

AN EXAMINATION OF THE RELATIONSHIP BETWEEN THE BUFFERING
RESPONSE OF PART-TIME AND TEMPORARY WORKERS AND TECH-
NOLOGY, PERCEIVED ENVIRONMENTAL UNCERTAINTY AND
SIZE IN TWO MANUFACTURING INDUSTRIES

by

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CHAPTER I

INTRODUCTION

During the last fifteen years, organization theorists have increasingly viewed general systems theory as a very useful tool for the analysis of the behavior of social organizations. Classical organization theorists such as Taylor (1911), Fayol (1929), Gulick and Urwick (1937), and Weber (1947) utilized a closed system, rational model for studying organizations. The organization was seen as a "rationally conceived means to the realization of expressly announced group goals" (Gouldner, 404). To accomplish these goals, the organization sought "technical rationality" which refers to achieving its desired output with the optimal allocation of resources. It was assumed that the organization was able to control or to predict reliably the influence of outside environmental forces. Thus the organization's production tasks were viewed as known and repetitive; the outputs of the production process somehow disappeared, and the necessary resources were automatically and uniformly available (Thompson, 5). The outcome of this closed system, rational view of the organization was the development of universal principles of planning, organizing, and controlling which applied to all organizations in all situations.

Modern organization theorists, utilizing the general systems theory approach, take a somewhat different view of the organization. The organization is seen as an open system composed of three interrelated and interdependent components: inputs, transformation process, and outputs. These components interact not only with each other, but also with the external environment. Resource inputs are acquired from the external environment and transformed by means of a core technology into outputs which are returned to the external environment.

This perspective emphasizes the importance of the environment and the need of the organization to relate to it for its own survival. Consideration of an environment which can be partially controlled at best also introduces the organization to the need to deal with varying degrees of uncertainty.

As a result of the open system perspective, modern organization theorists have been interested in determining more precisely the relationship between the organization and its environment. Burns and Stalker (1961), Bennis (1966), and Lawrence and Lorsch (1967) focused their attention on the adaptation of the organization to the environment. Cyert and March (1963), Starbuck (1965), and Thompson (1967) theorized that organizations may act on their environment in order to reduce uncertainty.

Researchers such as Macaulay (1963), Selznick (1949), Zald (1967), and Pfeffer (1972) tried to determine empirically how organizations reduce environmental uncertainty.

Concurrently, other organization theorists have been interested in the relationship between organization structure and technology. Woodward (1958, 1965) pioneered the investigation of the relationship between structure and technology. Subsequent research by Burack (1967), Harvey (1968), Hickson, Pugh, and Pheysey (1969), Aiken (1969), Meissner (1969), and Perrow (1970) resulted in disagreements on the definition of technology, the methods of measurement, and the relationship between structure and technology.

J. D. Thompson (1967) developed a theoretical model which conceptualized the relationship among the environment, technology, and structure within the closed and open systems framework. Utilizing open systems logic, Thompson asserted that the fundamental problem faced by complex organizations is that of coping with environmental uncertainty. To accomplish desired results, the organization must seek "technical rationality." However, in order for the organization to achieve "technical rationality," it must treat its technical core as a closed system by utilizing some type of coping response such as buffering. Thompson's proposition of organizational rationality states this specifically:

Under norms of rationality, organizations seek to buffer environmental influences by surrounding their

technical cores with input and output components (Thompson, 20).

Objectives of the Study

Primary Objective

The primary objective of this dissertation is to empirically test Thompson's proposition that organizations seek to buffer their technical cores from the uncertainty of the environment. This will be accomplished by examining in an applied setting the relationship among one buffering method, two types of core technologies, and perceived environmental uncertainty.

Applied research to date has taken a piecemeal approach to this proposition by investigating either the premise that organizations cope with environmental uncertainty or the premise that organizations have technical cores with supporting type mechanisms for protection. Lawrence and Lorsch's empirical analysis (1967) discovered that different configurations of organizational structure were required to cope with different environmental conditions. Burns and Stalker (1961) found that successful organizations facing a stable environment tended to have "mechanistic" or highly bureaucratic structures and processes, while those facing changing and uncertain environments tended to have "organic" or flexible structures and processes. Woodward (1965) and Harvey (1968), utilizing

Woodward's research, developed classifications of core technologies and found relationships between certain characteristics of a firm's organization and the type of core technology.

Applied researchers' failure to investigate Thompson's total proposition can be attributed to two causes. First, the underlying concepts had to be more clearly defined and operationalized before hypotheses could be tested in applied settings. Since Thompson's concepts represent a sophisticated conceptualization of organizations, applied researchers were unable to conduct field tests until his concepts had been specifically operationalized. Second, the necessary instrument to measure environmental uncertainty had to be developed. Empirical studies by Harvey (1968) and Burack (1967) and theoretical work by Khandwalla (1975) and Jelinek (1977) have further refined and operationalized Thompson's propositions. Empirical research done by Lawrence and Lorsch (1967), Duncan (1972), and Downey (1974) have resulted in the development of measuring instruments for perceived environmental uncertainty. The state of the metatheory has progressed to the stage where Thompson's propositions can be operationalized into researchable hypotheses for testing in applied settings.

Secondary Objectives

The following are secondary objectives of this study:

1. To explore the relationship among technology, perceived environmental uncertainty, size, and buffering. Little research has been done on examining the nature of the relationship among these variables (Child, 1974, 1975; Pfeffer and Leblebici, 1973; and Hall, 1977). Furthermore, there is a lack of research regarding the relationship between perceived environmental uncertainty and buffering and between size and buffering. This study will attempt to examine the nature of these relationships.
2. To provide descriptive statistics on the use of part-time and temporary workers in the manufacturing firms. There is a void in the literature regarding the use of part-time and temporary workers (Nollan, Eddy, Martin, and Monroe, 1976). This study will attempt to provide information regarding the type, source, activities performed, functional areas worked, and reasons for use of part-time and temporary workers in the sampled firms.
3. To test empirically the Perceived Environmental Uncertainty Instrument developed by Duncan (1972) and modified by Downey (1974). Downey (1974) to date is apparently the only researcher to utilize the Duncan instrument. It is employed in his study designed to

examine the conceptual and methodological adequacy of the Lawrence and Lorsch (1967) and the Duncan perceived environmental uncertainty instruments. This study will provide a needed field test of the Duncan instrument.

Statement of Hypotheses

In order to accomplish the research objectives, the following hypotheses will be tested. These hypotheses will be explained and supported in Chapter Two, Review of the Literature.

Hypotheses

- H₁: the more specific the technology, the more the organization will seek to buffer its technical core by using part-time and temporary workers.
- H₂: the greater the perceived environmental uncertainty, the more the organization will seek to buffer its technical core by using part-time and temporary help.
- H₃: the larger its size, the more the organization will seek to buffer its technical core by using part-time and temporary help.

Definitions of Terms

In this research study, the following definitions are used.

Technology

There is general lack of agreement about the exact meaning of technology and its parameters (Gillespie and Mileti, 8). Although there have been numerous studies

dealing with technology, researchers have either failed to specify its meaning or conceptualized it from differing perspectives. Technology has been viewed from the systems wide and the individual tasks level perspectives. The systems wide perspective maintains that the core production technology is indicative of the entire organization while the individual task level recognizes the existence of multiple technologies. Technology has been defined in terms of product standardization (Harvey, 1968); technical complexity (Woodward, 1965); work task nature (Touraine, 1962 and Blauner, 1964); standardization of techniques and materials (Thompson, 1967 and Perrow, 1967); and nature of technical hardware (Bright, 1958 and Fraunce, 1968).

In this study technology is defined as the "types and patterns of activity, equipment, and materials, and knowledge or experience" (Gillespie and Miletì, 8) used in the transformation of inputs (raw materials, labor, etc.) into outputs (goods, services, etc.). The definition is universally applicable incorporating the general systems theory perspective and the conceptualization of Gillespie and Miletì (1977). Their conceptualization provides a broad, unifying perspective, which takes into account machine sophistication, the nature of the raw materials, and the nature of task characteristics. This definition also provides a wholistic perspective by conceptualizing

technology as including the core and all supporting technologies.

Core Technology

The core technology is the primary or central transformation process used by the organization to convert inputs into outputs. Current thinking on technology is that the organization has a technical core as well as secondary or supportive technologies (Thompson, 1965; Jelinek, 1977). The core technology is seen as one of the major shaping factors in the organization, but supportive activities, such as purchasing, personnel, shipping, etc., are viewed as "intervening technologies" which surround the technical core.

The core technology can be classified according to typologies developed by Woodward (1965), Thompson (1967), Harvey (1968), or others. Woodward (1965), for example, developed a typology based upon technological complexity: unit and small batch production, large batch and mass production, and process or continuous production.

Specific and Diffuse Technology

Harvey (1968) used the works of Woodward (1965), Bright (1958), and others to develop a typology of core technologies based upon technical specificity. Specific technology refers to core transformation processes which

permit little variation in types of products produced, whereas diffuse technology refers to technologies which permit the production of a variety of products. Specific technology is similar to Woodward's process or continuous production while diffuse technology relates to the unit and small batch production.

Environment

As defined by Duncan, environment refers to the "totality of physical and social factors that are taken directly into consideration in the decision making behavior of individuals in the organization" (Duncan, 314). This definition permits the recognition of both an internal and external environment. The internal environment includes those relevant physical and social factors within the boundaries of the organization while the external factors are those relevant physical and social factors outside the organizational boundaries. Lawrence and Lorsch (1967), Thompson (1967) and Terreberry (1968) have suggested the need for a conceptualization of the environment which includes both internal and external elements.

Perceived Environmental Uncertainty

Perceived environmental uncertainty, as discussed in this study, has three components: (1) the lack of information regarding the environmental factors associated

with a given decision making situation; (2) unpredictability of the outcome of a specific decision in terms of the amount of the organization's losses if the decision was incorrect; and (3) inability to assign probabilities with any degree of confidence with regard to the effect of environmental factors on the success or failure of the decision unit in performing its function (Duncan, 274).

This model of uncertainty is considered an individual psychological trait rather than simply an environmental attribute as suggested by Dill (1962). This perspective emphasizes that environmental influences are stimuli which lack inherent meaning or information value until structured by an individual perceiver (Downey, 614). Michael (1973), Wieck (1969) and Galbraith (1973) support this perspective of uncertainty.

Buffering: A Coping Response

Buffering refers to any type of protective or control activity and mechanism used by an organization to absorb environmental shock or influences. The purpose of buffering responses is to seal off or protect the technical core from environmental disturbances. Thompson (1967) argues that organizations actually try to treat their technical core as a closed system, that is, one that does not interact with the external environment, by buffering both inputs (stockpiling, preventive maintenance) and

outputs (inventories). Staff functional activities, such as personnel, purchasing, shipping and receiving, and others, are seen as means of buffering the technical core from environmental disturbances. The activities are usually seen as nonproduction (not directly involved in the transformation process) and perform maintenance and regulation functions (Litterer, 1963).

Size

There are many different approaches used to define and measure size; among these are the physical capacity of an organization, the personnel available to an organization, organizational inputs or outputs, and discretionary resources available to an organization (Kimberly, 1976). Each of these approaches illustrate clearly distinguishable aspects which may have differing theoretical significance (Kimberly, 587).

In this study, size will refer to the number of people the organization has available to do its work. This definition represents the most commonly used approach in research. Kimberly (1976) found that more than 80 percent of the eighty studies reviewed used this measure of size in one form or another. Although the number of employees may have different substantive implications in different kinds of organizations, Kimberly asserts these effects can be

minimized by distinguishing between manufacturing and service organizations.

Part-Time and Temporary Workers

For this study, four separate categories of part-time and temporary workers are used. This classification was developed by the joint efforts of the Bureau of National Affairs and the American Society for Personnel Administrators (1974).

1. Permanent part-time: employees who work on a permanent, year round schedule, and regularly work less than a full workweek.
2. Occasional part-time: employees who work less than a full workweek and work on an irregular schedule in accordance with organizational needs.
3. Temporary company payroll: employees hired directly by the company to work a full work week in positions that are not anticipated to become permanent.
4. Temporary outside agency: individuals who are employed by an outside organization (such as Kelly Services or Manpower, Inc.) and who work for an organization for relatively short periods of time (Part-Time, 1).

Order of Presentation

The order of presentation for this study is as follows:

Chapter One

This chapter delineates the origin and purpose of the study, identifies the research objectives, introduces

the research hypotheses, and defines and explains the terminology in the study.

Chapter Two

In Chapter Two, the significant literature related directly to this study is reviewed. The hypotheses provide the framework for the literature review. The review is used to develop, support, and explain the hypotheses.

Chapter Three

The research methodology is explained in detail in Chapter Three. Justification of the research methodology, including the sample, data collection method, and statistical analysis techniques, is made and the weakness and its limitations are noted.

Chapter Four

In this chapter, the hypotheses are tested based upon the data collected. The acceptance or rejection of the hypotheses are noted and general summary drawn.

Chapter Five

Conclusions with respect to the acceptance or rejection of the hypotheses are drawn as well as conclusions with respect to the stated research objectives and the test findings. Implications of the conclusions and suggested areas for further research are discussed.

CHAPTER II

REVIEW OF THE LITERATURE

The rationale and supporting literature for the hypotheses are discussed in this chapter. In addition, the literature regarding part-time and temporary workers is reviewed.

First Hypothesis

H₁: The more specific the technology, the more the organization will seek to buffer its technical core by using part-time and temporary workers.

The first hypothesis deals with the relationship between the type of core technology and the use of part-time and temporary workers as one buffering response. In this study, it is hypothesized that soft drink bottling firms with specific core technologies will use significantly more part-time and temporary workers as one buffering response than do upholstered furniture manufacturers representing diffuse core technology. The underlying rationale for the greater use of the buffering response by the soft drink bottling firms is that of automation. The more automated the technical core or central conversion process, the less the machines, skills, materials, and knowledge can be used for other purposes. Automated systems lack flexibility

and variety and hence have less tolerance for disturbances. The input and output components of the technical core must be buffered; one method of buffering is the use of part-time and temporary workers. The soft drink bottling firms with their specific core technology represent a highly automated system. The diffuse technical core of the upholstered furniture manufacturers is less automated.

Review of the supporting literature for the technology hypothesis reflects the natural progression of technology research. Research dealing with the relationship between technology and structure is examined first. Then research pertinent to the relationship between core technology and environmental disturbances is discussed.

Technology and Structure

Organization theorists have focused their attention on technology as an important organizational variable. Early researchers attempted to discover the nature of the relationship between structure and technology by investigating the impact technology linkages had on structural properties.

Bright (1958) was one of the early researchers to investigate the nature of technology. He developed a classification of technology based upon automation. His seventeen-point scale, based upon the type of power, the initiating control source, and the type of machine response,

spans a range from manual operations to self-regulating, feedback operations. Based on his studies of manufacturing firms, Bright concluded that there was great variety in the degree of mechanization in firms, but that most mechanization occurred in the central production process (core technology) and along the main flow of inputs and outputs. He also suggested that automated systems' most critical problem was the lack of flexibility with regard to the inputs as well as outputs--the raw materials, volume, product mix, and product design. Planning the input-output criteria of automated lines became increasingly important because once the automated system was built, production capabilities as well as product mixes and product designs were relatively fixed. Bright is recognized as having made a significant contribution to the theory of organizations by trying to operationalize and measure technological characteristics. However, he did not investigate the implications of his findings.

Woodward (1958, 1965) is recognized as a pioneer researcher in the field of technology and organization structure. Her major work was based on a study of eighty industrial plants in Great Britain. She developed an organizational systems classification of core technologies based upon increasing levels of technological complexity: small batch, mass production, and continuous processing.

Based on a conceptualization of technical complexity as the extent to which the "production process is controllable and its results predictable" (Woodward, 1958; 12), Woodward found a number of linear and curvilinear relationships between technological complexity and structural variables such as span of control, the levels of authority, the ratio of managerial and supervisory staff to total personnel, and others. Woodward found that firms with similar technologies had similar organizational structures and concluded that technology can be linked to variations in organizational requirements.

Woodward's findings raised considerable controversy. Her classification of technologies based upon complexity was attacked because her nomenclature was misleading (Khandwalha, 1974). Starbuck (1965) asserted that her scale actually measured the "degree of continuity of throughput units in the production work flow," or smoothness of production, rather than complexity in terms of control and prediction.

Harvey (1968), utilizing the works of Bright (1958) and Woodward (1958, 1965), developed a classification of technologies based upon technical specificity which was measured in terms of the number of product changes made by his sample firms in the past ten years. Technically specific firms corresponded to Woodward's continuous core

technology and had the least amount of product variety. Technically diffuse firms (Woodward's small batch) produced a variety of products. Harvey found that as technical specificity increased, the number of levels of authority, the ratio of managers and supervisors to total personnel, and subunit specialization all increased. Highly specific technologies were accompanied by mechanistic organization structures. This conflicts with the findings of Woodward (1965) which concluded that continuous technologies were accompanied by organic structures. Bright (1958), however, provided partial support for Woodward. He found that the type of technology strongly affected organization structure. He disagreed, however, with her conceptualization of technology. Bright conceptualized technology based on the nature of the technical hardware. Woodward viewed technology as measured by the complexity of the technical core. Other researchers, including Zwerman (1970), Fullan (1970), Meissner (1969), and Grimes, Klein, and Shull (1972) adopted Woodward's position.

Hickson, Pugh, and Pheysey (1969) found little evidence to support Woodward (1965) and Harvey (1968) whose findings suggested technology's global impact upon the organization. In a study of thirty-one manufacturing firms, Hickson et al. conceptualized technology as having three facets--operations, materials, and knowledge--and tested

the relationship between operations technology and certain aspects of organization structure. They defined operations technology in terms of automation, the sequence of operations, the specificity of evaluation of operations, and the continuity of the units of throughput. They concluded that operations technology affected only those production level structural variables which are immediately impinged on by the work flow. Each of the other structural variables showed insignificant relationships when the size of the firm was controlled. The smaller the organization, the more completely its structure was pervaded by the immediate effects of technology. The larger the organization, the more the effects were confined to variables linked specifically to the work flow. Hickson et al. concluded that technology was not related to the wider administrative and hierarchical structure.

In their study of forty British manufacturing firms, Child and Mansfield (1972) replicated the findings of Hickson, Pugh, and Pheysey (1969). They supported Hickson and colleagues' findings that size and structure had a stronger relationship than technology and structure. However, their findings with respect to the relationship between production continuity and dimensions of organization structure disagreed with those of Hickson et al.

Aldrich (1972) challenged the assertion of Hickson

et al. (1969) that technology was not an important variable affecting structure. He based his analysis on their conceptualization of operations technology. By using path analysis to reanalyze Hickson et al.'s findings, Aldrich found that technology did indeed emerge as an important variable in organization structure.

Zwerman (1970) reported patterns inconsistent with the findings of Hickson, Pugh, and Pheysey (1969) in a study of fifty-five Minnesota manufacturing firms which utilized Woodward's basic approach (1965). He found that organization size was associated with the number of levels of management and average span of control of the chief executive officer. However, apart from these results, his findings largely supported Woodward's conclusion that technology was most influential.

Conclusion

The preceding studies demonstrated there is no consensus about the relationship between structure and technology. Some of the studies showed a definite relationship; others showed a very weak or insignificant relationship. When size of the organization was controlled, there was no clear evidence of a relationship between technology and structure.

These studies suggested several important implications. First, most of the studies were concerned with

the central transformation process or core technology and attempted to develop a typology of core technologies. Other researchers such as Amber and Amber (1962) and Thompson (1967) also developed core technology classifications. Second, the researchers conceptualized technology as measured by automation (Bright, 1969, and Hickson, Pugh, and Pheysey, 1969); complexity (Woodward, 1965); and/or specificity (Harvey, 1968). The common bond between these differing conceptualizations is automation. Automation is viewed as increasing technical complexity and specificity (Jelinek, 1976).

Core Technology and Environmental Disturbances

The preceding studies failed to show conclusively the relationship between core technology and organizational structure. Other researchers investigated the relationship among core technologies measured in terms of the degree of automation, organizational structure, and the firm's ability to tolerate environmental disturbances.

Thompson and Bates (1957) compared the technologies of a mining enterprise, a manufacturing organization, a hospital, and an university. They postulated that the type of technology available set limits on the types of structure appropriate for organizations. They concluded that as technology became more specialized, organizational

flexibility declined as shifts occurred from one goal to another. Also, as technology became elongated, the organization tended to have less control over the total organization process. Complex technologies required a more elaborate structure. This was due to the more intense interdependent relationship the organization had with its environment for the acquisition of resources and the disposition of outputs.

Emery and Marek (1962), based on a study of the effects of higher mechanization and automation in a power plant, found that the automated system had less tolerances for disturbances than the nonautomated systems. They also found that increased automation caused greater interdependence among the water treatment, broiler operations, and power house subunits of the electrical generation process and between the process with its environment. This required a more elaborate structure.

Burack (1967), in a study of thirteen companies with large batch and continuous core technologies, found that as technical complexity of the core technology increased, interdependence between the various operations increased and the cost of disrupting the production system became significant. This resulted in more complex organization structures with increasing control. This was

achieved by elaborate job descriptions, control technologies, and support functions.

Bright (1958) argued that the input/output functions of the automated system had less tolerance for variations and that automated systems had less flexibility than did nonautomated systems. Furthermore, as automation increased, tasks were subdivided. Thus, automated systems required more elaborate structure to coordinate activities.

Udy (1965) attempted to describe the precise relationship among technology, structure, and the ability to tolerate variations. He asserted that flexible technologies had less impact in structure determination than did nonflexible technologies. Udy argued as technical complexity increased, the organization sought to achieve better control in its relationship with its environment. This was accomplished by emphasizing administration.

Litterer (1961, 1963) examined the major internal administration developments in American manufacturing industries from 1875 to 1900. He found that problems of integration and coordination arose as firms grew in size and relied more heavily on the principles of division of labor and specialization. There was a gradual breakdown of integration of work flow at lower levels of the company and a deterioration in the ability of top management to control work at lower levels. To solve this problem, new staff

positions and activities, such as production control, cost accounting, and personnel, were created to perform many of the routine coordinating functions of management. These positions concerned the routine or the regular, steady-state portion of managerial activities and were created to insure coordination. Staff units were created to develop preestablished solutions for recurring problems.

Kynaston, Reeves, and Turner (1972) found, in their qualitative analysis of three English manufacturing firms, that certain features of the way work was planned and controlled in batch production firms was a consequence of the high degree of complexity and uncertainty inherent in scheduling production tasks. They found a relationship between the production task and operating patterns (roles, techniques, and activities) used by batch processors.

Van de Van and Delbecq (1974) studied one hundred and twenty work units in a large government employment-security agency. They examined differences in structure between work units or departments within complex organizations. Based upon an analysis of task difficulty and task variability, they found that increasing task difficulty and variability did affect the extent to which work unit activities were structured.

Conclusion

These studies revealed that automated technologies were not able to tolerate disturbances as effectively as less automated ones, especially in their input-output components. Automated systems required a more elaborate structure because these systems had greater interaction with their environment. Furthermore greater internal coordination was needed because of the increasing differentiation of tasks.

Organizations sealed off or buffered their cores when the complexity of the technical core increased. This was achieved by adding staff or nonproduction activities which created a more elaborate structure. The purpose of protecting the technical core was to absorb the environmental disturbances and influences, thus assuring some degree of predictability. The structure acted as a buffer to absorb the disturbances.

Therefore, it is hypothesized that soft drink bottling manufacturers with specific, highly automated core technologies will use more part-time and temporary workers to buffer their technical cores from environmental disturbances than will the upholstered furniture firms with their diffuse, less automated manufacturing process.

Second Hypothesis

H₂: The greater the perceived environmental uncertainty, the more the organization will seek to buffer its technical core by using part-time and temporary workers.

The second hypothesis deals with the relationship between perceived environmental uncertainty and the use of part-time and temporary workers as one possible buffering response. It is hypothesized that there is a positive relationship between perceived uncertainty and the use of the buffering response. As perceived environmental uncertainty increases, there is a greater need for the organization to protect itself from environmental influences. The organization must insure its flexibility by using coping responses. Buffering, through the use of part-time and temporary workers, is one such coping response. Thus, the greater the uncertainty, the more the organization will use part-time and temporary workers as a means of coping with the environment.

In the past two decades, organization theorists have focused their attention on the interaction of the organization and environment. Greatest attention has been directed at the uncertainty element of the environment and the adaption of the organization to the environment. Both perceptual and objective measures of environmental uncertainty have been developed. The perceived approach attempts to measure an individual's perception of his

environment. On the other hand, the objective approach measures uncertainty by the use of statistical, quantitative information. The literature review examines the research in each of these areas.

Perceived Environmental Uncertainty Approaches

Dill (1958), in his study of two Norwegian firms, described the environment in informational terms and found that the organization's environment had relevance for understanding managerial discretion and decision making activities within organizations. He noted that executives operating in relatively dynamic environments had more autonomy than those operating in relatively stable environments.

Extending the work of Burns and Stalker (1961), Lawrence and Lorsch (1967, 1969) investigated the differences in structure among organizational subunits in ten U.S. firms in the plastics, food, and container industries. They conceptualized environmental uncertainty as being composed of three elements: (1) lack of clarity of information; (2) the general uncertainty of casual relationships; and (3) the time span of feedback regarding results. They developed a nine-item questionnaire to measure perceived environmental uncertainty based upon the three components. The results of investigation of the research, production,

and sales subunits of the sampled firms indicated that the structure of the organizational subunits was systematically correlated with the type of perceived environment the subunit confronted. Furthermore, Lawrence and Lorsch concluded that the formality of the effective organization's structure was related to the degree of certainty and stability of its market and technological environments. Successful firms operating in relatively uncertain and diverse environments tended to be decentralized, while those facing less diverse and more stable environments were relatively centralized.

Tosi, Aldag, and Storey (1973) in their study of 122 top and middle level managers in twenty-two firms representing twelve industries, attempted to replicate the work of Lawrence and Lorsch. They analyzed the Lawrence and Lorsch instrument (1967, 1969) by (1) computing the internal reliabilities for both the total instrument and its subscales, (2) correlating scale and subscale scores with alternative measures of certainty, and (3) factor-analyzing the instrument's item scores. Tosi et al. found that the internal reliability assessments of the subscales were methodologically inadequate. The reliability of the total uncertainty scale was adequate for exploratory research according to Nunnally's (1967) criterion. The correlations of the subscale and total scores with the alternative

certainty measures were low and inconsistent. Downey and Slocum (1975), however, challenged Tosi et al.'s findings and asserted that there were several methodological problems with their analysis which made interpretation difficult.

In a study of four divisions and corporate headquarters of six multidivisional firms, Lorsch and Allen (1973) extended the earlier research of Lawrence and Lorsch (1967, 1969). The firms and divisions studied were selected to accentuate differences in environments and performance as in the earlier study. Uncertainty was measured by the Lawrence and Lorsch instrument. Although their study was designed to test contingency propositions, Lorsch and Allen found statistically significant differences in perceived uncertainty among the four divisions of each of the four firms. This study provided support for the earlier findings of Lawrence and Lorsch (1967, 1969) that perceived uncertainty of subunits affected organization structure.

Kefalas and Schoderbek (1973) in their study of three farm equipment and three meat-packing organizations examined how differences in organizational environments affected the information-acquisition behavior of managers. They adopted the methodology developed by Lawrence and Lorsch (1967, 1969) to classify the firms into stable and dynamic environments. Kefalas and Schoderbek tested the hypotheses that managers in dynamic environments spent more

time acquiring external environment-related information and utilized human sources of information more frequently than managers in stable environments. Neither of the hypotheses was supported, but the small sample size may have influenced the results.

Yeung (1974) investigated the applicability of Lawrence and Lorsch's (1967, 1969) contingency findings to organizations in Hong Kong. Six companies in three industries were selected representing high or low performing firms with certain, moderately certain, or uncertain environments. Yeung tested the hypotheses that the overall structure and subunit differentiation and integration of high performing firms would be more closely aligned to the industry's required pattern than those of low performing firms. He also hypothesized that firms in more certain environments would be more structured while firms in uncertain environments would be less structured. None of the hypotheses was supported. Yeung concluded that apparently the relationship between organizations and their environments was more complex than Lawrence and Lorsch suggest.

Blandin (1974) empirically investigated the effect of environmental uncertainty on managerial information sources and frequency of use, the locus of responsibility for planning and length of planning horizons, and the use

of forecasting techniques. The methods used to achieve integration for organizations operating in environments characterized by differential levels of uncertainty were also examined. The sample included seventy top level managers of eight organizations, four each in the electronics and wood products industries. Perceived environmental uncertainty was measured by the methodology developed by Lawrence and Lorsch (1967, 1969). Blandin concluded that relationships did exist between uncertainty and certain organizational design, structure, and behavior variables. Significant positive correlations were found to exist between perceived uncertainty and a manager's propensity to rely on external rather than internal information sources, to use informal rather than formal information sources, to use all information sources, and to allocate time to information-gathering activities. Blandin concluded that environmental uncertainty represented a major contingency in terms of explaining systematic differences in design, structure, and behavior of organizations.

Duncan (1971, 1972, 1973) studied twenty-two decision groups in three manufacturing and three development organizations. He analyzed the manner in which managerial decision making was affected by the organization's need to adapt to the uncertainty in its environment. Duncan presented a more specific conceptualization

of organizational environment and perceived environmental uncertainty by identifying eight components of organizational environments and two specific dimensions of the environment. He developed a measure of perceived environmental uncertainty based upon a semantic analysis of individuals' verbalization of the concept of uncertainty. Duncan also developed a measure of two perceived environmental dimensions--the simple-complex and the static-dynamic. The simple-complex dimension referred to the number of factors considered in decision making. The static-dynamic dimension indicated the amount of variability in the decision making factors. He related these two dimensions of the environment to perceived environmental uncertainty and found that decision units with dynamic-complex environments experienced the greatest amount of perceived uncertainty. Decision units in simple-static environments experienced the least amount of perceived uncertainty. The static-dynamic dimension of the environment was found to be a more important contributor to uncertainty than the simple-complex dimension. Duncan also found differences in the way decision units were structured for making routine and nonroutine decisions under different conditions of perceived uncertainty and perceived influence over the environment. Under conditions of high uncertainty and high perceived influence over their environment,

routine decisions were found to be more highly structured. Nonroutine decisions were less highly structured.

Downey (1974, 1975) studied fifty-one division managers in a U.S. conglomerate to examine the conceptual and methodological adequacy of the Lawrence and Lorsch (1967, 1969) and the Duncan (1971, 1972, 1973) perceived environmental uncertainty instruments. He also explored individual characteristics as potential sources of perceived uncertainty variability and the relationship between perceptions of uncertainty and managerial performance. The two instruments were found to be methodologically adequate for basic research when only internal reliability was used. However, neither instrument met the more stringent, applied setting reliability requirements suggested by Nunnally (1967). Downey also reported that the validity of these instruments had yet to be established using criterion measures. The research also revealed the two instruments, designed to measure similar concepts of uncertainty, did not significantly overlap. The Lawrence and Lorsch instrument was designed to measure uncertainty in the three subenvironments of marketing, production, and research. The Duncan instrument did not require respondents to divide the environment into subenvironments. All the important factors and decisions could be located in the subenvironment. Downey also concluded that the

perception of uncertainty was related to individual cognitive processes of trivialization, fragmentation, dissociation, and value systems. Perceived environmental uncertainty was also found to be related to perceived environmental characteristics of complexity and dynamism. A positive relationship was also found between perceived environmental uncertainty and managerial performance. Downey, Hellreigel, and Slocum (1975) suggested that considerable caution should be taken in utilizing the Lawrence and Lorsch and Duncan uncertainty instruments.

Based on a study of thirty-eight small manufacturing firms in Illinois, Pfeffer and Leblebici (1973) examined the effect of perceived uncertainty (measured by competitiveness) of an organization's environment on organization structure. Competitiveness (uncertainty) was observed to be positively associated with the frequency of subordinates' reporting to superiors, the extent to which decision procedures were specified in advance, and with a relatively taller organization structure. Competitiveness was also found to increase the demand for control and coordination. Pfeffer and Leblebici also concluded that the competitiveness (uncertainty) of an organization's environment interacted with technology, the number of products, and the extent of product design and production process changes in determining organization structure. Only in less competitive

(more certain) environments were changes in product design, the production process, and the number of products associated with decentralization, less formalization, and more departments. In relatively more competitive (uncertain) environments, the demand for control and coordination led to more formalization, to less departmentalization and horizontal differentiation, and to a relatively taller organization structure.

Hinings, Hickson, Pennings, and Schneck (1974), in their study of twenty-eight subunits in seven manufacturing firms, tested the hypothesis of Hickson, Hinings, Lee, Schneck, and Pennings (1971) that the power (a dimension of organization structure) of subunits resulted from contingent dependencies among them created by unspecified combinations of coping with uncertainty, work-flow centrality, and non-substitutability. Power was defined as the determination of the behavior of one social unit by another (Hickson et al., 1971). It was seen as having two dimensions: amount and scope. Perceived environmental uncertainty was conceptualized as the lack of information regarding future events (future variability) and was measured by a ten-item, six-category scale of unpatterned variability. Hinings et al. found a moderate relationship between perceived environmental uncertainty and power. They also found that coping with uncertainty correlated most highly with power. Work-

flow centrality and nonsubstitutability also related positively.

Objective Environmental Uncertainty Approaches

Burns and Stalker (1961) investigated the relationship between management systems and certain characteristics of the external environment in twenty electronics firms in Great Britain. They defined environmental uncertainty as the rate of change in the scientific techniques and markets. Burns and Stalker concluded that two organizational types existed: the mechanistic and the organic. Mechanistic organizations were characterized by highly centralized bureaucratic structures and seemed to be more appropriate for certain, stable environments. Organic organizations were more flexible and less structured and found in more changing, uncertain environments.

Harvey (1968) in his study of forty-three industrial organizations examined the relationship between an organization's technology and certain aspects of its internal structure. Harvey found that structural variables were related to technology. He also observed that an organization with a high degree of product change (high uncertainty) tended to have a less-structured, organic management system. Organizations with technically specific technology (more certainty) tended to have more formalized, mechanistic systems.

Negandhi and Reimann (1972), in their study of thirty manufacturing firms in India, explored the impact of decentralization on organizational effectiveness under differing market conditions (uncertainty). The degree of market competition (uncertainty) was measured by information collected regarding the degree of price competition among competing firms, the degree of delay in securing a product, and the number of alternatives available to the consumer. Negandhi and Reimann concluded that in a developing country like India, organizational effectiveness did not necessarily require decentralization or competitive market conditions and centralization under stable, non-competitive conditions. They suggested, however, that dynamic, competitive market conditions made decentralization more important to organizational effectiveness than did stable, noncompetitive conditions. Their results supported the findings of Burns and Stalker (1961) and of Lawrence and Lorsch (1967, 1969).

Khandwalha (1974), in his study of seventy-nine manufacturing firms representing several industries, examined how organizations adapted to environmental demands. Uncertainty was conceptualized as a function of the industry's rate of technological change and level of competition within the industry. Khandwalha found that the correlation between competition and uncertainty-reduction

efforts, differentiation, and integration for high performing companies was consistently greater than for low-performing companies. A similar, though not as strong relationship, was found when technological change was substituted for competition as an indicator of uncertainty. Khandwalha concluded that as environmental uncertainty increased, so did the planning difficulty and thus the need to reduce uncertainty.

Keller, Slocum, and Susman (1974) examined the relationships among the type of management systems, environmental uncertainty, and economic success in forty-four continuous-process production firms. Uncertainty was measured by the number of major product changes made by an organization during the past five years (Harvey, 1968). It was hypothesized that organizations operating under conditions of high uncertainty would have organic management systems, while organizations operating under conditions of low uncertainty would have mechanistic management systems. The findings did not support the hypotheses. Keller et al. concluded that environmental uncertainty did not offer an adequate explanation for the association between organic management and effective performance in continuous-process technologies. They found that an organic management system was significantly more successful overall in process technologies regardless of the number of

product changes that take place (organization uncertainty). They suggested that task uncertainty was more likely to affect the type of management system in continuous process production firms than was environmental uncertainty.

Pennings (1975) studied forty widely dispersed branch offices of a large United States brokerage organization to examine further the hypothesis that environmental variables are related to structure. He predicted the higher the environmental uncertainty the greater the amount of informal communication, participativeness, frequency of meetings, specialization, and power equalization. Environmental uncertainty was measured by instability, resourcefulness, demand volatility, competitiveness, and complexity. Pennings concluded that only resourcefulness and complexity correlated with structure. His findings did not lend support to those of Burns and Stalker (1961) and of Lawrence and Lorsch (1967, 1969).

Child (1974, 1975) examined the relationship between organization structure, economic performance, and environmental factors (uncertainty) in his study of eighty British companies representing six industries. Industry statistics were used to assess the degree of variability (uncertainty) in the companies' environments. By analyzing the relationship between environmental uncertainty and size as they interacted with organization structure, Child found

that as company size increased, so did the development of formalized and specialized organization structures of successful firms. Furthermore, the degree of formality was significantly greater for companies in more certain environments than for companies in less certain environments. This contradicted Pfeffer and Leblebici (1973) who found greater formalization in more competitive environments.

Conclusion

These studies examined the relationship between environmental uncertainty and the structural adaptation of the organization to the environment. Two approaches were used to measure environmental uncertainty: the perceived and objective. Researchers such as Dill (1958), Lawrence and Lorsch (1967, 1969), Duncan (1971, 1972, 1973), Downey (1974, 1975), Hinings et al. (1974), and Pfeffer and Leblebici (1973) adopted the perceived environmental uncertainty perspective. Lack of information was one common dimension used by these researchers' conceptualization. Perceived uncertainty was measured by an instrument designed to assess the individual person's perception of his environment. Burns and Stalker (1961), Harvey (1968), Negandhi and Reimann (1972), Khandwalha (1974), Pennings (1975), and Child (1974, 1975), on the other hand, adopted the objective approach to measuring uncertainty.

Competitiveness and the rate of change were common dimensions used by these researchers in their conceptualization. Uncertainty was measured by the use of statistical, quantitative information which often was collected from external sources. There had been considerable discussion in the literature concerning which was the better approach (Downey and Slocum, 1975; Pennings, 1975; and Galbraith, 1973). It appeared that the perceived approach has more support since individual responses to environmental attributes were perceived by an individual to be certain or uncertain.

Both measures of uncertainty supported the relationship between environmental uncertainty and the structural adaptation of the organization to the environment. Pennings (1975) argued that the perceived approach provided stronger and clearer support for the relationship than does the objective approach.

It appeared that the greater the uncertainty, the greater the need for the organization to cope with its environment. This need manifested itself in increased organizational flexibility. Under conditions of high uncertainty, organizations adopted a more flexible, organic structure, both on a macro and micro level. On a macro level, the organization achieved flexibility by its organization design, the creation of staff units, etc. On a

micro level, the organization can protect itself from environmental influences and achieve flexibility through the use of buffering responses such as the employment of part-time and temporary workers. This type buffering response gives the organization greater manpower flexibility. The organization can readily cope with environmental disturbances such as peak periods, seasonal variations, work load fluctuations, unexpected increased demand, etc. by utilizing part-time and temporary workers in its input, transformation process, and output components. It is, therefore, hypothesized that the greater the environmental uncertainty, the more the organization will seek to buffer its technical core from environmental influences by using part-time and temporary workers.

Third Hypothesis

H₃: The larger its size, the more the organization will seek to buffer its technical core by using part-time and temporary help.

The third hypothesis deals with the relationship between organization size as measured by the number of full-time employees and the use of part-time and temporary workers as a buffering response. It is hypothesized that there is a direct relationship between these two variables. As organization size increases, organizations tend to use a greater amount of part-time and temporary workers to buffer their technical cores from environmental influences.

The supporting literature for this hypothesis is developed by first providing a general overview of the size/structure relationship. Then, the research regarding the relationship between size and buffering is discussed.

Size and Structure

Although the relationship between size and structure has received a great deal of attention from organizational theorists, the exact nature of this relationship is unclear. Meyer (1972) observed that "the effects of size are ubiquitous," and Kimberly (1976) provided support for this claim in his review of eighty empirical, comparative studies of size and organizational structure.

A number of researchers have claimed that size is the major determinant of organizational structure. Pugh, Hickson, Hinnings, and Turner (1968, 1969) concluded that increased size was related to increased structuring of organizational activities and decreased concentration of authority. Blau (1970) found that increased size generated differentiation within organizations and that structural differentiation added to the size of an organization's administrative component. Child (1973) concluded that the size of the organization exerted a dominant influence upon the level of organizational complexity and decentralization. Hickson, Pugh, Pheysey (1969), Inkson,

Pugh, and Hickson (1970), Meyer (1968, 1972), and Blau and Schoenherr (1971) asserted that size was the dominant determinant of structure.

Other researchers, however, have argued that the relationship between size and structure is not as clear as empirical studies have suggested. Hall, Haas, and Johnson (1967) argued that there was inconsistency in the relationship between size and structural components. Hall and Tittle (1966) found only a modest relationship between size and the perceived degree of bureaucratization. Researchers such as Woodward (1958, 1965), Harvey (1968), and Perrow (1967) argued that technology was the prime determinant of structure.

Currently, Hall (1977) and Kimberly (1976) point out that the confusion regarding the size/structure relationship can be attributed to conceptual and methodological problems. Conceptual problems include the definitions of size, the relationship between type of organization and size, inter- and intra-industry sampling, and the nature of the causal sequence between size and structure. Methodological issues, as Kimberly suggests, include operationalizing the definition of size, empirical pragmatism, and definitional dependence. Because of these conceptual and methodological problems, it is difficult to draw any valid conclusions about the precise nature of the relationship between size and structure.

There is growing consensus that it is even foolish to consider one variable such as size, technology, or environment as the prime determinant of structure. Rather, it is argued that structure is the result of the various combinations and interactions of the size, technology, and environmental variables. Child (1974, 1975) concluded that factors such as environment, size, and technology established requirements for organization structure. Aldrich (1972) observed that size was the consequence of environmental, technological, and structural factors. Dewar and Hage found that technology was a good predictor of some aspects of structure, while size was a better predictor of others. More important, they also concluded that not even a combination of interaction effects of size and technology were good predictors of structure. Pfeffer and Leblebici (1973) hypothesized that environment, technology, and size interacted to determine structure.

Size and Buffering

The relationship between size and buffering responses in general is somewhat clearer. Litterer (1961, 1963) found that as organizations grew in size, they tended to add the buffering activities to their structures. Thus, it would appear that buffering responses increase as company size increases. Two studies provide support for a positive relationship between size and the use of part-time and

temporary workers as a buffering response. The American Society for Personnel Administration and the Bureau of National Affairs (1974) jointly conducted a survey of one hundred twenty-two firms. Survey results indicated that large companies employed somewhat more part-time and temporary workers than did small companies. Joray and Hulin (1974), in their study of users of temporary help provided by outside agencies, concluded that large companies used more outside temporary workers than did small companies. Thus, it is hypothesized that there is a direct relationship between size and the use of part-time and temporary workers as one buffering response.

Part-Time and Temporary Employment

The use of part-time and temporary workers is viewed as a buffering response in this study. To support this, a selective review of the literature is presented. It should be noted that there has been very little empirical research done on part-time and temporary employment (Nollen, Eddy, Martin, and Monroe, 1976). Much of the research is fragmented, and there are only a few major scholarly contributors. Most of the major research has been supported and/or conducted by the U.S. Department of Labor, trade associations, and doctoral candidates.

The review covers the status and major issues of part-time and temporary workers. The extent of usage,

usage patterns, type of work performed, attitudes of employers, reasons for use and nonuse, and costs and benefits are discussed. The major studies dealing with the temporary help industry are then presented.

Extent of Usage

In a study supported by a grant from the Manpower Administration, U.S. Department of Labor, Nollen, Eddy, Martin, and Monroe (1976) conducted one of the most thorough literature review investigations on permanent part-time employment. They found that in the United States in 1974, 20.8 percent of the total work force were permanent part-time employees. Approximately one-third of the women employed in 1974 worked part-time, while approximately one-eighth of the men worked part-time. Business Week reported that in 1974 nearly 3 percent of the total labor force were temporary workers supplied by temporary help agencies.

Usage Patterns

Permanent and Occasional Part-Time

The American Society of Personnel Administration and the Bureau of National Affairs (ASPA-BNA) jointly conducted a survey of one hundred and twenty-two organizations regarding their use of part-time and temporary workers (1974). The sample was composed of 52 percent manufacturing

and 48 percent nonmanufacturing companies, with 43 percent of the respondents from large organizations with over one thousand or more employees, and 57 percent from small organizations. Survey results indicated that three-fourths of the respondents used permanent part-time employees, and two-thirds used occasional part-timers. Large companies and nonmanufacturers were found to use more permanent and occasional part-time workers than either small companies or manufacturers.

Nollen et al. (1976) reported that permanent part-time employment was found in all major industries, but it was most heavily used in two: the wholesale/retail and service industries, with 24.1 percent and 21.9 percent of the total work force, respectively. The all-industry average for 1974 was 13.6 percent. The manufacturing industry was found to have 4.3 percent part-time employment, which represented the lowest proportion of the major industry groups.

Company and Outside Temporary Workers

The ASPA-BNA survey (1974) reported that 70 percent of the respondents used temporary company payroll workers and 75 percent utilized outside temporaries. Large companies and nonmanufacturers used more temporary workers than either small companies or manufacturers.

The Administrative Management Society (AMS) in 1971 conducted a survey of its 15,000 members regarding the

use of outside temporary workers. Of the 3,480 respondents, 80.8 percent reported using temporary workers at some time.

Type of Work Performed

Permanent and Occasional Part-Time

The ASPA-BNA survey (1974) concluded that both permanent and occasional part-time workers were used most frequently in office/clerical positions and less frequently in production, professional/technical, and sales positions. Large companies were found to use part-time employees more frequently for professional/technical positions than small companies. Small companies, however, were more likely to use part-timers in sales jobs. More nonmanufacturers reported using part-time workers in office/clerical jobs. As can be expected, more manufacturers employed these workers in production jobs than did nonmanufacturers.

Nollen et al. (1976) found that two types of occupations--the routine and minimally skilled and the highly specialized professional services--represented the most popular, permanent part-time occupations. Very few part-time employees filled managerial or supervisory positions. Nollen et al. reported that the literature suggested, but had not proven, three conditions for the use of permanent part-time workers:

1. Cyclical demand or extended hours of operation.

2. Industries characterized by high rates of innovation and technological change.

3. Noncontinuous manufacturing operations or other activities requiring continuity of work flow.

Examination of the types of jobs performed by permanent part-time employees showed that these jobs had three important characteristics:

1. They can be divided into discrete tasks.
2. They require a high level of mental concentration and involvement.
3. They are repetitive, monotonous, and tedious.

Company and Outside Temporary Workers

The ASPA-BNA study (1974) concluded that both company and outside temporary workers were used most frequently in office/clerical positions. The same usage pattern for large and small manufacturers and nonmanufacturers as reported for part-time workers was found to exist. The AMS survey (1971) found that 60 percent of outside temporary workers filled office positions. Data processing, industrial, technical, and sales represented 17.8, 16.1, 4.1, and 1.4 percents, respectively.

Attitudes and Perceptions of Employers

Permanent Part-Time Employees

Nollen et al. (1976) found that among employers, part-time employment was often perceived as "marginal and unnecessary except as an expedient to cope with special work needs, appropriate for only certain work technologies, and suitable mainly for entry-level and less desirable jobs" (Nollen et al., 13). However, there was indication that this attitude was changing. Labor unions had generally ignored part-time employees as long as they did not threaten full-time jobs or wages. Women had usually favored part-time employment because of their household responsibilities.

Part-Time and Temporary Workers

The ASPA-BNA survey (1974) found that there was wide variation in the attitudes of employers of part-time and temporary workers. Some respondents reported avoiding the hiring of such workers. Reasons cited for the avoidance included low morale, lack of motivation, poor attendance, and lack of dependability among these workers. Other companies, especially those which operated six or seven days a week, felt that their operations cannot be run without part-time and temporary workers. Often, many part-time and

temporary workers were former experienced and loyal employees who no longer desired full-time work.

Reasons for Use/Nonuse

Permanent Part-Time Workers

Nollen et al. (1976) found that the most important reasons for using permanent part-time employees had been (1) labor shortages, (2) cyclical demand for products or services, and (3) peak load periods or extended hours of operation. The most important reasons for not using part-time workers included (1) fear of complication and disruption of work schedules, (2) fear of higher administrative costs, and (3) fear of higher production costs.

Company and Outside Temporary Workers

Several studies (AMS, 1971; Gannon, 1974; Joray and Hulin, 1974) had identified the reasons for using outside temporary help. The most important reasons were (1) to replace absent workers due to illness, vacation, or vacancy, (2) to use as additional aids during peak periods, and (3) to handle special jobs and projects. The ASPA-BNA study (1974) study also found similar reasons for utilizing both company and outside temporary workers. The study also concluded that large companies and manufacturing firms hired company temporary workers most often to replace employees on leave. Small companies and nonmanufacturers used these

employees most frequently to assist with special projects. Outside temporary workers were used to replace absent employees in large companies, while small companies utilized such workers for assisting with special projects. Over half of the respondents of the ASPA-BNA survey reported using temporary help to aid their regular work force during peak periods.

Costs and Benefits

Permanent and Occasional Part-Time Workers

The ASPA-BNA survey (1974) reported that companies can reduce fringe benefit expense by utilizing both types of part-time employees. Most organizations provided some benefits for permanent part-time workers, while only 17 percent provided any benefits for occasional part-timers.

Nollen et al. (1976) concluded that increases in personnel administration expenses were slight, and often savings were possible when permanent part-time employees were used. Fringe benefit costs were less for part-time employees since they seldom received the full fringe benefits. Potential benefits of utilizing permanent part-timers included: (1) cost savings due to less absenteeism, tardiness, and turnover; (2) greater productivity; and (3) equal or better quality of output.

Company and Outside Temporary
Workers

The ASPA-BNA survey (1974) found that 57 percent of the responding companies provided no fringe benefits for company temporary employees. Ten percent of the companies provided the same benefits that full-time employees received if the company temporaries worked a minimum period of time.

Temporary help agencies assert that there are definite cost-saving advantages for users of outside temporary workers. Employers can save money on recruiting, placement, fringe benefits, turnover, absenteeism, and productivity expenses. Employers pay no fringe benefits for such workers, can staff peak demand more efficiently, and can request replacements for employees not meeting expectations. (Notaro, 1970; Winter, 1974.)

Major Studies on the Temporary
Help Industry

The first major research done on the temporary help industry was conducted by Mack Moore in 1963. Moore investigated the history of the temporary office help industry, described the firms and their methods of operations, looked at the temporary clerical workers' motives and economic characteristics, and explored the public policy issues facing the industry at the time.

Robert Smith (1971) investigated the effect that changes in the permanent labor market have upon the selection of temporary clerical workers. He approached the temporary help agency as a transaction facilitator. Smith concluded that only in years of high unemployment did temporary help agencies give preference to their most skilled, experienced and personable workers in making assignments. Demand for typists was found to be sensitive to the current state of the labor market while stenographer demand was more sensitive to price and seasonal factors. Smith also concluded that the quality of workers in each market deteriorated as the number of workers were increased.

Paul Joray (1972) investigated the historical development of the temporary help industry, the temporary help industrial segment, and the economic structure of the industry. He also examined the characteristics of the industrial temporary help worker.

Alithisa Ikada (1969) explored the economics of the labor market and its relationship to the temporary help industry. John Griswald of Arthur D. Little, Inc., in 1969 conducted research on the temporary help industry. He examined the economic characteristics, competitiveness, problems, and social significance of the industry. Martin Gannon (1974) conducted an investigation into the nature of the temporary help industry and its workers. He

investigated the motives of temporary workers, their personal characteristics, and attitudes. Paul Joray and Charles Hulin (1974) conducted a study for the National Association of Temporary Services, Inc. They examined the economic and sociological impact of the temporary help service industry upon its customers, its workers, and local economies.

Conclusion

These studies examined the status and major issues of part-time and temporary workers. Large companies and manufacturers were found to employ more part-time and temporary workers than small companies or manufacturers. Part-time and temporary workers were used most frequently in office/clerical positions. Large companies hired part-time workers more frequently for professional/technical positions than small companies. Part-time sales workers were employed more frequently by small companies. The most popular permanent part-time occupations were the routine and minimally skilled and the highly specialized professional services.

Employers of part-time and temporary workers expressed mixed attitudes about their use. Various reasons were reported for using part-time and temporary workers. It appeared that their use was a means of coping with both internal and external environmental uncertainties. The

studies revealed that most employers were able to reduce fringe benefit and personnel expenses by using part-time and temporary workers.

There have been a limited number of major studies on the temporary help industry. The early studies examined the historical and/or economic developments in the industry. Later studies investigated the nature of temporary workers and/or the users of temporary services.

CHAPTER III

RESEARCH METHODOLOGY

Research Design and Sample

In order to test the specific hypotheses developed in the previous chapter, a convenience sample of twenty-two upholstered furniture companies and twenty-two autonomous soft drink bottling manufacturing plants that used part-time and temporary workers during 1976 was selected.

Industry Selection

The upholstered furniture and soft drink bottling industries were selected for this study because of their distinct core technologies. The upholstered furniture industry represents a small batch technology, according to Woodward's typology (1958). The soft drink bottling industry represents Woodward's continuous technology. The factors used to classify the core technologies include those originally developed by Woodward. They are as follows.

1. Production of goods by custom-order or for mass production.
2. The size of the production batches.
3. The simple or complex nature of the products.

4. The continuous or intermittent flow of the production process.

5. The labor-or capital-intensive nature of the process.

6. The skills of the labor involved.

The upholstered furniture industry produces complex, custom-made goods in small batches via an intermittent production process which is labor intensive, and utilizes a large percentage of skilled employees. The soft drink bottling industry manufactures its relatively simple products in large, mass-produced batches via a continuous production process which is capital intensive and utilizes a large percentage of unskilled and semi-skilled employees.

These technologies can also be classified according to Harvey's typology (1968). The bottling firms have technically specific cores, resulting in limited product variation. The upholstered furniture manufacturers have technically diffuse cores enabling the production of a great variety of products. Some upholstered furniture manufacturers can, for example, produce up to two hundred different varieties of furniture, while the bottlers are able to produce only a limited number of products. Implicit in the amount of product variation are the characteristics Woodward (1958) used to classify core technologies. Soft

drink products are manufactured via a highly automated, mass-producing, continuous system. The result is limited product variety. Upholstered furniture products are manufactured via a custom-making, intermittent, labor-intensive system which permits the production of a wide variety of products.

Convenience Sample

A convenience sample was used for this study. The 1972 Census of Manufacturers was used to pinpoint the geographic concentration of the industries. The upholstered furniture companies are located in the High Point, North Carolina, area. The High Point Chamber of Commerce's Directory of Manufacturers was used to identify potential participants. The soft drink bottling firms are located in the Triad, North Carolina, and Southwestern and Central Virginia region. Directories of Manufacturers and the Yellow Pages were used to identify the potential sample. To determine the companies that used part-time and temporary workers during 1976 and their willingness to participate in the study, telephone interviews were conducted.

A convenience sample was used for the following reasons:

1. There was the necessity for complete information. The data collection procedure involved both a personal interview and a questionnaire. It was extremely

important that both the personal interview and the questionnaire be completed. Willingness to participate in the study was therefore an important sample selection criteria.

2. There were limited resources. The researcher had limited financial resources available for the data collection. The geographic proximity of the sample minimized travel expenses.

3. There was a need to expedite data collection. The personal interview was one of the data collection methods. The geographic proximity of the people also helped to minimize time involved in data collection.

It should be noted that field research conducted in the organization theory area often uses convenience sampling. For example, the pioneering study by Woodward (1958) was based upon a convenience sample of firms in South Essex. Zwerman (1970) used a convenience sample of firms in the Minneapolis-St. Paul metropolitan area. Organization theory studies frequently contain the statement that the sample is not a probability sample and cannot be regarded as representative of the total population. Caution should be exercised in making inferences beyond the scope of this study.

Data Collection Methods

Data were collected by a structured personal interview (Appendix I) and questionnaire (Appendix II). Interview and questionnaire responses were solicited from top management in the sampled firms. In order to test the hypotheses, the following information was collected: the amount of use of part-time and temporary workers for the 1976 calendar year; organizational characteristics, including size; and perceived environmental uncertainty.

Use of Part-Time and Temporary Help

The use of part-time and temporary workers, the dependent variable, is viewed as a buffering, coping response in this study. As stated previously, the purpose of buffering responses is to protect or isolate the technical core from environmental influences. The literature on part-time and temporary workers showed that these workers made up an important segment of the total work force. They were, in fact, used to protect the organization from environmental disturbances such as labor shortages, absent workers, peak periods, and special jobs or projects. Employers felt that part-time and temporary workers were necessary to cope with special work needs.

Jobs held by these workers were usually repetitive and monotonous requiring little skill. Representative jobs included material handling activities, such as shipping, receiving, and moving goods from one production area to another. In Thompson's conceptualization (1967), these activities link the technical core with the input and output components of the organization. Jobs in these areas require flexibility because it is often difficult to predict the volume of work. Furthermore, accumulation of work at one stage in the production process will cause delays in other stages. Part-time and temporary workers can be effectively used in these areas. Therefore, it is argued that part-time and temporary workers are used by organizations to buffer their technical cores from environmental disturbances.

The use of part-time and temporary workers is one buffering, coping response carried out by the personnel function. Other alternative buffering responses include the use of overtime, labor pools, short work weeks, and others. These responses are not mutually exclusive, and various combinations could be utilized. Part-time and temporary workers have been selected as the buffering response in this study for the following reasons:

1. There is a definite lack in the literature on the use of part-time and temporary workers in manufacturing firms as the literature review has ascertained.

2. Information regarding the use of part-time and temporary workers is likely to be more readily available to the researcher than that on other alternatives.

Personal interviews with either the president, vice president, plant superintendent, or personnel director were used to collect information about the use of part-time and temporary workers during 1976.

The following specific information was collected:

1. Company background
2. Nature and type of products
3. Organization structure characteristics
4. Average number of full-time employees
5. Estimated man hours worked during 1976
6. Estimated use of part-time and temporary workers during 1976
7. Reasons for the use of part-time and temporary workers
8. Type of part-time and temporary workers used
9. Source of part-time and temporary workers
10. Functional area where part-time and temporary workers were used

11. Person who had the authority to approve the use of part-time and temporary workers.

Size

The independent variable, size, refers to the average number of full-time employees utilized during 1976. This information was collected during the personal interview.

Perceived Environmental Uncertainty

Perceived environmental uncertainty, an independent variable, was measured by the questionnaire developed by Duncan (1967, 1969) and modified by Downey (1971, 1972, 1973). As the researcher in the literature review has ascertained, the perceived approach has more support for measurement of environmental uncertainty than does the objective approach (Pennings, 1975; Downey and Slocum, 1975; and Galbraith, 1973). The Duncan instrument was developed to measure the perceptions of environmental uncertainty by decision makers. The instrument is deemed appropriate for the study since it is also being used to measure the perceptions of decision makers.

In this study, the decision makers' decision to use part-time and temporary workers was assumed to be based on his perception of environmental uncertainty. The decision maker was defined as the person who has

the authority to approve the use of part-time and temporary workers. In the original studies by Duncan (1967, 1969) and Downey (1971, 1972, 1973), the decision situation was a "typical decision" rather than a specific one.

To determine if the instrument was appropriate to the specific decision to use part-time and temporary workers, the instrument was pretested on six decision makers. The following changes were made in the original instrument.

1. The factors identified as being considered in the decision to use part-time and temporary workers were more appropriately identified and more clearly defined.

2. The original instrument listed twenty-five possible factors; the revised instrument added a twenty-sixth factor, "other," to incorporate any alternatives not listed.

3. The order of the questions was changed to insure the completion of the instrument. The easier questions were placed before the more difficult ones.

Statistical Analysis

Four nonparametric statistical tests were employed to analyze the data in the study. These were the Kruskal-Wallis-One-Way Analysis of Variance, Dunn's Distribution-

Free Multiple Comparisons, the Mann-Whitney U Test, and the Spearman Rank Correlation.

The Kruskal-Wallis-One-Way Analysis of Variance was used to determine whether the groups established in the factorial design were from same populations. The level of significance for this test was set at ($p < .05$).

Dunn's distribution-free multiple comparisons test (Hollander and Wolfe, 1973) was used to isolate differences among the appropriate pairs of groups in the factorial design. This procedure was selected because of its convenience; it is based upon the Kruskal-Wallis rank sums. This procedure also included an experiment-wise error rate which was set at ($p < .005$). This level was determined by dividing alpha of .05 by thirteen, the number of comparisons made.

The Mann-Whitney U Test was used to test for the main effects of the variables in the factorial design and to test Hypothesis One. This procedure was used to determine whether two independent groups had been drawn from the same population. The level of significance for the preliminary analysis was set at ($p < .005$). This level was again used to provide an experimentwise error rate. A significance level of ($p < .05$) was used to test Hypothesis One.

The Spearman rank correlation was utilized to test Hypotheses Two and Three. This procedure was employed to

ascertain correlation between key variables. The level of significance was set at ($p < .05$).

The rationale for selecting nonparametric statistics is based on three reasons (Siegel, 1956, and Hollander and Wolfe, 1973). First, due to the convenience sampling procedure used in this study, the rigid assumptions of parametric statistics--normality and homogeneity of variances--cannot be met. Nonparametric assumptions do not specify conditions about the underlying populations from which the data are obtained. Second, since the sample size in this study is small, nonparametric statistics are more suitable for testing the hypotheses. Third, since the sample is taken from two distinct industries--the upholstered furniture and soft drink bottling--nonparametric statistics are better able to handle the data which may in fact be two different populations. The assumptions of the parametric tests do not have to be made.

Limitations of the Methodology

Data Collection Methods

Limitations of the research design are a function of the methods of data collection. The personal interview and questionnaire data collection methods used in this study are what Filley, House, and Kerr (1976) term the analytical survey. Hypotheses are developed and the data collected by the instruments are statistically analyzed to

determine the nature of the relationship between the variables.

Filley, House, and Kerr (1976) point out two important limitations to the analytical survey. First, establishing a statistically significant relationship between the variables in the study only demonstrates that there is some degree of association between the variables greater than one would expect to find by chance. The statistical significance does not necessarily demonstrate the cause and effect or interdependent relationship between the variables. Second, since the data collected by analytical survey represent a single point in time, the results cannot be generalized beyond the scope of the study.

The reliability of Duncan's Perceived Environmental Uncertainty instrument (1967, 1969) is questionable (Downey, Hellriegel, and Slocum, 1975). Their analysis showed when internal reliability was used as a criteria, the Duncan instrument appeared methodologically adequate for basic research. However, the instrument did not meet the reliability requirements suggested by Nunnally (1967) for applied settings. Downey et al. suggest that the instrument should be used cautiously. However, it was felt that since this instrument represents the best developed to date, it would be suitable to use as long as it is noted as one of the limitations in this study.

Sampling Procedure

The sampling method used in this study is another limitation. Since the firms in each of the industries were selected on the basis of their convenience, the sample cannot be considered random. The sample population may be different from the total population the researcher is interested in. Therefore, caution must be exercised in making inferences from the findings of the study (Kerlinger, 1973). The findings should be interpreted within the context of this study.

CHAPTER IV

ANALYSIS AND RESULTS

Introduction

The purpose of this chapter is to report the results of the statistical testing of the three hypotheses stated in Chapter I and developed and supported in Chapter II. Statistical analysis performed to determine the possible relationship among the key variables is also discussed. Finally, descriptive statistics on the use of part-time and temporary workers in the sampled manufacturing firms are presented.

Preliminary Analysis

A 3 x 2 factorial design was established to determine relationships between the independent variables-- technology, size, and perceived environmental uncertainty-- and the dependent variable--the amount of use of part-time and temporary workers during 1976. The size of the sample for this analysis is forty, twenty firms in each industry. The perceived environmental uncertainty scores for four firms (two in each industry) were missing. The Kruskal-Wallis one-way analysis of variance procedure by ranks indicated significant differences among the groups. Dunn's

distribution-free multiple comparison procedure and the Mann-Whitney test determined that the only significant variable was technology. Two-tailed tests were used in the preliminary analysis since this research aspect was considered exploratory in nature.

To utilize the above procedures, the data was divided into two groups based on the specificness or diffuseness of the core technology. Each technology group was then divided into large and small size subgroups. The industry average size, based on the 1972 Census of Manufacturers, was used to categorize the firms. Finally, the firms were divided into low and high uncertainty subgroups based upon their perceived environmental uncertainty scores. The scoring procedure for Duncan's instrument is provided in Appendix 3. The uncertainty scores for the firms were placed in ascending order and divided at the median. This resulted in eight independent groups. The number of firms in each group is shown in Table 4-1.

The amount of use of part-time and temporary workers, the dependent variable, for each firm was standardized in order to permit comparisons among firms. The number of hours of part-time and temporary workers used during 1976 was divided by the total number of full-time manhours worked plus the total number of part-time and temporary hours.

Table 4-1
Number of Firms in Each Group

Upholstered Furniture			Soft Drink Bottling				
Small (Size 10-80)	Large (Size 100-455)		Small (Size 20-54)		Large (Size 61-170)		
	Low Uncer- tainty	High Uncer- tainty	Low Uncer- tainty	High Uncer- tainty			
Group I	Group II	Group III	Group IV	Group V	Group VI	Group VII	Group VIII
5	5	3	7	5	4	7	4

The Kruskal-Wallis one-way analysis of variance by ranks was used to determine if the eight groups differed in the amount of use of part-time and temporary workers. The observed value of H , the test statistic, was calculated to be 18.71. This is significant at the ($p < .05$) level. Thus, it appears the groups differ in the amount of use of the buffering response. Table 4-2 summarizes the results of the analysis.

To identify the significant variables, Dunn's distribution-free multiple comparison procedure, based on Kruskal-Wallis rank sums, and the Mann-Whitney test are used. Table 4-3 summarizes the findings. Dunn's procedure is used to test the various combinations of the variables. No significant interaction effects were found. The Mann-Whitney U test is used to measure the main effects of each variable since the data represented two groups. The technology variable was the only one found to be significant at the ($p < .002$) level (two-tailed test). Thus, the data suggests that technology affects the use of part-time and temporary workers.

Although significance was not found among the other variables, the following should be noted regarding size. Table 4-4 presents the usage means of large and small firms in each industry. Inspection of the data shown in this table suggests that there is some difference between large and small firms. In both industries, large firms use less

Table 4-2
Summary of Kruskal-Wallis One-Way Analysis of Variance

Purpose	Test	Test Statistic	Results
To determine if eight groups established in factorial design are from different populations	Kruskal-Wallis One-Way Anova	18.71	P < .05

Table 4-3
Summary of Dunn's Comparison and Mann-Whitney U Tests

Source	Test	Value	Results
<u>Technology x Size</u> x <u>Uncertainty</u>			
Group 1 vs Group 2	Dunn's Comparison	9.40 < 19.04	N.S.
Group 3 vs Group 4	Dunn's Comparison	.07 < 20.77	N.S.
Group 5 vs Group 6	Dunn's Comparison	.08 < 20.19	N.S.
Group 7 vs Group 8	Dunn's Comparison	6.04 < 18.87	N.S.
<u>Size x Uncertainty</u>			
Groups 1 + 5 vs Groups 2 + 6	Dunn's Comparison	5.70 < 13.83	N.S.
Groups 3 + 7 vs Groups 4 + 8	Dunn's Comparison	8.05 < 13.15	N.S.
<u>Technology x</u> <u>Uncertainty</u>			
Groups 1 + 3 vs Groups 2 + 4	Dunn's Comparison	6.46 < 13.74	N.S.
Groups 5 + 7 Groups 6 + 8	Dunn's Comparison	2.81 < 13.74	N.S.
<u>Technology x Size</u>			
Groups 1 + 2 vs Groups 3 + 4	Dunn's Comparison	7.35 < 13.46	N.S.
Groups 5 + 6 vs Groups 7 + 8	Dunn's Comparison	5.08 < 13.53	N.S.
<u>Size</u>			
Groups 1+2+5+6 vs Groups 3+4+7+8	Mann-Whitney U Test	U = 144.5	N.S.
<u>Uncertainty</u>			
Groups 1+3+5+7 vs Groups 2+4+6+8	Mann-Whitney U Test	U = 128	N.S.
<u>Technology</u>			
Groups 1+2+3+4 vs Groups 5+6+7+8	Mann-Whitney U Test	U = 62.5	p < .002

Table 4-4
Usage Means of Large and Small Firms by Industry

Upholstered Furniture		Soft Drink Bottling	
Small	Large	Small	Large
2.52	.96	6.61	4.24

part-time and temporary workers than do small firms. However, since the statistical procedure failed to indicate significance, it should be noted only that visual inspection indicates some type of effect due to size.

Technology/Buffering Hypothesis

Hypothesis One states that firms with specific core technologies (soft drink bottlers) will use significantly more part-time and temporary workers as one buffering response than do firms with diffuse core technologies (upholstered furniture manufacturers). Statistical significance was found at the ($p < .001$) level (one-tailed test). A one-tailed test was used since the literature indicated the direction of the relationship. Table 4-5 summarizes the results of the testing.

The Mann-Whitney U test is used to test the hypothesis. Part-time and temporary worker usage for the twenty-two firms in each industry was rank ordered and the test statistic calculated. The observed value of U ($Z = 4.00$) was found to be significant at the ($p < .001$) level (one-tailed test). Therefore, the data suggests that soft drink bottlers do in fact buffer their specific technical cores with significantly more part-time and temporary workers than do upholstered furniture manufacturers with their diffuse technical cores.

Table 4-5
Summary of the Technology/Buffering Hypothesis

Hypothesis	Test	Test Statistic	Results
Specific Core technologies use more buffering than diffuse	Mann-Whitney U Test	$Z = 4.00$	$p < .001$

Uncertainty/Buffering Hypothesis

Hypothesis Two is concerned with the relationship between perceived environmental uncertainty and the use of the buffering response. It was hypothesized that the greater the uncertainty, the greater the use of part-time and temporary workers as one buffering response.

Statistical significance was not found when the perceived environmental uncertainty scores were correlated with the amount of use of part-time and temporary workers in each industry. Table 4-6 summarizes the results of the analysis.

The Spearman rank correlation coefficient was computed for each industry to test for the uncertainty/buffering relationship. The uncertainty scores and the usage rate for the twenty firms in each industry were rank ordered and the test statistic calculated. The correlation coefficient (r_s) for the upholstered furniture manufacturers and the soft drink bottlers were ($r_s = -.26$) and ($r_s = .17$), respectively. Neither statistic was significant at the ($p < .05$) level (one-tailed test). A one-tailed test was used since the literature indicated the direction of the relationship.

Size/Buffering Hypothesis

Spearman rank correlations were used to test the hypothesis that there is a direct relationship between size

Table 4-6
Perceived Uncertainty and Buffering Correlations

Industry	r_s	Significance
Upholstered Furniture	-.26	N.S.
Soft Drink Bottling	.17	N.S.

and the use of part-time and temporary workers in each industry. Statistical significance was not found when size was correlated with the buffering response in the upholstered furniture and soft drink bottling industries. The findings are summarized in Table 4-7.

To test the hypothesis, the size and the usage rate for each of the twenty-two firms in each industry were rank ordered. A negative correlation ($r = -.40$) was calculated for the upholstered furniture manufacturers. The correlation for the soft drink bottlers was also negative ($r = -.13$). Neither of the correlations were statistically significant at the ($p < .05$) level (one-tailed test). A one-tailed test was used since the literature suggested the direction of the relationship.

Thus, it appears there is not a positive relationship between size and the use of part-time and temporary workers in the sampled firms. It is interesting to note that the direction of the correlation was negative in each industry. Implications of these results are presented in the following chapter.

Summary

Significant differences in the use of one buffering response were found between manufacturing firms with specific core technologies and those with diffuse technologies. Statistical significance was not found when

Table 4-7
Size and Buffering Correlations

Industry	r_s	Significance
Upholstered Furniture	-.40	N.S.
Soft Drink Bottling	-.13	N.S.

size was correlated with the use of part-time and temporary workers in the upholstered furniture and soft drink bottling industries. Statistical significance was also not found in either industry when perceived environmental uncertainty was correlated with the buffering response. Table 4-8 provides a summary of the research findings.

Part-Time and Temporary Worker Usage Patterns

This section provides summary statistics of the usage patterns of part-time and temporary workers during 1976 by industry and by individual firms.

Descriptive Statistics

Table 4-9 summarizes the extent of usage by industry. Based on the data presented in the table, it appears there is considerable difference between industries in mean usage. The size of the range and standard deviation in each industry indicates that the data are widely dispersed about the mean.

Type of Part-Time and Temporary Help Used

The type of part-time and temporary workers used by each industry is summarized in Table 4-10. There appear to be differences in the type of workers used in the two industries. Almost two-thirds of the upholstered furniture

Table 4-8
Summary of Findings

Hypothesis	Variables	Test	Results
One	Technology/ Buffering	Mann-Whitney U test	$p < .001$
Two	Uncertainty/ Buffering	Spearman Rank Correlation	
Upholstered Furniture			N.S.
Soft Drink Bottling			N.S.
Three	Size/ Buffering	Spearman Rank Correlation	
Upholstered Furniture			N.S.
Soft Drink Bottling			N.S.

Table 4-9
Descriptive Statistics on Use of Part-Time and
Temporary Workers During 1976 by Industry

Industry	Mean	Range	Standard Deviation
Upholstered Furniture	1.74	6.61	1.71
Soft Drink Bottling	5.43	14.18	3.77

Table 4-10
 Type of Part-Time and Temporary Help Used in the
 Upholstered Furniture and Soft Drink
 Bottling Industry During 1976

Type	Upholstered Furniture	Soft Drink Bottling
Permanent Part-Time	16.13%	58.98%
Occasional Part-Time	15.10	.84
Temporary Company	64.87	37.46
Temporary Outside Agency	<u>3.90</u>	<u>2.72</u>
	<u>100.00%</u>	<u>100.00%</u>

industry's usage are company temporaries. These include summer employees. Among soft drink bottlers, almost 60 percent of its part-time and temporary workers are permanent part-timers, while about one-third are company temporaries. The upholstered furniture manufacturers use more occasional part-time workers than do soft drink bottlers. This difference can be attributed to the use of high school co-op students by furniture makers. Neither industry uses much outside temporary help.

Table 4-11 summarizes the percent of firms using each type of part-time and temporary worker. The study demonstrates that company temporaries are used by almost all the sampled firms in both industries. Upholstered furniture manufacturers use considerably more occasional part-time workers than do soft drink bottlers (63.6 percent versus 9.1 percent). Twice as many bottlers report using outside temporaries than do furniture makers.

Type of Services Used

As Table 4-12 indicates, there appears to be little difference in the type of services used in the upholstered furniture and soft drink bottling industries. Over 80 percent of the part time and temporary workers in each industry perform industrial services.

Table 4-11
 Percent of Firms Using Each Type of Part-Time and
 Temporary Workers by Industry

Industry	Type			
	Permanent Part-Time	Occasional Part-Time	Company Temporary	Outside Temporary
Upholstered Furniture	45.4%	63.6%	90.9%	18.1%
Soft Drink Bottling	59.1	9.1	86.4	36.3

Table 4-12
 Use of Part-Time and Temporary Workers in the Upholstered
 Furniture and Soft Drink Bottling Industry
 by Type of Services Performed

Type of Service	Upholstered Furniture	Soft Drink Bottling
Office Services	12.49%	8.4%
Industrial Services	85.16	82.84
Marketing Services	<u>2.35</u>	<u>8.76</u>
	100.00%	100.00%

Sources of Part-Time and Temporary Workers

Table 4-13 provides a summary of the sources of part-time and temporary workers in each industry. These results should be interpreted cautiously since the firms had difficulty in providing accurate information about this category.

In the upholstered furniture industry, almost one-half of the workers are college students. This reflects the use of company temporaries during the summer months. Retirees, who represent about one-fourth of the part-time and temporary workers, are usually skilled former employees who work until they reach their social security maximum. In the soft drink bottling industry, college and high school students account for almost 90 percent of the part-time and temporary workers. As will be shown later, these are unskilled workers used primarily for materials handling.

Functional Area Worked and Activities Performed

Tables 4-14 through 4-17 summarize by industry the functional areas worked and type of activity performed. As demonstrated by Table 4-14, among soft drink bottlers approximately one-half of the part-time and temporary workers are used in the distribution function and about one-fourth in the production area. In the distribution

Table 4-13
Sources of Part-Time and Temporary
Workers by Industry

Source	Upholstered Furniture	Soft Drink Bottling
College Students	45.64%	47.45%
High School Coop	8.75	2.23
High School Students	3.23	39.61
Housewives	5.73	.97
Former Employees	1.19	3.87
Moonlighters	2.61	3.87
Retirees	23.95	3.14
Trade School Students	2.65	2.72
Outside Agency	3.90	2.73
Other	<u>2.35</u>	<u>-</u>
	<u><u>100.00%</u></u>	<u><u>100.00%</u></u>

Table 4-14
 Functional Areas (Departments) Where Part-Time and
 Temporary Workers Were Used in the Soft
 Drink Bottling Industry During 1976

Functional Area	Usage
Distribution	51.15%
General Plant	8.70
Marketing	8.48
Office	8.92
Production	<u>22.75</u> <u>100.00%</u>

Table 4-15
 Type of Work Performed by Part-Time and Temporary
 Workers in the Soft Drink Bottling Industry

Activity	Usage
Bottle Sorting	2.74%
Checking	5.90
General Labor	3.21
Inspecting	.56
Laboratory	.52
Loading	51.16
Maintenance	1.24
Marketing	8.00
Materials Handling	2.61
Office	2.50
Production	20.33
Repairing	.72
Supervision	.04
Vending	<u>.47</u>
	<u><u>100.00%</u></u>

Table 4-16
 Functional Areas (Departments) Where Part-Time/Temporary
 Workers Were Used in the Upholstered Furniture
 Industry During 1976

Functional Area	Usage
Cabinet	3.69
Cloth	.27
Cushion	3.62
Cutting	5.74
Finish	3.36
Frame Up	.27
General Plant	32.45
Machine	7.05
Marketing	2.78
Office	13.26
Sewing	6.97
Shipping/Receiving	9.99
Spring Up	3.40
Upholstery	<u>7.15</u>
	<u><u>100.00%</u></u>

Table 4-17
 Type of Work Performed by Part-Time/Temporary Workers
 in the Upholstered Furniture Industry

Activity	Usage
Assembly	6.08%
Cushioning	3.62
Cutting	6.01
Finishing	3.36
General Labor	8.62
Inventory	1.59
Machining	7.05
Maintenance	6.94
Marketing	2.78
Materials Handling	11.17
Office	13.26
Security	4.13
Sewing	6.97
Shipping/Receiving	12.54
Upholstering	<u>5.88</u>
	<u><u>100.00%</u></u>

area, these workers are used to load and unload trucks (Table 4-15). In the production area, these workers actually work on the production line; the majority of the usage here represents summer employees who are used to run a second shift. A large majority of the activities of the part-time and temporary workers are relatively unskilled in nature.

Tables 4-16 and 4-17 summarize the usage patterns in the upholstered furniture industry. These results should also be interpreted loosely since it was difficult for these firms to provide accurate information. It can be inferred from the tables that the manufacturing process for upholstered furniture is more complex. This accounts for the greater number of functional areas worked and activities performed by the part-time and temporary workers. As Table 4-16 indicates, approximately one-third of part-timers and temporaries were used in the general plant category. This reflects the use of the summer employees who fill in whenever needed. The use of part-time and temporary workers among the other functional areas is fairly evenly distributed with the office and shipping/receiving areas having slightly greater usage. Table 4-17 suggests that there are a variety of activities that the part-time and temporary workers perform. However, approximately one-fourth of the activities involve unskilled handling of material and shipping/receiving tasks. Other

activities such as cushioning, cutting, sewing, and upholstering are highly skilled activities.

Reasons for Use

Tables 4-18 and 4-19 summarize the reasons for use of each type of part-time and temporary workers in the upholstered furniture and soft drink bottling industries, respectively. Since the responses are multiple ones, the percentages do not add up to 100 percent. The number of firms responding for each type of worker is reported at the bottom of each table.

Based on the information presented in Table 4-18, it can be concluded that among users of permanent part-time workers in the upholstered furniture industry, the most important reasons for their use is that there is no need for full-time employees to perform such activities. Occasional part-timers are used to supplement full-time employees, to help during peak periods, and to help the firm fulfill its social responsibilities. Company temporaries are used for special jobs and projects to help during peak periods. The users of outside temporary workers reported that they employed such workers mainly for special jobs or projects and for recruiting purposes.

Table 4-19 suggests that among soft drink bottlers who use permanent part-time employees, all reported that the primary reason for their use was that there was no need

Table 4-18
Reasons for Use of Part-Time and Temporary Workers
in the Upholstered Furniture Industry

Reason	TYPE			
	Permanent Part-Time	Occasional Part-Time	Company Temporary	Outside Temporary
Replace regular employees	0	0	30	0
Help during peak periods	20	50	55	25
Special jobs or projects	30	21.4	65	50
Undesirable full-time jobs	10	0	10	25
Avoid paying overtime	0	0	5	25
Community/social responsibility reasons	10	50	30	0
No need for full-time	80	0	0	0
Supplement full-time	0	57.1	15	50
Recruiting purposes	0	7.1	0	0
Reward former retired employees	30	21.4	25	0
Already trained	20	28.6	20	0
Number of firms responding	10/22	14/22	20/22	4/22
Percent	45.5%	63.6%	90.9%	18.1%

Table 4-19
Reasons for Use of Part-Time and Temporary Workers
in the Soft Drink Bottling Industry

Reason	TYPE			
	Permanent Part-Time	Occasional Part-Time	Company Temporary	Outside Temporary
Replace regular employees	0	0	21.1	75
Help during peak periods	7.7	50	100	0
Special jobs or projects	15.4	50	0	37.5
Undesirable full-time jobs	23.1	0	0	12.5
Avoid paying overtime	7.7	0	0	0
Community/social responsibility reasons	15.4	0	31.6	0
No need for full-time	100	0	0	0
Supplement full-time	0	50	0	0
Recruiting purposes	0	0	0	0
Reward former retired employees	20.7	0	0	0
Already trained	15.4	0	0	0
Number of firms responding	13/22	2/22	19/22	8/22
Percent	59.1%	9.1%	86.4%	36.3%

for full-time employees to perform such activities. Only several bottlers used occasional part-timers, but the two firms who responded indicated that they are used to help during peak periods, for special jobs or projects, and to supplement full-time workers. All firms using company temporaries reported that the most important reason for their use was to help during peak periods. Outside temporaries are used primarily to replace regular employees who are absent from the job and to do special jobs or projects.

CHAPTER V

DISCUSSION

Introduction

This study has attempted to empirically test Thompson's proposition (1967) that organizations seek to buffer their technical cores from environmental influences. This was accomplished by examining the relationship among one buffering response, two types of core technologies, perceived environmental uncertainty, and company size in an applied setting. Three hypotheses were developed which dealt with the relationship between the buffering response and (1) the type of core technology, (2) perceived environmental uncertainty, and (3) size. The purpose of this chapter is to discuss the findings of this study and their research implications. Each of the hypotheses is in turn discussed. Then the interaction effects of the variables are discussed. Finally directions for future research, including research propositions, are presented.

Core Technology and Buffering

The first hypothesis attempted to determine if the nature of the core technology affects the use of part-time and temporary workers as one buffering response. The

research findings have shown that significant differences exist in the use of the buffering response between firms with specific and those with diffuse core technologies.

Thompson (1967) argued that organizations seek to buffer their input and output components in order to protect their technical cores. However, no attempt was made to distinguish between the types of core technology and the use of buffering responses. Thompson, for example, discussed long linked, mediating, and intensive core technologies and buffering in general terms. He did not, however, explain in detail the nature of the core technology/buffering relationship.

This study suggests that the nature of the core technology has an important influence on the use of part-time and temporary workers as one buffering response. Soft drink bottling firms representing the specific core technology were found to use significantly more of the buffering response than upholstered furniture manufacturers representing the diffuse core technology. The specific technical core of the soft drink bottlers represents a highly automated, rigid manufacturing process which has little flexibility. This type manufacturing process is relatively fixed as to the nature, type, and amount of products produced. Therefore, it is less tolerant of variations in the input and output components which surround the technical

core. The organization seeks to insure efficient utilization of the automated systems by protecting its technical core from fluctuations or variations in the input and the output components. Part-time and temporary workers are used as a buffering response.

The results of this study also suggest that the input/output components of an organization are indeed buffered. Thompson (1967) discussed buffering in general terms briefly mentioning several possible input and output buffering activities such as stock-piling of materials, preventive maintenance, and warehouse inventories. However, depth and empirical support were not provided regarding specific buffering activities and the extent of use. This study has examined the use of part-time and temporary workers as one buffering response by the personnel function.

In this study, it was observed among soft drink bottlers that 51.16 percent of the part-time and temporary workers were used for loading purposes. These workers were used to unload trucks (providing inputs) from the environment and to load the finished goods or outputs. Furthermore, other activities such as bottle sorting, checking, marketing, and office provide support for the input/output activities. These activities accounted for almost one-fourth of the part time and temporary worker use. Thus,

in the soft drink bottling industry, over seventy percent of the part-time and temporary workers were used to buffer input and output components.

A similar pattern was also prevalent in the upholstered furniture industry. Approximately fifty percent of the part-time and temporary workers were in such input/output activities as shipping/receiving, general labor, materials handling, office, and marketing.

Support is thus provided for Thompson's assertion (1967) that the input/output components of the technical core are buffered. Furthermore, the use of part-time and temporary workers as one buffering response appears to be largely limited to activities requiring unskilled workers. In this study it was observed that the majority of these unskilled workers were high school and college students. However, among upholstered furniture manufacturers, some skilled workers were used in the actual transformation process.

The significance of the core technology variable lends support to the contingency theory of organization design. This theory maintains that there is no one best organizational design, structure, and behavior patterns for all organizations. Rather, the most appropriate organizational style is contingent upon the interrelationships

among such variables as technology, environment, and objectives. The research findings have shown that significant differences exist in the usage pattern of the buffering response between firms with specific and those with diffuse technical cores. The data presented here indicates that the use of part-time and temporary workers as one buffering response is more suited and more appropriate for organizations having a specific core technology rather than a diffuse core.

Perceived Environmental Uncertainty
and the Buffering Response

The second hypothesis attempted to determine if perceived environmental uncertainty affects the use of part-time and temporary workers as one buffering response. This study failed to show any statistically significant relationship between perceived environmental uncertainty and the use of the buffering response.

One apparent explanation for the results can be attributed to the perceived environmental uncertainty instrument. As discussed previously the reliability of the instrument is questionable. Downey, Hellriegel, and Slocum (1975) suggested the instrument should be used cautiously. Furthermore, Downey's study (1974) which attempted to test the adequacy of the Duncan (1971, 1972, 1973) and the Lawrence and Lorsh (1967, 1969) perceived

environmental uncertainty instruments included a sample of fifty-one division managers of a large U.S. conglomerate. Since the respondents were from the same company, the sample was perhaps more homogenous than the sample in the present study. In this study, however, the sample was comprised of top level managers in forty firms representing two manufacturing industries.

This study reinforces the assertion that the measurement of perceived environmental uncertainty is still in the developmental stage. A more appropriate instrument for use in field research is needed. It was observed that respondents felt the Duncan instrument (1971, 1972, 1973) was difficult to understand and therefore difficult to complete. Implications for future research based upon the research findings for the uncertainty variable are discussed later in this chapter.

Size and the Buffering Response

The third hypothesis attempted to determine if size affects the use of part-time and temporary workers as one buffering response. The results of this study do not support prior research findings that a positive relationship between size and the use of part-time and temporary workers exist. This study did not find statistically significant correlations between size and the buffering response among upholstered furniture manufacturers and soft drink bottlers.

One explanation for the results is the research design. The method of sample selection and the size of the sample influence the results. However, this study, unlike the previous research, deals exclusively with manufacturing firms. Earlier work in this area is limited to two studies: the ASPA-BNA (1974) and Jorary and Hulin (1974). The ASPA-BNA study did not compare manufacturing firms by size, but rather grouped both manufacturers and nonmanufacturers into large and small firms. The Jorary and Hulin study dealt only with the use of office and industrial outside temporary workers and again only categorized firms by size. Research implications of the findings for this hypothesis are discussed later in this chapter.

Relationship Among Variables

Statistical analysis was performed to determine the relationships between the independent variables--core technology, size, and perceived environmental uncertainty--and the dependent variable--the amount of use of part-time and temporary workers. Interaction effects between and among the variables were not statistically significant. Technology was found to be the only significant variable, and the observation was made that in both industries large firms use less part-time and temporary workers than do small firms.

Again, one apparent explanation for the results can be attributed to the research design. The size of the sample and the method of data collection influence the results. Furthermore, the decision criteria used to subdivide the data into large and small firms and high and low perceived environmental uncertainty are arbitrary and can also affect the outcome of the statistical analysis. Finally, the level of significance for the testing of the interaction effects was set at ($p < .005$). This level was used to establish an experimentwise error rate since the same data was being manipulated again and again. The ($p < .005$) level made it more difficult to reject the null hypotheses.

Although statistical significance was not found in the interaction effects of the variables, it is somewhat naive to conclude that the variables core technology, perceived environmental uncertainty, and size are not related. A firm such as an upholstered furniture manufacturer or a soft drink bottler produces its products via a core technology with a certain number of employees within the framework of both an internal and external environment. As discussed earlier, researchers such as Child (1974, 1975), Aldrich (1972), and Pfeffer and Leblabici (1973) are exploring the various combinations and interactions of size, technology and environmental

variables as they relate to organization structure. Several observations regarding the interaction effects of the variables in this study which can be made based upon the research findings and directions for future research are discussed later in this chapter.

Future Research

Core Technology

There are several directions future research inquiries could explore. Since this study only considers the relationship between two types of manufacturing core technologies and one buffering response, the large batch or mass production core should be examined. A comparison study of the three types of manufacturing core technologies should determine what characteristics of a particular technology dictate the buffering type. Another alternative is the investigation of Thompson's core technology classification (1967) of long linked, mediating, and intensive.

Perceived Environmental Uncertainty

This study failed to show any statistically significant relationship between perceived environmental uncertainty and the use of the buffering response. This suggests that the nature of environmental uncertainty needs more careful exploration.

Analysis of the responses to the perceived environmental uncertainty instrument does provide some understanding for the uncertainty/buffering relationship and does suggest directions for future research. The perceived environmental uncertainty instrument is designed to measure both internal and external uncertainties. The respondents were asked to select the three most important factors they considered in their decision to use part-time and temporary workers. The possible decision factors are listed under the general category of internal and external. Table 5-1 summarizes the factors most frequently selected by industry. The three most important factors in each industry are classified as internal as opposed to external environmental factors. (There is a two way tie for the third factor in the bottling industry. Demand is an external factor while the routine/nonroutine nature of product is an internal one.) The identification of internal factors suggests that the use of part-time and temporary workers may be more of a coping response to internal environmental influences. The research implication of this conclusion is that internal task predictability and work flow predictability might better explain the relationship between the buffering response and environmental uncertainty in this study.

As defined by Comstock and Scott (1977) these concepts refer to the extent that the raw materials and

Table 5-1
 Most Frequently Listed Decision Factors in the
 Perceived Environmental Uncertainty
 Instrument by Industry^a

Upholstered Furniture		Soft Drink Bottling	
Work Load Fluctuations	70%	Availability of Manpower	65%
Skills of Employees	65%	Work Load Fluctuations	55%
Availability of Manpower	45%	Routine/Nonroutine Nature of product	30%
Labor Supply	35%	Demand	30%
Social Responsibility	30%		

^aThe responses are multiple ones and therefore will not total 100 percent.

task activities associated with a particular job or combination of tasks (workflow predictability) are understood and nonproblematic. It would appear that differences would be found in the task and workflow predictabilities among different types of core technologies. In the upholstered furniture industry, the products are manufactured via a custom-made, intermittent, highly skilled labor-intensive system which permits the production of a wide variety of products. The products in the soft drink bottling industry are manufactured via a mass-produced, highly automated continuous system which utilizes unskilled and semi-skilled workers. The task and workflow predictabilities would be expected to be lower in the upholstered furniture industry since the manufacturing process is more complex and elongated.

Support for this is provided by Table 4-1. This table reports the number of firms in each group of the 3 x 2 factorial design. There are differences between the uncertainty distribution of large firms in both industries (Groups III, IV, VII and VIII). Firms were categorized as large or small based upon the industry average number of employees. In the upholstered furniture industry, there were seven large firms with high uncertainty scores as compared to three with low uncertainty. In the soft drink bottling industry, the reverse situation exists. Seven

large firms had low uncertainty scores while four had high uncertainty. Table 5-1 indicates that the major environmental factors considered in the decision to use part-time and temporary workers were internal rather than external. Thus, the study suggests that one explanation for the differences among the uncertainty scores of large firms is attributed to their task and workflow predictabilities. It appears that large upholstered furniture firms perceive high uncertainty which perhaps may be attributed to task and workflow predictabilities. On the other hand, large soft drink bottlers may perceive less uncertainty due to the more certain nature of the task and workflow predictabilities.

Although this study failed to show any statistically significant relationship between perceived environmental uncertainty and the use of part-time and temporary workers as one buffering response, it does provide insights and directions for future research. The findings have provided additional insight about the nature of the buffering response and environmental uncertainty. Thompson (1967) argued that buffering responses are used to cope with environmental disturbances. However, these disturbances can be of an internal or external nature. Analysis of the responses to the perceived environmental uncertainty instrument show the internal environmental factors are most frequently mentioned as important in the

decision to use part-time and temporary workers. Task and workflow predictabilities may well explain the source of internal uncertainty and account for the differences in perceived environmental uncertainty between large firms in the upholstered furniture and the soft drink bottling industries.

The precise nature of internal and external environmental factors from both an objective and perceived approach should be examined in future research since the perceived environmental uncertainty approach used in this study failed to produce significant results. Alag and Storey (1975) have developed an index of volatility of industries based on variation in sales over the past ten years plus the average amounts of R&D and capital expenditures relative to total assets. Their classification of volatility could be used to select low and high volatile industries. This industry measure plus actual company sales could be used to provide an objective measure of external environmental uncertainty. A perceived uncertainty instrument clearly designed to measure such factors as perceived fluctuating demand and the perceived level of competition could be compared with the objective criteria. Internal environmental uncertainty could also be approached by trying to determine more precisely the task and the workflow predictabilities from both an

objective and perceived perspective. By measuring internal and external environmental uncertainty from both an objective and perceived approach, the nature of the relationship between these two phenomena could be explored. The controversy in the literature regarding which approach is the better indicator of management action could be further explained.

Another approach to the uncertainty issue would be to select firms with the same type of core technology operating in different environments. Controlling for the technology variable would allow more careful investigation of the uncertainty variable. The size factor could also be controlled by selecting similar sized firms.

Size

Results of this study failed to support the hypothesis that a positive relationship existed between size and the use of part-time and temporary workers. The direction of the correlation in the upholstered furniture industry was negative ($r = -.40$). This negative correlation does weakly suggest that an inverse relationship may well exist between size and the use of part-time and temporary workers. Additional analysis using a two-tailed test showed significance at the ($p < .076$) level. Further support for the direction of the relationship is provided by Table 4-4. This table shows that in both industries

large firms use less part-time and temporary workers than do small firms. However, due to the method of sample selection and the sample size, this implication should be interpreted cautiously.

One explanation for the decreased use of part-time and temporary workers as size increases in the sampled manufacturing firms can be attributed to organizational slack. Thompson (1967) describes slack as the "fund of uncommitted capacities" which gives an organization flexibility and more assurance of self control from uncertainties. Organizations can have manpower slack which enables the flexible use of workers according to specific needs.

Small organizations lack the manpower resources that large organizations have. In small firms activities such as maintenance or shipping/receiving may require only occasional attention. There would be no need for full time workers to exclusively perform such activities. When the need arises, full time workers could be pulled off their regular jobs to perform these occasional activities. As the firm grows in size, these activities must be performed on a more regular basis, and the firm might not be able to continually transfer full time employees. It would appear that the growing organization would employ part-time and temporary workers to perform these activities giving the

organization more flexible manpower utilization. As the organization continues to grow in size, eventually there is a need to hire permanent, full time employees to perform activities formerly requiring part-time attention. The organization eventually reaches a point where it achieves manpower slack. Slack provides the organization with flexibility and is manifested in their full time employees. In large organizations, activities which still require part-time attention can also be handled by manpower slack. Therefore, as the organization grows in size, its dependence on the use of part-time and temporary employees to achieve flexibility is replaced by its own manpower slack.

Another explanation for the decreased use of part-time and temporary workers as size increases can be attributed to the availability of capital resources which is another form of organization slack. Large organizations tend to have more funds available for the purchase of sophisticated machinery such as automated material handling systems. This study has shown that many unskilled part-time and temporary workers are used for material handling activities such as shipping, receiving, and packaging. The observation was made in both industries that the reason some organizations were not using part-time and temporary workers for such activities was due to the increased utilization of mechanization. Several furniture

manufacturers had sophisticated machines which would package and crate the finished goods. Likewise, in the soft drink bottling industry, several firms had machines which stacked the cases on pallets in appropriate lot sizes ready to be loaded by fork-lift trucks onto the delivery vehicles. In both instances, these machines represented a major investment affordable only by larger firms. Thus, the capital resources available to large companies for the purchase of sophisticated material handling systems may also decrease a company's dependence on the use of part-time and temporary workers for such activities.

Litterer (1961, 1963) argued that as organizations grow in size, they tended to add buffering responses. The results of this study suggest that the relationship between size and buffering is more complex. The use of part-time and temporary workers as one buffering response may have an inverse relationship with size. Similar inverse relationships might well exist with other buffering responses. Future research could expose more carefully the exact nature of this relationship.

Relationship Among Variables

Although the research findings failed to indicate statistically significant interaction effects, several

observations which have implications for future research can be made regarding the relationship among the variables. Considerable caution, however, should be exercised in interpreting these implications.

Results show that significant differences exist between firms with specific technical cores and those with diffuse technical cores. This establishes the importance of the technology variable. No relationship was found between size and the use of part-time and temporary workers among upholstered furniture manufacturers and soft drink bottlers. As discussed previously, however, the ($r = -.40$) direction of the correlation in the upholstered furniture industry suggests an inverse relationship may exist. Additional analysis using a two-tailed test showed significance at the ($p < .076$) level. In addition, Table 4-4 shows that in both industries, large firms use less part-time and temporary workers than do small firms. Perhaps, these results suggest that within a given type of core technology, size rather than the core technology may determine the amount of use of the buffering response.

No relationship was found between perceived environmental uncertainty and the use of part-time and temporary workers in either industry. However, in the preliminary analysis to test for interaction effects, the observation was made based upon Table 4-1 that there were seven large upholstered furniture firms that had high

uncertainty scores and three with low uncertainty scores. Among soft drink bottlers, there were seven large firms that had low uncertainty scores while four bottlers had high uncertainty scores. This suggests that the interaction of core technology and size may affect perceived environmental uncertainty. It appears that there is a core technology/size interaction. Since large firms are involved in both types of core technology, it may well be that core technology overcomes the size effect to influence the level of perceived environmental uncertainty among large firms. Future research could explore the exact nature of these relationships.

Buffering Responses

Since this study considers only one buffering response used by the personnel function, other personnel buffering responses such as overtime, labor pools, or short work weeks should be investigated. Organization slack should also be looked at more closely to determine the extent of its buffering utility. However, there are problems of operationally defining it. An indepth study which considers the total personnel buffering activity would provide better understanding of the nature of the personnel function. Such a study should determine the decision criteria for the use of various personnel

buffering responses. Longitudinal studies could trace the evolution of various buffering responses.

Other buffering responses should also be examined. Buffering activities which involve the input and output components of the organization and perform control and maintenance functions merit exploration. Some of these buffering activities include materials management, production control, distribution, finance, and maintenance. Propositions for future research include the following.

5.1 The more diffuse the core technology, the greater the use of materials management buffering responses.

The diffuse core technology is capable of producing a wide variety of complex products. Thus, there is a greater need to acquire, stock, and transfer a wide variety of raw materials (parts, supplies, etc.). This involves the greater use of such activities as purchasing, warehousing, inventory control, and materials handling. Due to the elongated production process, the goods in process must be moved from one work area to another. Finally, the complex nature of the products suggests that more elaborate packing and shipping activities are required. Therefore, it is proposed that diffuse technical cores have a greater use of materials management buffering responses.

5.2 The more diffuse the core technology, the greater the use of production control buffering responses.

Diffuse core technologies manufacture complex products which are composed of many interdependent parts. The production process is sequential and elongated thus resulting in a complicated process. In order to insure the production of quality goods on time, activities such as process planning, work planning, scheduling, and quality control must be utilized. Therefore, diffuse core technologies require greater use of production control buffering responses.

5.3 The more specific the core technology, the greater the use of distribution buffering responses.

Since the specific technical core produces a large number of standardized goods which may be mass marketed directly to a variety of different retail outlets, an elaborate distribution system is required. This involves activities such as packing, loading, shipping, and shelving the goods. In some instances, as in the case of the soft drink bottling industry, it may also involve the transferring of inputs from the environment for recycling. Thus, it is proposed specific core technologies require more elaborate distribution buffering responses.

5.4 The more specific the core technology, the greater the use of finance buffering responses.

Specific core technologies produce a large number of standardized goods via an automated, capital intensive production process. This suggests the importance of the finance function in such companies since considerable capital is needed to purchase the machinery and equipment and insure adequate inventories of raw materials. It is thus proposed that specific core technologies require greater use of the finance buffering responses.

5.5 The more specific the core technology, the greater the use of maintenance buffering responses.

Specific core technologies are capital intensive utilizing sophisticated machinery and equipment. In order to ensure the efficient utilization of the plant and equipment, proper maintenance activities are required. Thus, it is proposed that specific core technologies require greater use of the maintenance buffering response.

REFERENCES

- Administrative Management Society. "How Offices Use Temporary Help," Office, Vol. 73 (January, 1971), 87-89.
- Aldag, Ramon, and Ronald Storey. "Environmental Uncertainty," Proceedings, Academy of Management, (1975).
- Aldrich, Howard. "Technology and Organization Structure: A Re-examination of the Findings of the Aston Group," Administrative Science Quarterly, Vol. 17 (1972), 26-43.
- Amber, G. S., and P. S. Amber. Anatomy of Automation. Englewood Cliffs, N.J.: Prentice-Hall, 1962.
- Bennis, Warren G. Changing Organizations. New York: McGraw-Hill, 1966.
- Blandin, James Sherman. Environmental Uncertainty and the Design, Structure Comparative Empirical Study. Ph.D. dissertation, University of Oregon, 1974.
- Blau, Peter. "A Formal Theory of Differentiation in Organizations," American Sociological Review, Vol. 35 (1970), 201-18.
- Blau, Peter M., and Richard Schoenherr. The Structure of Organizations. New York: Basic Books, 1971.
- Blauner, R. Alienation and Freedom. Chicago: University of Chicago Press, 1964.
- Bright, J. R. Automation and Management. Boston: Division of Research, Harvard Business School, 1958.
- Burack, Elmer H. "Industrial Management in Advanced Production Systems: Some Theoretical Concepts and Preliminary Findings," Administrative Science Quarterly, Vol. 12 (1967), 479-500.
- Bureau of National Affairs. Bulletin to Management: ASPA-BNA Survey No. 25-Part-Time and Temporary Employees, December 5, 1974.
- Burns, Tom, and G. M. Stalker. The Management of Innovation. London: Tavistock Publications, 1961.

Business Week, "A Boost for Temporary Help," (August 10, 1974), 60-61.

Child, John. "Managerial and Organizational Factors Associated with Company Performance, Part I: A Contingency Analysis," The Journal of Management Studies, Vol. 11 (1974), 175-89.

Child, John. "Managerial and Organizational Factors Associated with Company Performance, Part II: A Contingency Analysis," The Journal of Management Studies, Vol. 12 (1975), 12-27.

Child, John. "Predicting and Understanding Organizational Structure," Administrative Science Quarterly, Vol. 18 (1973), 168-85.

Child, John, and Roger Mansfield. "Technology, Size and Organization Structure," Sociology, Vol. 6 (1972), 369-93.

Comstock, Donald, and W. Richard Scott. "Technology and the Structure of Subunits: Distinguishing Individual and Work-group Effects," Administrative Science Quarterly, Vol. 22 (June, 1977), 177-202.

Cyert, Richard M., and James G. March. A Behavioral Theory of the Firm. Englewood Cliffs, N.J.: Prentice Hall, 1963.

Dewar, Robert, and Jerald Hage. "Size, Technology, Complexity, and Structure Differentiation: Towards a Theoretical Synthesis," Mimeographic Paper, Graduate School of Management, Northwestern University, Evanston, Illinois.

Dill, William R. "The Impact of Environment on Organizational Development," in Sidney Mailick and Edward H. Van Ness (Eds.), Concepts and Issues in Administrative Behavior. Englewood Cliffs, N.J.: 1962, pp. 94-109.

Downey, H. Kirk. Perceived Uncertainty Variability: A Methodological and Exploratory Study. Ph.D. dissertation, Pennsylvania State University, 1974.

Downey, H. Kirk, Don Hellriegel, and John Slocum. "Environmental Uncertainty: The Construct and Its Application," Administrative Science Quarterly, Vol. 20 (1975), 613-29.

Downey, H. Kirk, and John Slocum. "Uncertainty: Measures, Research and Sources of Variation," Academy of Management Journal, Vol. 18, No. 3 (1975), 562-78.

- Duncan, Robert. "Characteristics of Organizational Environments and Perceived Environmental Uncertainty," Administrative Science Quarterly, Vol. 17, No. 3 (1972), 313-27.
- Duncan, Robert. "Multiple Decision-Making Structures in Adapting to Environmental Uncertainty: The Impact on Organizational Effectiveness," Human Relations, Vol. 26 (1973), 273-91.
- Duncan, Robert. The Effects of Perceived Environmental Uncertainty on Organizational Decision Unit Structure: A Cybernetic Model. Ph.D. dissertation, Yale University, 1971.
- Emery, F. E., and J. Marek. "Some Socio-Technical Aspects of Automation," Human Relations, Vol. 15 (1962), 17-25.
- Faunce, W. A. Problems of an Industrial Society. New York: McGraw Hill, 1963.
- Fayol, Henry. General and Industrial Management. Translated by J. A. Conbrough. Geneva: International Management Institute, 1929.
- Filley, Alan C., Robert J. House, and Stephen Kerr. Managerial Process and Organizational Behavior. Glenview, Illinois: Scott, Foresman and Co., 1976.
- Fullan, Michael. "Industrial Technology and Worker Integration in the Organization," American Sociological Review, Vol. 35, (1970), 1028-39.
- Galbraith, Jay. Designing Complex Organizations. Reading, Mass.: Addison-Wesley, 1973.
- Gannon, Martin J. "A Profile of the Temporary Help Industry and Its Workers," Monthly Labor Review, Vol. 97 (May, 1974), 44-49.
- Gillespie, David, and Dennis Miletic. "Technology and the Study of Organizations: An Overview and Appraisal," Academy of Management Review, Vol. 2 (1977), 7-16.
- Gouldner, Alvin. "Organizational Analysis," in R. K. Merton, L. Broom and L. S. Cottrell (Eds.), Sociology Today. New York: Basic Books, 1959, 400-28.
- Griswald, John. Temporary Help Industry. A report prepared by Arthur D. Little, Inc., July, 1969.

Grimes, A. J., S. M. Klein, and F. A. Shull. "Matrix Model: A Selective Empirical Test," Academy of Management Journal, Vol. 15 (1972), 9-31.

Gulick, Luther, and Lyndall Urwick. Papers in the Science of Administration. New York: Institute of Public Administration, 1937.

Hage, Jerald, and Michael Aiken. "Routine Technology, Social Structure and Organizational Goals," Administrative Science Quarterly, Vol. 14 (1969), 366-76.

Hall, Richard H. Organizations: Structure and Process. Englewood Cliffs, N.J.: Prentice-Hall, 1977.

Hall, Richard H., J. E. Haas, and N. J. Johnson. "Organizational Size, Complexity, and Formalization," American Sociological Review, 1967, 903-12.

Hall, Richard H., and C. R. Tittle. "Bureaucracy and Its Correlates," American Journal of Sociology, Vol. 72 (1966), 267-72.

Harvey, Edward. "Technology and the Structure of Organizations," American Sociological Review, Vol. 33 (April, 1968), 247-59.

Hickson, David, C. R. Hinings, C. A. Lee, R. E. Schneck, and J. M. Penning. "A Strategic Contingencies Theory of Intra-organizational Power," Administrative Science Quarterly, Vol. 16 (March, 1971), 216-29.

Hickson, David, Derek Pugh, and Diana Pheysey. "Operations, Technology, and Organizational Structure," Administrative Science Quarterly, Vol. 14 (1969), 378-98.

Hinings, C. R., D. J. Hickson, J. M. Pennings, and R. E. Schneck. "Structural Conditions of Interorganizational Power," Administrative Science Quarterly, Vol. 19 (1974), 22-44.

Hollander, Myles, and Douglas Wolfe. Nonparametric Statistical Methods. New York: Wiley, 1973.

Inkson, J. H., D. S. Pugh, and D. J. Hickson. "Organization Context and Structure: An Abbreviated Replication," Administrative Science Quarterly, Vol. 15 (1970), 318-29.

Jelinek, Mariann. "Technology, Organizations, and Contingency," Academy of Management Review, Vol. 2 (1977), 17-26.

Joray, Paul A. The Temporary Industrial Labor Service Industry in the Chicago and St. Louis Metropolitan Areas. Ph.D. dissertation, University of Illinois, 1972.

Joray, Paul A., and Charles Hulin. The Temporary Help Industry: Customers, Workers, Firms. Report prepared for the National Association of Temporary Services, 1974.

Kefalas, Asterios, and Peter Schoderbek. "Scanning the Business Environment--Some Empirical Results," Decision Sciences, Vol. 4 (1973), 62-72.

Keller, Robert, John Slocum, and Gerald Susman. "Uncertainty and Type of Management Systems in Continuous Process Organizations," Academy of Management Journal, Vol. 17 (1974), 56-68.

Kerlinger, Fred N. Foundations of Behavioral Research. New York: Holt, Rinehart and Winston, 1973.

Khandwalla, Pradip N. "Mass Output Orientation of Operations Technology and Organizational Structure," Administrative Science Quarterly, Vol. 19 (1974), 74-97.

Kimberley, John R. "Issues in the Design of Longitudinal Organizational Research," Sociological Methods and Research, Vol. 4 (1974), 321-47.

Kimberley, John R. "Organizational Size and the Structuralist Perspective: A Review, Critique, and Proposal," Administrative Science Quarterly, Vol. 21 (1976), 571-97.

Kynaston Reeves, Tom, and Barry A. Turner. "A Theory of Organization and Behavior in Batch Production Factories," Administrative Science Quarterly, Vol. 17 (1972), 81-98.

Lawrence, Paul R., and Jay W. Lorsch. Organization and Environment. Boston: Harvard Graduate School of Business Administration, 1967.

Lawrence, Paul R., and Jay W. Lorsch. Organization and Environment: Managing Differentiation and Integration. Homewood, Ill.: Richard D. Irwin, 1969.

Litterer, Joseph A. "Systematic Management, Design for Organizational Recoupling in American Manufacturing Firms," Business History Review, Vol. 37 (1963), 369-91.

Litterer, Joseph A. "Systematic Management, The Search for Order and Integration," Business History Review, Vol. 35 (1961), 461-76.

- Lorsch, Jay, and S. Allen. Managing Diversity and Interdependence: An Organizational Study of Multidivisional Firms. Boston: Harvard University Graduate School of Business Administration, Division of Research, 1973.
- Macaulay, Stewart. "Non-Contractual Relations in Business: A Preliminary Study," American Sociological Review, Vol. 28 (1963), 55-67.
- Meissner, Martin. Technology and the Worker. San Francisco: Chandler Publishing Co., 1969.
- Meyer, Marshall W. "Size and the Structure of Organizations: A Causal Model," American Sociological Review, Vol. 37 (1972), 434-41.
- Meyer, Marshall W. "Two Authority Structures of Bureaucratic Organizations," Administrative Science Quarterly, Vol. 13 (1968), 211-28.
- Michael, D. Learning to Plan and Planning to Learn. San Francisco: Josey Bass, 1973.
- Moore, Mack Arthur. "The Temporary Help Service Industry: Historical Development, Operation and Scope," Industrial and Labor Relations Review, Vol. 18 (July, 1965), 554-69.
- Moore, Mack Arthur. The Role of Temporary Help Services in the Clerical Labor Market. Ph.D. dissertation, University of Wisconsin, 1963.
- Negandhi, Anant, and Bernard Reiman. "A Contingency Theory of Organizations Re-examined in the Context of a Developing Country," Academy of Management Journal, Vol. 15 (1972), 137-46.
- Nollen, Stanley, Brenda Eddy, Virginia Martin, and Douglas Monroe. Permanent Part Time Employment: An Interpretative Review. Georgetown University: School of Business Administration, February, 1976.
- Notaro, Michael R. "Advantages of Temporary Help During a Business Slowdown," Office, Vol. 71 (March, 1970), 78, 82, 163.
- Nunnally, J. Psychometric Theory. New York: McGraw-Hill, 1967.
- Okada, Akhihisa. "The Industrial Temporary Help Service. Unpublished paper, 1969.

- Pennings, Johannes. "The Relevance of the Structural Contingency Model for Organizational Effectiveness," Administrative Science Quarterly, Vol. 20 (1975), 393-410.
- Perrow, Charles. "A Framework for Comparative Organization Analysis," American Sociological Review, Vol. 32 (April, 1967), 194-208.
- Perrow, Charles. Organizational Analysis: A Sociological View. Belmont, California: Wadsworth, 1970.
- Pfeffer, Jeffrey. "Merger as a Response to Organizational Interdependence," Administrative Science Quarterly, Vol. 17 (1972), 382-94.
- Pfeffer, Jeffrey, and Huseyen Leblebici. "The Effect of Competition on Some Dimensions of Organizational Structure," Social Forces, Vol. 52 (1973), 268-79.
- Pugh, Derek, D. J. Hickson, C. R. Hinnings, and C. Turner. "The Contest of Organizational Structures," Administrative Science Quarterly, Vol. 14 (1969), 91-114.
- Pugh, Derek, D. J. Hickson, C. R. Hinnings, and C. Turner. "Dimensions of Organizational Structure," Administrative Science Quarterly, Vol. 13 (1968), 65-105.
- Selznick, Philip. TVA and the Grass Roots. Berkeley: University of California Press, 1949.
- Siegel, Sidney. Nonparametric Statistics. New York: McGraw Hill, 1956.
- Smith, Robert Steward. Analysis of Labor Market Adjustments in the Clerical Temporary Help Market: 1953-1960. Ph.D. dissertation, Stanford University, 1971.
- Starbuck, William H. "Organizational Growth and Development," in James G. March (Ed.) Handbook of Organizations. Chicago: Rand McNally, 1965, pp. 451-533.
- Taylor, F. W. The Principles of Scientific Management. New York: Harper and Brothers, 1911.
- Temporary Help Industry. A Report prepared by John D. Griswald of Arthur D. Little, Inc., July, 1969.
- Terreberry, Shirley. "The Evolution of Organizational Environments," Administrative Science Quarterly, Vol. 13 (1968), 590-613.

Thompson, James D. Organizations in Action. New York: McGraw-Hill Book Co., 1967.

Thompson, James D., and F. L. Bates. "Technology, Organization, and Administration," Administrative Science Quarterly, Vol. 2 (1957), 325-43.

Tosi, H., R. Aldag, and R. Storey. "On the Measurement of the Environment: An Assessment of the Lawrence and Lorsch Environmental Uncertainty Scale," Administrative Science Quarterly, Vol. 18 (1973), 27-36.

Touraine, A. "An Historical Theory in the Evolution of Industrial Skills," in C. R. Walker (ed.), Modern Technology and Civilization, 1962.

Udy, S. H., Jr. "The Comparative Analysis of Organizations," in James G. March (ed.), Handbook of Organizations. Chicago: Rand McNally, 1965.

U.S. Bureau of the Census. 1972 Census of Manufacturers. Washington, D.C.: Government Printing Office, 1976.

Van de Ven, Andrew H., and Andre L. Dalbecq. "A Task Contingent Model of Work-Unit Structure," Administrative Science Quarterly, Vol. 19 (1974), 183-97.

Yeung, Eric Tsun Man. Environmental Uncertainty and Organizational Designs. Ph.D. dissertation, Washington University, 1974.

Weber, Max. The Theory of Social and Economic Organization. Translated by A. M. Henderson and Talcott Parsons. New York: Oxford University Press, 1947.

Weick, Karl E. The Social Psychology of Organizations. Reading, Mass.: Addison-Wesley, 1969.

Winter, Elmer. "How Temporary Help Can Cut Your Payroll Costs," Office, Vol. 80 (December, 1974), 56-57.

Woodward, Joan. Industrial Organization: Behavior and Control. London: Oxford University Press, 1970.

Woodward, Joan. Industrial Organization: Theory and Practice. London: Oxford University Press, 1965.

Woodward, Joan. Management and Technology. London: Her Majesty's Printing Office, 1958.

Zald, Mayer N. "Urban Differentiation, Characteristics of Boards of Directors, and Organizational Effectiveness," American Journal of Sociology, Vol. 75 (1967), 97-111.

Zwerman, William L. New Perspectives on Organization Theory. Westpoint, Conn.: Greenwold, 1970.

APPENDIX I
PERSONAL INTERVIEW QUESTIONNAIRE

DATE _____
TIME (Beg) _____
TIME (End) _____

PERSONAL INTERVIEW QUESTIONNAIRE

NAME _____ POSITION _____

COMPANY _____

ADDRESS _____

BACKGROUND ON COMPANY

NATURE OF PRODUCTS

MAJOR PRODUCTS _____

TECHNOLOGY

Are goods made to order _____

Are goods produced in small or large batches _____

Are the goods mass produced via assembly line _____

Is there a continuous flow or intermittent steps _____

Are products simple or complex _____

Is labor skilled or unskilled _____

PERCENTAGE BREAKDOWN

EXAMPLES

Skilled _____
Semi-Skilled _____
Unskilled _____

ORGANIZATION STRUCTURE OF FIRM (Departments, sections,
Lines of Authority)

AVERAGE NUMBER OF FULL TIME EMPLOYEES DURING 1976

PLANT _____

OFFICE _____

TOTAL _____

TOTAL FULL TIME MAN HOURS EXPENDED DURING 1976

(Number of days (weeks) x number of hours/day (week) plus
adjustment for overtime, layoffs, vacations)

For this survey, four separate categories of part-time and temporary workers will be used:

Permanent Part-Time: employees who work on a permanent, year-round schedule, and regularly work less than a full workweek.

Occasional Part-Time: employees who work less than a full workweek and work on an irregular schedule in accordance with organizational needs.

Temporary--Company Payroll: employees hired directly by the company to work a full workweek, in positions that are not anticipated to become permanent.

Temporary--Outside Agency: individuals who are employed by an outside organization (such as Kelly Services or Manpower, Inc.) and who work for your organization for relatively short periods of time.

USE OF PART-TIME AND TEMPORARY HELP

Amount of use during 1976 (in 8 hour man days)

	<u>PART-TIME</u>	<u>TEMPORARY</u>
1. PERMANENT	_____	3. COMPANY PAYROLL _____
2. OCCASIONAL	_____	4. OUTSIDE AGENCY _____

REASONS FOR USE:

PERMANENT PART-TIME

OCCASIONAL PART-TIME

TEMPORARY COMPANY PAYROLL

TEMPORARY OUTSIDE AGENCY

NUMBERED REASONS

1. Replace regular employees who are sick, vacation, etc.
2. Help during peak periods
3. Special jobs and projects
4. Fill job until permanent
5. Avoid paying overtime
6. No need for full time

TYPE AND AMOUNT OF WORKERS USED

	PERMA- NENT	PART-TIME OCCASIONAL	TEMPORARY COMPANY	TEMPORARY OUTSIDE
<u>OFFICE SERVICES</u> (secretarial, stenographic, typing, filing, general office work)	_____	_____	_____	_____
<u>INDUSTRIAL SERVICES</u> (general labor, maintenance warehousing, janitorial, machine)	_____	_____	_____	_____
<u>SALES/MARKETING SERVICES</u> (product demonstration, survey interviewing, sales)	_____	_____	_____	_____
<u>TECHNICAL</u> (engineering, drafting, designing)	_____	_____	_____	_____
<u>DATA PROCESSING</u> (keypunching, computer programming editing, coding)	_____	_____	_____	_____
OTHER _____	_____	_____	_____	_____

FUNCTIONAL AREAS WHERE USED (Indicate on Organization Chart)

DECISION MAKER (As differentiated from the USER, BUYER)

APPENDIX II
DUNCAN'S PERCEIVED ENVIRONMENTAL
UNCERTAINTY INSTRUMENT

MANAGERIAL QUESTIONNAIRE

COMPANY _____

POSITION (TITLE) _____

DEPARTMENT (SECTION) _____

I am a graduate student in Business at Virginia Polytechnic Institute and State University in Blacksburg, Virginia who is doing a research study as part of my degree requirements on the use of temporary and part-time workers in your industry. I would appreciate your answering the following questions. Your responses will be strictly confidential.

SECTION I

In this section of the Questionnaire you are asked to respond regarding your decision to use part-time and/or temporary workers.

PART A

The following is a list of 25 factors some of which might have been considered by you in your decision to use part-time/temporary workers. Please place a check mark (✓) beside those factors which you feel were major considerations in the above decision situation. The factors have been placed into categories only to aid your reading and should not be viewed as a guide for completing the questionnaire.

- | <u>Internal Factors</u> | <u>External Factors</u> |
|--|--|
| Personnel: | Customers: |
| ___ (1) Skills of personnel (including educational and technological background).' | ___ (13) Distributors of product(s). |
| ___ (2) Previous technological and managerial skills of personnel. | ___ (14) Actual users of product(s) (Demand) |
| ___ (3) Individual member's involvement and commitment to attaining division or company goals. | Suppliers: |
| ___ (4) Interpersonal behavior styles | ___ (15) New materials suppliers. |
| ___ (5) Availability of manpower for utilization with division or company. | ___ (16) Equipment suppliers. |
| | ___ (17) Product parts suppliers. |
| | ___ (18) Labor supply. |
| Function and Staff Units: | Competitors: |
| ___ (6) Fluctuations in work loads of organizational units. | ___ (19) Competitors for suppliers. |
| ___ (7) Interdependence of organizational units in carrying out their objectives. | ___ (20) Competitors for customers. |
| ___ (8) <u>Intra</u> -unit conflict in organizational functional or staff units. | Socio-Political: |
| ___ (9) <u>Inter</u> -unit conflict in organizational functional or staff units. | ___ (21) Government regulatory control over your industry. |
| Organizational Level: | ___ (22) Public and Community attitude towards the social responsibility of your industry and its product(s). |
| ___ (10) Division or company objectives or goals. | ___ (23) Relationship with trade unions with jurisdiction in the organization. |
| ___ (11) Processes integrating individuals and groups for maximum attainment of goals. | Technological: |
| ___ (12) Routineness/Non-Routineness nature of division's or company's product(s). | ___ (24) Meeting new technological requirements of your industry and related industries in production of product(s). |
| | ___ (25) Improving and developing new products by implementing new technological advances in your industry. |
| ___ (26) Other please specify: _____ | |

PART B

Of the factors which you checked in the previous part of this questionnaire (Section I, Part A), please list the three factors which you feel were most important in your decision. Please write the number and description of these factors in the following spaces:

<u>Number</u>	<u>Description</u>
Factor 1 _____	_____
Factor 2 _____	_____
Factor 3 _____	_____

In this part of the questionnaire you will be asked to respond to a series of questions regarding the above three (3) factors. Please answer each question for each of the three factors. Beside each factor (below) please write the number representing the appropriate response category listed below as it applies to your experience for the particular factor under discussion. Simply write the number in the blank at the left of each factor.

For Questions 1 and 2 use the following responses:

- | | |
|--|---------------------------------|
| "1" means <u>EXTREMELY DIFFICULT</u> | "4" means <u>SOMEWHAT EASY</u> |
| "2" means <u>SOMEWHAT DIFFICULT</u> | "5" means <u>EXTREMELY EASY</u> |
| "3" means <u>NEITHER EASY OR DIFFICULT</u> | |

1. How difficult is it for you to get the necessary information about this factor for decision making?

_____ Factor 1 _____ Factor 2 _____ Factor 3

2. How difficult is it to obtain additional information about this factor when you need it for decision making?

_____ Factor 1 _____ Factor 2 _____ Factor 3

For Questions 3 through 8, use the following responses:

- | | |
|-------------------------------|-------------------------------|
| "1" means <u>NEVER</u> | "4" means <u>FAIRLY OFTEN</u> |
| "2" means <u>SELDOM</u> | "5" means <u>ALWAYS</u> |
| "3" means <u>OCCASIONALLY</u> | |

3. How often do the basic characteristics of this factor change?

_____ Factor 1 _____ Factor 2 _____ Factor 3

4. How often do you believe that the information you have about this factor is adequate for decision making?

_____ Factor 1 _____ Factor 2 _____ Factor 3

5. How often is it difficult to tell how this factor will react to, or be affected by a decision before it is made?

_____ Factor 1 _____ Factor 2 _____ Factor 3

6. How often do you feel that you are unable to predict how this factor is going to react to, or be affected by, decisions made by this division or company?

_____ Factor 1 _____ Factor 2 _____ Factor 3

7. How often do you feel that you have the necessary information about this factor in order to understand what is expected of your company or division in making decisions by this factor?

_____ Factor 1 _____ Factor 2 _____ Factor 3

8. As you move from decision situation to decision situation, how often would you expect your list of three most important factors to change?

In summing up your beliefs about each of the above three factors, we would like you to respond to two more questions concerning these factors. First, please indicate how sure you are about how each of these factors is going to affect the success or failure of your division or company in its tasks. After each factor listed below, circle one of the numbers from zero (0) to one (1) to indicate how sure you are of how that factor affects your division or company.

Second, after you have indicated how sure you are about a factor, please indicate the range of numbers (between 0 and 1.0) you were considering in your "sureness". For example, if you answered by indicating that you were .3 sure regarding Factor 1, what was the range you were considering in giving this answer? Was it between .2 and .4, or .1 and .7, or 0 and 1.0, etc.? Indicate this range by writing it in the blank space to the left of each of the following 3 factors.

	Completely Unsure									Completely Sure	
Factor 1 . . .	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
(Range)											

	Completely Unsure									Completely Sure	
Factor 2 . . .	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
(Range)											

	Completely Unsure									Completely Sure	
Factor 3 . . .	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
(Range)											

PART C

In the following five (5) questions you are asked to consider your decision processes in general. Simply circle the response after each question you feel best suits your experience.

1. How often do you feel that you can consider alternative courses of action before making a decision to follow a specific course of action?

1. Never	4. Fairly Often
2. Seldom	5. Always
3. Occasionally	

2. How often do you feel you can effectively consider the consequences of making decisions before they are made?

1. Never	4. Fairly Often
2. Seldom	5. Always
3. Occasionally	

3. How often do you feel that you are able to tell if the decisions you make will have a positive or negative effect on your organization's overall performance?

1. Never	4. Fairly Often
2. Seldom	5. Always
3. Occasionally	

4. How often can you determine what the outcome of a decision will be before it is made?

1. Never	4. Fairly Often
2. Seldom	5. Always
3. Occasionally	

5. Please circle the alternative below which most nearly describes the typical length of time involved before you can obtain feedback or information concerning the effects of your decision on your division or company.

a. One day	e. Six months
b. Three days	f. One year
c. One week	g. Two years or more
d. One month	

THANK YOU FOR YOUR COOPERATION

APPENDIX III
SCORING INSTRUCTIONS FOR DUNCAN'S PERCEIVED
ENVIRONMENTAL UNCERTAINTY INSTRUMENT

SCORING INSTRUCTIONS FOR DUNCAN'S PERCEIVED
ENVIRONMENTAL UNCERTAINTY INSTRUMENT

FACTOR ONE Lack of information regarding environmental factors.

Add the following:

Part B--Average of Question 1 (Reverse score)
Average of Question 2 (Reverse score)
Average of Question 4 (Reverse score)
Average of Question 7 (Reverse score)

Part C--Question 4 (Reverse score, response number)
Question 5 (Response number)

FACTOR TWO Lack of knowledge concerning the outcome of a specific decision in terms of how much the organization would lose if the decision were "incorrect."

Add the following:

Part B--Average of Question 5
Average of Question 6

Part C--Question 1 (Reverse score, response number)
Question 2 (Reverse score, response number)
Question 3 (Reverse score, response number)

FACTOR THREE The ability to assign Probabilities.

Last section of Part B

Determine the Degree of Ability for each factor and total.

Degree of Ability: (Certainty of effects of factor) X
(1 - range of certainty estimate)

TOTAL UNCERTAINTY SCORE

Weight FACTOR TWO score by a factor of 1.2.

Weight FACTOR THREE score by factor of 10.

Add the three factors giving negative weighting to FACTOR THREE.

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AN EXAMINATION OF THE RELATIONSHIP BETWEEN THE BUFFERING
RESPONSE OF PART-TIME AND TEMPORARY WORKERS AND TECH-
NOLOGY, PERCEIVED ENVIRONMENTAL UNCERTAINTY AND
SIZE IN TWO MANUFACTURING INDUSTRIES

by

Daniel G. Kopp

(ABSTRACT)

The primary objective of this study was to empirically test J. D. Thompson's proposition that organizations seek to buffer their technical cores from the uncertainty of the environment. Secondary objectives included: to explore the relationship among core technology, perceived environmental uncertainty, size, and buffering; to provide descriptive statistics on the use of part-time and temporary workers in manufacturing firms; and to empirically test the Perceived Environmental Uncertainty Instrument developed by Duncan and modified by Downey. These were accomplished by examining in an applied setting the relationship among one buffering method, two types of core technologies, size, and perceived environmental uncertainty.

Three hypotheses were developed which dealt with the relationship between the buffering response of part-time and

temporary worker usage and (1) the type of core technology, (2) perceived environmental uncertainty, and (3) size.

Data were collected by personal interview and written questionnaire from the top management of twenty-two firms each in the upholstered furniture and soft drink bottling industries.

Significant differences in the use of the buffering response were found between the two types of core technologies. Statistical significance was not found when size was correlated with the use of part-time and temporary workers in the upholstered furniture and soft drink bottling industries. Statistical significance was also not found in either industry when perceived environmental uncertainty was correlated with the buffering response.

The significance of the core technology variable lends support to the contingency theory of organization design. The research findings also suggest that the use of the buffering method appears to be more of a coping response to internal as opposed to external environmental factors. Furthermore, the relationship between size and the use of buffering responses appears to be more complex than previously thought. Finally, the descriptive results perhaps suggest the following interaction effects. Core technology and size appear to interact to affect the amount of use of part-time and temporary workers as one buffering response. Size may overcome the core technology effect in both

industries in influencing the use of the buffering response. Core technology appears to have the dominant influence over size in influencing the level of perceived environmental uncertainty among large firms.