	1.59	5.20	1.68
Client/Coworker Feedback	3.49	1.48	3.59	1.51
Attending to Interpersonal Relations, Involving the Employee, and Positively Reinforcing Work Behavior	4.85	1.19	4.84	1.18
Reliability (Cronbach's Alpha)	.89		.88	
Supervisor-Subordinate Relations	5.37	1.54	5.34	1.55
Tolerance of Conflict	5.11	1.58	5.03	1.62
Team Orientation	5.50	1.43	5.42	1.44
Upward Communication	4.54	1.51	4.52	1.53
Disseminating General Information	4.70	1.73	4.61	1.71
Setting an Example	5.11	1.63	5.08	1.57
Manager Feedback	4.26	1.60	4.29	1.58
Recognition or Praise	4.23	1.59	4.38	1.70
Attending to Production, Providing Negative Feedback, and Targeting Work Behavior	4.75	1.17	4.76	1.17
Reliability (Cronbach's Alpha)	.77		.76	
Emphasizing Quantity of Output	5.13	1.54	5.06	1.53
Emphasizing Quality of Output	4.84	1.80	4.81	1.83
Correcting Poor Performance	5.20	1.49	5.25	1.46
Setting Performance Expectations	4.28	1.62	4.33	1.69
Setting Challenging Goals	4.29	1.62	4.32	1.63
Productivity	4.80	1.17	4.90	1.11
Reliability (Cronbach's Alpha)	.94		.94	
Amount of Work	4.76	1.30	4.90	1.23
Time to Complete Work	4.64	1.32	4.76	1.29
Quality of Work	4.95	1.30	4.94	1.25
Meeting Assigned Deadlines	4.82	1.32	5.00	1.20
Overall Contribution	4.84	1.23	4.90	1.22

\*Because of missing values for some cases, N for scale analyses other than Productivity varies from 481-503 in the first and second samples. Because productivity data is available for primarily clerical and technical-professional participants from six companies, N for Productivity is based on the 250 such participants in the first sample and 240 in the second.

tude of two of these stray loadings is .30 and .31, respectively, while the third is .50. The non-stray loadings range from .45 to .81 with a median of .70. The reliabilities for the three scales range from .76 to .89 with all reliabilities within .01 of those in the first sample.

The stability of the reliability coefficients and factor patterns from both samples indicates that the selection of items to form coherent, distinct scales in the first sample did not capitalize on just sampling error. While these scales could benefit from further development, they have acceptable reliability and construct validity for testing the hypotheses with the second half sample.

Factor analysis and reliability analysis were also used on the five items designed to measure productivity. The results of a single run of each analysis on the first sample indicated that these five items form a single, coherent scale. Item and scale means and standard deviations along with scale reliabilities for the first and second half samples are shown in Table 2. Factor analysis of the five items in each of the first and second samples shows a single factor with an eigenvalue greater than 1.0. The five items have factor loadings ranging from .85 to .92 in the first sample and .83 to .92 in the second sample. The reliability for this scale is .94 in each sample. This scale, too, demonstrates that it is acceptable for use in testing the hypotheses with the second sample.

## HYPOTHESIS TESTS

### Linear Tests

Simple and complex versions of the linear hypothesis are tested using linear regression. In the simple representation of work unit environment, a single independent variable for work unit environment is constructed by taking the mean of the three scales derived above. In the more complex representation, each scale is used as an independent variable. In both tests the employee's status as an IS or non-IS employee is represented as a dummy variable with 0 representing non-IS and 1 representing IS. This dummy variable is multiplied by the independent variable(s) representing work unit environment to obtain the interaction terms that are of primary interest in testing the null hypothesis. Four regression analyses are conducted with the second half sample to test the linear hypothesis: a simple analysis for clerical and technical-professional employees and a more complex analysis for clerical and technical-professional employees.

The results of the simple regression analyses are presented in Table 3. (The results of the complex analyses are available from the authors and are summarized here.)

In none of the four analyses does the regression coefficient for any interaction effect significantly differ from zero at the .05 level of significance. Only two regression coefficients (other than the constants) in any of the four analyses significantly differ from zero at the .05 level of significance. One is the coefficient for the work unit environment in the simple linear model for clerical employees. The other is the coefficient for the dimension of the work unit environment that represents attending to interpersonal relations, involving the employee, and positively reinforcing work behavior in the more complex clerical employees analysis.

### Non-linear Tests: Identifying the Categories

The non-linear hypothesis requires that a limited number of categories be identified for work unit environment. Analysis of the first sample resulted in the number of categories differing from simple and complex representations of work unit environment.

Just as with the simple linear hypothesis, the simple non-linear hypothesis starts by representing work unit environment as a simple mean of the three underlying dimensions. The most parsimonious number of categories for investigating a non-linear hypothesis is three. Using the mean work unit environment to divide the first sample into thirds such that a third falls into low, moderate, and high work unit environment categories showed the strongest relationship with productivity for both clerical and technical-professional groups.

The number of categories and the method of determining those categories for the more complex representation of work unit environment involved a complex procedure. Just as with the complex linear hypothesis, work unit environment was represented initially by the three separate dimensions. These dimensions were used first in a two-stage cluster analysis procedure to identify alternative sets of three to five work unit environments. The relationship between the different sets of clusters and productivity was tested with one-way analysis of variance, resulting in the selection of a set of four work unit environments to use in subsequent analysis. Finally, the four selected clusters suggested decision rules that could be used to guide the categorization of employees into four different work unit environments.

The resulting means for each dimension and the number of employees in each type of work unit environment when the decision rules are applied to clerical and technical-professional employees in the second sample are shown in Table 4. The decision rules are also presented. Furthermore, the mean productivity in each work unit

environment is shown. It is based on those employees for whom productivity is available.

### **Non-linear Tests: Results**

The simple and complex versions of the non-linear hypothesis are tested in the second sample for clerical and technical-professional employees separately. These tests use two-way analysis for variance, where work unit environment is an independent variable with three (simple version) or four (complex version) categories representing different work unit environments, employee status is an independent variable with two categories (i.e., IS and non-IS), and productivity is the dependent variable. Neither the simple nor the complex test has a significant interaction effect at the .05 level of significance for either clerical or technical-professional employees. The only effects significant at the .05 level in any of the four analyses are the main effect of employee status for technical-professional employees in both the simple and complex tests and the main effect of work unit environment for technical-professional employees in the complex test.

## **Discussion**

What are the most productive work unit environments? The analyses above suggest one result that is consistent with conventional wisdom as well as some thought-provoking ones that will be elaborated on below. Are these productive work unit environments different for IS and non-IS people? The analyses above suggest that they are not; however, one finding presents an intriguing question that will be presented below.

### **PRODUCTIVE WORK ENVIRONMENTS**

#### **Expected Result: High Work Unit Environment**

The result consistent with conventional wisdom is that the high work unit environment is a productive one. This result is based on two significant findings. The first finding is that a linear relationship exists between work unit environment and productivity for clerical employees, where work unit environment is represented as the mean of the three underlying dimensions. The sign of the regression coefficient is positive (see Table 3), indicating that relatively high values of the underlying dimensions are associated with higher productivity. The second finding is that a non-linear relationship exists between work

unit environment and productivity for technical-professional employees, where work unit environment is represented as having four types: low, high, and two mid-range types. The productivity of the work unit environment that is relatively high on the underlying dimensions is higher than the average productivity (see Table 4). Thus, a high work unit environment is a productive work unit environment.

#### **Unexpected Results: Low Work Unit Environment**

One result inconsistent with conventional wisdom is that the work unit environment that is relatively low on all three underlying dimensions is not consistently associated with the lowest productivity. Notice in Table 4 that the low work unit environment has the lowest average productivity for clerical employees in the second sample (which is consistent with the simple linear hypothesis test results) but does not for the technical-professional employees. The opposite results are present in the first sample, i.e., the low work unit environment has the lowest productivity for the technical-professionals but does not for the clerical employees.

One explanation for this unexpected result could be that employees with above average skills and abilities will perform reasonably well in such an environment while those with average or below average skills and abilities will not be helped to perform at a higher level. Further complexity could be added to this explanation by suggesting that of those employees with average or above average skills and abilities, some may perform reasonably well because the motives for (or reinforcers of) their behavior come from sources other than the work unit environment while others may not perform reasonably well because the low work unit environment provides negatively valent (or punishing) outcomes for productive work behavior. Future research could investigate these explanations.

#### **Unexpected Results: Mid-Range Work Unit Environment**

The other unexpected result is that the mid-range work unit environment represented by relatively low attending to production, providing negative feedback, and targeting work behavior is a productive work unit environment. This result is based on an examination of the productivity of this work unit environment compared to the other mid-range work unit environment (see Table 4) for both clericals (5.09 versus 4.73) and technical-professionals (5.02 versus 4.39) in the second sample. The same pattern of productivity is present in the first sample.

**Table 3**

Linear Regression Results  
for Simple Representation of Work Unit Environment\*  
(All results are derived from the second sample)

CLERICAL EMPLOYEES  
(N = 189)

<i>Regression Coefficient</i>	<i>Estimated Value</i>	<i>Standard Error</i>	<i>t Value</i>	<i>Significance</i>
b1	.212	.105	2.02	.045
b2	1.324	.972	1.36	.175
b3	-.220	.208	-1.06	.293
a (constant)	3.822	.506	7.55	.000

TECHNICAL-PROFESSIONAL EMPLOYEES  
(N = 60)

<i>Regression Coefficient</i>	<i>Estimated Value</i>	<i>Standard Error</i>	<i>t Value</i>	<i>Significance</i>
b1	-.113	.273	-.42	.679
b2	-.058	1.752	-.03	.974
b3	.153	.346	.44	.659
a (constant)	5.127	1.383	3.71	.000

$$* Y = a + b1X1 + b2X2 + b3X1X2$$

where    Y = Productivity  
           X1 = Work Unit Environment (i.e., the mean of the three underlying dimensions)  
           X2 = Employee Status (0 = non-IS; 1 = IS)

**Table 4**

Work Unit Environments and Productivity  
 Derived from Non-Linear Analysis  
 (All data are based on the second sample)

**CLERICAL EMPLOYEES**

<i>Work Unit Environment</i>	<i>N</i>	<i>X1*</i>		<i>X2</i>		<i>X3</i>		<i>Productivity</i>		<i>N</i>
		<i>Mean</i>	<i>S.D.</i>	<i>Mean</i>	<i>S.D.</i>	<i>Mean</i>	<i>S.D.</i>	<i>Mean</i>	<i>S.D.</i>	
1. Low	47	3.37	.95	3.22	.89	3.70	1.28	4.66	1.16	46
2. Mid-range 1	48	4.15	.65	4.65	.72	5.68	.45	4.73	1.14	48
3. Mid-range 2	51	4.79	.76	4.97	.84	4.41	.63	5.09	.92	48
4. High	47	5.31	.79	5.97	.59	5.95	.64	5.06	1.26	47
Total Sample	193	4.41	1.07	4.71	1.24	4.93	1.22	4.89	1.13	189

Decision Rule (to identify an individual's work unit environment):

If the average of the three dimensions (X1, X2, and X3) is less than 4.10, work unit environment is low; if the average is greater than 5.30, it is high; if the average is between 4.10 and 5.30 inclusive, it is one of the two mid-range work unit environments. If either X1 or X2 is greater than X3, the mid-range work unit environment is classified as mid-range 2; otherwise, it is mid-range 1.

**TECHNICAL-PROFESSIONAL EMPLOYEES**

<i>Work Unit Environment</i>	<i>N</i>	<i>X1</i>		<i>X2</i>		<i>X3</i>		<i>Productivity</i>		<i>N</i>
		<i>Mean</i>	<i>S.D.</i>	<i>Mean</i>	<i>S.D.</i>	<i>Mean</i>	<i>S.D.</i>	<i>Mean</i>	<i>S.D.</i>	
1. Low	9	4.65	.98	2.34	.72	2.98	1.06	5.80	.00	4
2. Mid-range 1	29	4.76	.78	4.20	.86	4.91	.64	4.39	.99	18
3. Mid-range 2	33	5.34	.48	4.77	.50	3.87	.56	5.02	.87	10
4. High	50	5.63	.59	5.75	.58	5.46	.68	5.14	1.06	28
Total Sample	121	5.27	.74	4.86	1.15	4.71	1.05	4.94	1.04	60

Decision Rule (to identify an individual's work unit environment):

If the average of the three dimensions (X1, X2, and X3) is less than 3.875, work unit environment is low; if the average is greater than 5.19, it is high; if the average is between 3.875 and 5.19 inclusive, it is one of the two mid-range work unit environments. If both X1 and X2 are greater than or equal to X3, the mid-range work unit environment is classified as mid-range 2; otherwise, it is mid-range 1.

\* X1, X2, X3 represent the work unit environment, where

X1 = Job enrichment

X2 = Attending to interpersonal relations, involving the employee, and positively reinforcing work behavior

X3 = Attending to production, providing negative feedback, and targeting work behavior

An explanation for this unexpected result could be that relatively high attending to production, negative feedback, and targeting work behavior are sufficiently negatively valent that compensating positively valent outcomes must be provided by one (for clericals) or two (for technical-professionals) other dimensions of the work unit environment. Future research could explore this explanation with employees in other types of companies or with other research methodologies.

### **Expected and Unexpected Results: A Final Thought**

An hypothesis for further research that is consistent with the expected result and the second unexpected result is that work unit environments that are high and mid-range 2 have higher productivity than a mid-range 1 work unit environment. A post hoc analysis of all clerical and technical-professional employees in both the first and second samples combined was conducted to suggest the kind of results future studies designed to test this hypothesis might obtain. The 277 employees in the high and mid-range 2 work unit environments have a mean productivity of 5.06 with a standard deviation of 1.06, while the 123 employees in the mid-range 1 work unit environment have a mean productivity of 4.49 with a standard deviation of 1.16. The difference in means is significant beyond the .000 level.

### **ARE PRODUCTIVE WORK UNIT ENVIRONMENTS DIFFERENT FOR IS AND NON-IS PEOPLE?**

Eight different analyses (i.e., two linear and two non-linear tests for the clerical and technical-professional groups separately) failed to show any significant interaction effects for the status of an employee when investigating the relationship between work unit environment, employee status, and productivity. While these are certainly not all the tests that could be performed, they do provide a wide range of opportunities for an interaction effect to be discovered. Given that none was found, it is appropriate to proceed with a conclusion that productive work unit environments are the same for both IS and non-IS people.

One intriguing finding is that employee status has a significant main effect for technical-professional employees when the high, low, and two mid-range work unit environments are used. Since this main effect indicates a difference in the level of productivity for IS and non-IS employees, the productivity of these two groups was examined. Interestingly, IS technical-professional employees are rated higher (5.27 versus 4.56 in the second sample, with similar results in the first sample) than non-

IS employees. The question that arises is whether IS employees are indeed higher in productivity than non-IS employees or are their immediate superiors more lenient raters than their non-IS counterparts. Future research could investigate this question.

## **Conclusions**

What are productive work unit environments? This study has identified two. These work unit environments are based on three dimensions: (1) job enrichment, (2) attending to interpersonal relations, involving employees, and positively reinforcing work behavior, and (3) attending to production, providing negative feedback, and targeting work behavior. One productive work unit environment is relatively high on all three dimensions for both clerical and technical-professional employees. The other productive work unit environment has a mid-range pattern with the third dimension (i.e., attending to production, providing negative feedback, and targeting work behavior) being low relative to both other dimensions for technical-professionals and low relative to at least one other dimension for clerical employees.

These findings suggest that managers do not need to be high on all three dimensions to establish a productive work unit environment. That should be welcome news for many managers! They also suggest, though, that the dimensions that a manager establishes as relatively high do make a difference. However, a cautionary note is appropriate. This study used a field survey, not an experimental methodology, to obtain these results. Furthermore, the sample of employees is from the insurance industry in the midwest United States. Our results need to be replicated with other samples and more causal methodologies before being widely accepted.

Are productive work unit environments different for IS and non-IS people? The results of eight different analyses in this study indicate that they are not. Within the cautions just cited, these results suggest that IS and non-IS employees do not need to have different work unit environments for productive work behavior.

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