Sophisticated Information Processing Technology: Its Relationship with an Organization’s Environment, Structure, and Culture*

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This study examined the sophistication of information processing technology in an organization in relation to the organization’s environment, its structure, and its culture. The relationships were examined by using both archival and questionnaire data from 298 public human resource departments. Human resource departments are important users of information technology because they require large amounts of data and because sophisticated software is available to them. The results indicate that both the presence of computer hardware and the sophistication of the information processing technology were associated with the organization’s environmental and structural characteristics. Organization culture, however, was related only to the sophistication of information technology.

Over the past decade, the use of computer hardware and software has increased dramatically. Yet, little is known about the connection between the use of sophisticated computer applications and an organization’s environment, its structure, and its culture. Knowledge of these relationships could prove helpful to practicing managers. For example, the organization’s culture may either be an obstacle or enhancement to the implementation of sophisticated data analysis applications. Organization innovation may be enhanced by an organizational culture that supports and encourages change. While this example focuses on organization culture, the environment and the structure may prove equally important to the development of sophisticated computer use. This study was designed to assess the relationship of an organization’s environment, the structure of the organization, and the organization’s culture with the amount and sophistication of information processing technology.

Figure 1 overviews the specific areas of investigation to be considered in this study. Information concerning the characteristics of the environment and characteristics of the organization was obtained using two methods of data collection for county and city human resource units. Human resource departments were chosen for this study because these departments service entire organizations and have a high need for information. Characteristics of the environment (city or county size, number of gov-
government employees, geographic growth rate, average per capita income, and budget dollars) were collected from a secondary archival source.

Organizational variables were collected from responses to a mail survey questionnaire that was mailed to municipalities' human resource managers. The structure of the organization was assessed by measuring specialization of the work force, the number of rules and procedures, and the extent of centralization of decision making. The three organizational culture dimensions were: power distance, the acceptance of unequal power distribution; uncertainty avoidance, the extent to which methods are developed to reduce threat of an ambiguous situation; and masculinity/femininity, assertiveness and domination versus cooperation. The information processing technology variables surveyed were: the department’s computer use potential, i.e., the presence of computer hardware in the department; and sophistication of the information processing technology (IPT). At the lower end of the scale, IPT is simple data storage and retrieval; at the upper end, IPT includes the use of forecasting and decision-making software.

The following three sections of this paper will summarize the rationale for studying these particular environmental, structural, and cultural aspects of human resource units and the relationship of those aspects with potential processing capabilities.

**Relationship of Environmental Factors and the Processing Capabilities Variables**

The association between the availability of computer hardware and environmental variables such as size, growth, income, and organizational budgets is unknown. Yet, a positive relationship is known to exist between organizational size and computerization in the management literature as well as in research conducted in the public sector (Ostrowski, Garder, and Motawi, 1986). Pragmatically, the computer serves as a tremendous aid for the storing, retrieval, and analysis of data for large groups of employees. Since large human resource units require significant amounts of information, we assume that the size of the municipality will be positively related to computer use potential (equipment availability). Sophisticated computer applications (e.g., forecasting software) may be used regardless of size, that is, small and large communi-