

ASSESSMENT OF PRODUCTIVITY AND RELATED  
PERFORMANCE MEASURES IN HOSPITAL  
FOODSERVICE SYSTEMS

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## TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION . . . . .	1
Purposes and Objectives . . . . .	3
Hypotheses of the Study . . . . .	5
Assumptions and Limitations in the Study. . . . .	6
Definition of Terms . . . . .	7
II. REVIEW OF LITERATURE . . . . .	10
The Criteria of Organizational Performance. . . . .	11
Innovation. . . . .	18
Quality of Work Life. . . . .	21
Effectiveness . . . . .	25
Efficiency. . . . .	27
Quality . . . . .	27
Productivity. . . . .	30
Profitability . . . . .	32
Productivity and Performance Studies: A Historical Perspective. . . . .	34
Productivity and Performance Studies: At Oklahoma State University. . . . .	43
Method. . . . .	44
Subjects. . . . .	45
The Instrument. . . . .	46
Date Analyses . . . . .	47
Results . . . . .	47
Summary . . . . .	54
III. METHOD . . . . .	57
Research Design . . . . .	58
Population and Sample . . . . .	58
Data Collection . . . . .	58
Preliminary Study . . . . .	58
The Instrument. . . . .	59
Data Analysis . . . . .	61
IV. RESULTS AND DISCUSSION . . . . .	62
Characteristics of Survey Participants. . . . .	63
Age and Years of Education. . . . .	63
ADA Registration and Route to ADA . . . . .	65

Chapter	Page
Position Title, Salary, and Years of Experience . . . . .	65
Productivity Training and Professional Membership. . . . .	68
Characteristics of the Institutions . . . . .	73
Type of Hospital, Size and Location . . . . .	73
Type of Foodservice Management and Foodservice System. . . . .	74
Foodservice Budget and Training Programs. . . . .	75
Performance Measures. . . . .	75
Quality Measures. . . . .	77
Effectiveness Measures. . . . .	82
Quality of Work Life Measures . . . . .	84
Innovation Measures . . . . .	86
Innovation and Quality of Work Life Measures. . . . .	91
Efficiency Measures . . . . .	94
Profitability Measures. . . . .	96
Performance Ratios. . . . .	97
Productivity Ratios . . . . .	97
Effectiveness/Profitability Ratio . . . . .	99
Efficiency Ratios . . . . .	102
Absentssism Ratio . . . . .	105
Implications. . . . .	108
 V. SUMMARY, RECOMMENDATION, AND IMPLICATION . . . . .	 110
Description of the Sample . . . . .	111
Performance Measures. . . . .	112
Performance Ratios. . . . .	115
Recommendations . . . . .	118
Questionnaire . . . . .	118
Recommendations Based on the Results of the Study. . . . .	118
 BIBLIOGRAPHY . . . . .	 120
 APPENDIXES . . . . .	 128
APPENDIX A - PRELIMINARY STUDY QUESTIONNAIRE . . . . .	129
APPENDIX B - CORRESPONDENCE. . . . .	135
APPENDIX C - RESEARCH INSTRUMENT . . . . .	138
APPENDIX D - FREQUENCY TABLES OF PERFORMANCE MEASURES. . . . .	146
APPENDIX E - FREQUENCY TABLES OF PERFORMANCE RATIOS. . . . .	152

LIST OF TABLES

Table	Page
I. Organizational performance studies at Oklahoma State University . . . . .	46
II. Organizational performance ratios and measures currently being used in the foodservice industry . . . . .	48
III. Performance criteria ranking from Oklahoma State University studies . . . . .	53
IV. Degrees held by respondents. . . . .	64
V. Annual salary earned by respondents. . . . .	67
VI. Current year budget for foodservice of responding hospitals. . . . .	76
VII. Means of 13 performance ratios during four monthly periods. . . . .	153
VIII. Means of 13 performance ratios during four yearly periods. . . . .	154

## LIST OF FIGURES

Figure	Page
1. Relationship between three conceptualizations of organizational systems performance criteria . . . . .	13
2. Causal relationship between the seven basic performance criteria. . . . .	14
3. The performance/productivity management process . . . . .	15
4. Simplest forms, ABS's of management and change and their interrelationships. . . . .	16
5. A foodservice system model. . . . .	37
6. Route to ADA membership/registration by respondents . . . . .	66
7. Years of experience in foodservice management of respondents. . . . .	69
8. Training in productivity measures of respondents. . . . .	70
9. Professional organization memberships of respondents. . . . .	72
10a and 10b. Use of performance measures by respondents . . . . .	78
11. Monthly trends of productivity ratios . . . . .	100
12. Yearly trends of productivity ratios. . . . .	101
13. Monthly trend of effectiveness/profitability ratio. . . . .	103
14. Yearly trend of effectiveness/profitability ratio . . . . .	103
15. Monthly trends of efficiency ratios . . . . .	104
16. Yearly trends of efficiency ratios. . . . .	106
17. Yearly trend of absenteeism ratio . . . . .	107
18. Performance model to control and monitor a foodservice system. . . . .	109



## CHAPTER I

### INTRODUCTION

In 1973, Leon Skan found only 10 firms that had initiated companywide performance improvement efforts. In 1984, well over half of the nations 1,000 largest companies had improvement efforts underway and the number was still growing. The trend to initiate improvement efforts began in certain industries as a means to catch up with the competition and in some cases as a matter of business survival. Today managers realize that improvement efforts also make good business sense. Businesses that produce quality products or services in an efficient manner, while involving employees in the decision-making process, are identified as the excellent companies and are set apart from the others (Skan, 1985)

With our current economic state of a rapidly growing service industry in the face of falling productivity and rising price levels (Runyon, 1985), the idea of monitoring performance and producing quality products and services is paramount once again and the pressure is mounting to develop better ways to manage and measure productivity (Tuttle & Ramanowski, 1985). The foodservice industry is not exempt to the current trends of monitoring productivity and performance. Matthews and Norbach (1986) state that hospital foodservice directors have begun to recognize that coping with increased costs in the 1980's will require

Careful planning and controlling of resources, rather than trying continually to cut expenses by some percentage factor.

In light of the increasing cost and increasing competition from expanding markets, improved performance and productivity becomes an absolute condition of survival. David Vice (1984) tells his employees that the greatest threat they face when it comes to jobs and future success, is not technological innovation or automation but competition. Vice feels the current dilemma businesses face is finding themselves at a crossroads because the rules of the competitive game have changed. For the foodservice industry, the competitive game is to increase productivity by using proportionately fewer resources per unit of output, or producing more output with the same amount of resources, while maintaining standards of quality and value added. Productivity will improve by managing and intervening upon key transformations or work process that affect inputs and outputs. The areas which need intervention for improvements can be identified through a performance measurement and evaluation system.

According to Sink (1986), a critical job of every manager is to design, develop and implement measurement and evaluation systems that provide necessary information as to how well resources are brought together and used to accomplish a desired set of results. Hence, measurement is an important tool as it identifies whether the best mixture of labor, capital and materials is present in a foodservice operation. In addition, if measured figures are compared over time, managers can determine when productivity improvement occurs, or better yet, when it needs to occur. Although models for measuring and evaluating productivity are available for manufacturing companies,

similar models do not exist for the foodservice industry eventhough productivity research has been conducted in this industry. Numerous performance measures and systems have been reported, however, use by foodservice operators has not been documented into a standard set of performance measures. Thus, a dire need exists to develop a standard organizational performance model to curtail the declining productivity rates in the foodservice industry. The results of this study could lead to the development of productivity measures and a performance model, and provide strategies to improve hospital foodservice systems.

#### Purposes and Objectives

In 1954, Drucker identified seven key results areas as components of a performance measurement system - customer satisfaction, innovation, internal productivity, operating budget, employee attitude and performance, management development and performance, and social responsibility. Sink (1983a) condensed this to what he defines as seven performance criteria by which an organization may be evaluated and controlled which include; effectiveness, efficiency, innovation, productivity, profitability, quality and quality of work life. Robertson (1982), whose research was the first in a series of foodservice productivity studies conducted by Oklahoma State University's Department of Food, Nutrition, and Institution Administration, found that foodservice operators were controlling inputs and outputs, but few knew what they were actually measuring and tended to label all performance criteria collectively as productivity criteria. Further research was conducted by Shaw 1983; Lamb, 1984; Pickere1 1984; Putz, 1985; and Nazarieh 1986 to

identify performance measures when each criteria was specifically defined.

In this study, ratios and measures identified as dimensions of productivity and organization performance are synthesized from the five previous foodservice studies. The common ratios and measures will be examined for their appropriateness in measuring performance as a means for establishing a base from which to build a performance measurement model. The relevance of the common ratios and measured will be examined in health care institutions.

The objectives in this research include:

1. To validate 32 performance indicators over a specific time period
2. To discover which of the 32 indicators most accurately reflects organizational performance
3. To develop a concise list of standard measures of productivity, profitability, efficiency, effectiveness, quality, quality of work life, and innovation which will help establish a base for strategies to improve foodservice systems.
4. To identify factors which hinder attainment of optimum organizational performance.
5. To make suggestions as to how performance standards can be used by hospital foodservice managers.
6. To propose a performance model for use in the foodservice industry.

## Hypotheses of the Study

The hypotheses postulated for this study are:

H<sub>1</sub>: There is no significant difference in the pattern of 13 performance index ratios based on selected personal variables:

- a. Age
- b. Educational background
  1. Degree
  2. Major
- c. Registration status
- d. Route to ADA registration
- e. Position title
- f. Annual salary
- g. Number of years in foodservice management position
- h. Training in productivity measures
- i. Membership in professional organizations

H<sub>2</sub>: There is no significant difference in the pattern of 13 performance index ratios based on selected institutional variables:

- a. Financial goals of the hospital
- b. Type of hospital control
- c. Type of medical service provided
- d. Size of hospital
- e. Hospital location
- f. Type of foodservice management
- g. Type of foodservice system
- h. Annual budget for foodservice
- i. Available training programs for management staff

H<sub>3</sub>: There is no significant difference in the (yes/no) score of 19 performance measures based on selected personal variables as stated in H<sub>1</sub>.

H<sub>4</sub>: There is no significant difference in the (yes/no) score of 19 performance measures based on selected institutional variables as stated in H<sub>2</sub>.

H<sub>5</sub>: There is no significant difference in the pattern of performance index ratios based on (yes/no) score of selected performance measures.

H<sub>6</sub>: There is no significant difference of any one ratio versus another in accurately reflecting organization performance.

H<sub>7</sub>: There is no significant differences in factors identified as hindrances to organizational performance based on selected personal variables as stated in H<sub>1</sub>.

H<sub>8</sub>: There is no significant differences in factors identified as hindrances to organizational performance based on selected institutional variables as stated in H<sub>2</sub>.

#### Assumptions and Limitations in the Study

The assumptions which could have an effect on the results of this study are the following:

1. Hospital foodservice managers surveyed will have enough knowledge of performance measures to objectively respond to the questionnaire.

2. Assessment of the performance measures for the operation will be within the realm of duties of the manager in their current position.

3. The respondents will have access to the information requested to complete the questionnaire.

4. The respondents will provide honest answers based on fact, rather than assumed ideal answers.

A limitation of the study is that foodservice managers surveyed will be only those who are employed in health care systems with 500 beds or more. Although results of this research can only be generalized to this group, the study can provide cross-sectional application to other groups. Another limitation is that the respondents may or may not be representative of the population.

#### Definition of Terms

✓ ADA: A professional organization responsible for establishing education and supervised clinical experience requirements and standards of practice in dietetics (American Dietetic Association Reports, 1981).

ASHFSA: Professional organization of the American Society for Hospital Foodservice Administration.

✓ Effectiveness: Doing the right things (Drucker, 1974) or the degree of achievement of objectives (Smalley & Freeman, 1966).

✓ Efficiency: Doing things right (Drucker, 1974) or the ratio of resources expected to be consumed to resources actually consumed (Sink, 1985).

✓ Foodservice System: The methodology used to prepare, assemble and deliver food to the consumer.

✓ Innovation: A deliberate, novel, specific change aimed at accomplishing the goals of the system more effectively (Mueller, 1971) or applied creativity (Shaw, 1983).

Multifactor Productivity Ratio: A productivity ratio which includes some or all of the outputs and some of the inputs (Swaim and Sink, 1983)

Partial Factor Productivity Ratio: A productivity ratio which includes some or all of the outputs and only one type of input (Swaim & Sink, 1983).

✓ Performance: Is equal to the outcomes of the combined functions of the following criteria; innovation, quality of worklife, effectiveness, efficiency, quality, productivity and profitability (Sink, 1985)

✓ Productivity: The ratio of quantities of outputs to quantities of inputs. These outputs and inputs must be for the same unit of time (APC, 1979).

✓ Productivity Index: Successive productivity measurement, usually in the form of the percentage difference (a ratio divided by itself) between measurements for two periods (Swaim & Sink, 1983). A base period is used and another period compared to it. The index reveals the change in productivity over time.

✓ Productivity Measurement: The selection of physical, temporal, and/or perceptual measures for both input and output variables and the development of a ratio of output measure(s) to input measure(s) (Sink, 1980).

✓ Productivity Ratio: The comparison of two variables of single parameters (i.e., labor and labor, hours and hours), or of several parameters such as net outputs when several inputs are required (mali, 1978).



✓ Profitability/Budgetability: Various financial measures relating total revenues to total costs; budgetability measures are used to assess adherence to a planned budget (Sink, 1985).

✓ Quality: The degree of the system's conformance to requirements, specifications, and expectations (Sink, 1995), or at the consumer level, fitness for use (Furan & Gryna, 1980).

✓ Quality of Work Life: Work with meaning (Mali, 1978) or the degree to which work provides an opportunity for an individual to meet a variety of personal needs, to survive with security, to interact with others, to feel useful, to be recognized for achievements, and to have an opportunity to improve one's skill and knowledge (Lippitt, 1978).

Surrogate Productivity Measures: Substitute performance measures which are highly correlated with productivity (i.e., the other performance criteria), (Swaim & Sink, 1983).

Total Factor Productivity Ratio: A ratio which includes all output measures and all input measures (Sink, 1980).

## CHAPTER II

### REVIEW OF LITERATURE

According to Bobbe and Schaffer (1983), management of performance is what top management must do to get greater outputs from available resources. Shaw and Capoor (1979) define performance management as the control process by which managers make sure resources are obtained and used effectively and efficiently to accomplish the organizations objectives. When the concepts of increased outputs and efficient use of resources are mentioned together, managers think of productivity. Productivity is not a new imperative. It has been relevant since the start of the industrial revolution (Sink, Dhir and Roberts, 1985). However, in that era methods of production were labor intensive and efforts to improve operations were focused on production efficiency. As a consequence the historic productivity gains were produced by major investments in new technology, mechanization and automation, as well as by motivational and pay incentives to spur individual efforts (Bobbe and Schaffer, 1983). These approaches have produced some gains, but even expanded they are no longer enough to produce the kinds of results needed to meet the unprecedented productivity challenges of the eighties. The challenges are emerging as the transition to a predominately service and information based economy requires new management practices that recognize the special needs of providing value added services (Tuttle and Romanowski, 1985). Many companies try to meet the challenge

of productivity improvement by means of capital investments in more efficient technology and equipment while others concentrate on training, incentives or quality circles. All the individual management actions, investments and programs will not in themselves yield much productivity improvement. Significant improvement requires management to expand its capacity to get more from both the new investments and from the ones in place (Bobbe & Schaffer, 1983). The way management expands its capacity is through high performance. High performance is the product of the highest order of managerial actions which assure the full exploitations of resources and investments. Therefore, the key to increase productivity in the new service economy of the 1980's is through an expanded performance management system. Sink (1986), views this concept as a challenge and states increased proactivity on the part of managers through improved measurement and evaluation systems will improve the link between productivity management and high performance.

In this chapter a discussion of the literature relating to performance is presented along with the components of a performance model. The model will be separated into seven criteria and the definitions, parameters and measures for each are examined. The results of existing organizational performance studies are also presented.

#### The Criteria of Organizational Performance

Before performance can be evaluated and improved it is essential that the correct criteria and measures be identified which accurately reflect the activities of the organization. If this step is not taken important facets of performance are unmeasured while relatively unimportant facets are tracked and monitored because they are easy to

measure. This process will lead to resource allocation flowing from unmeasured to measured areas. Such actions can distort performance, misallocate resources, and reduce rather than enhance productivity (Tuttle and Sink, 1985). Another reason to identify the correct measures is to make sure a complete set of performance indicators is developed. An incomplete set will result in incomplete analysis, whereas a complete set will provide the manager and the organization a group of system parameters to monitor, diagnose and improve performance (Mallack, 1985). Sink (1985) and Richardson and Gordon (1980), are in agreement on a set of measures as they believe there is not one single measure that can successfully perform the function of performance analysis as well as a set can.

To help establish a set of system parameters Sink (1983) lists seven criteria for performance: innovation, quality of work life (QWL), effectiveness, efficiency, quality, productivity and profitability. These seven criteria agree with those proposed by Peter Drucker in The Practice of Management (1954) and those found in In Search of Excellence (1982), by Peters and Waterman. Figure 1 illustrates the relationship among the proposed criteria by the three authors.

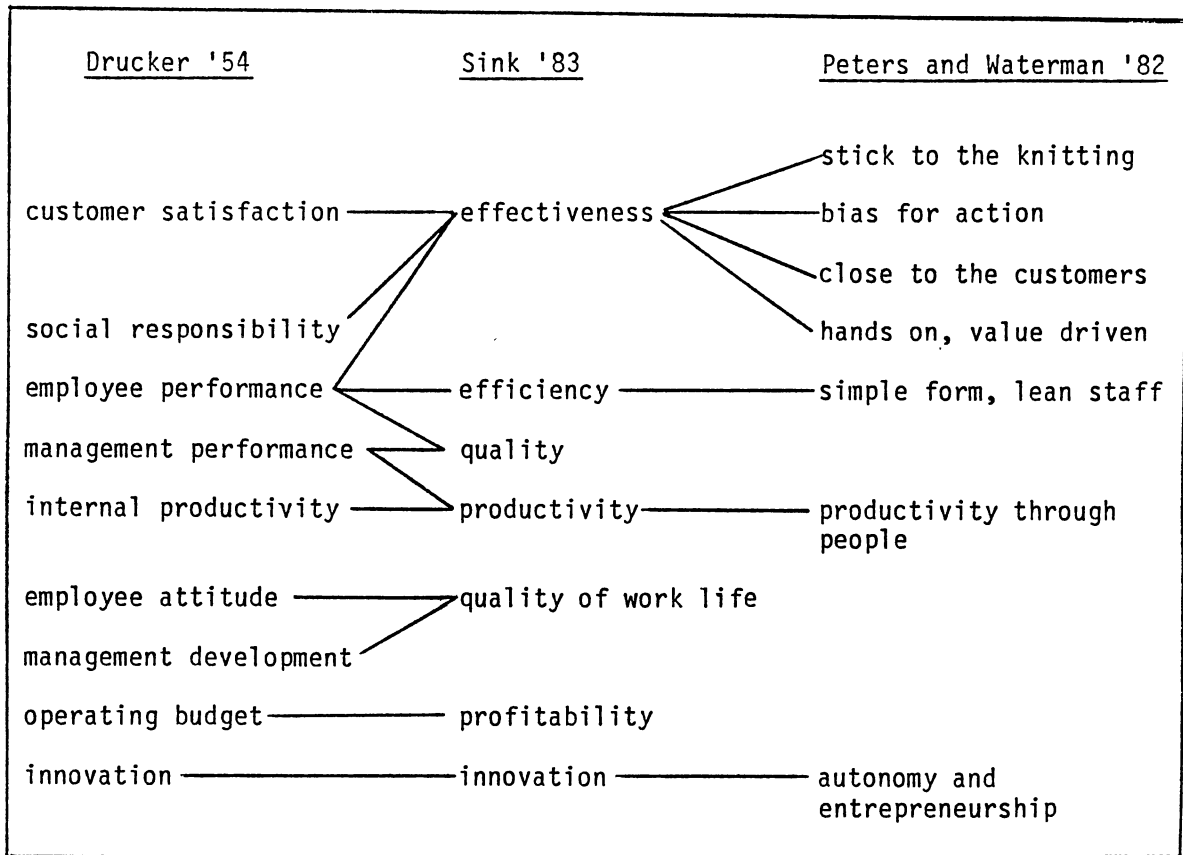


Figure 1. Relationship between three conceptualizations of organizational systems performance criteria from Productivity Management: Planning, Measurement and Evaluation, Control and Improvement, (p. 251) by D. Scott Sink, 1985, New York: John Wiley & Sons. Copyright 1985 by John Wiley & Sons, Inc. Reprinted by Permission

The criteria are interrelated and hard to separate. In fact measuring and evaluating only one criterion such as profitability, does not provide a realistic nor wholistic picture of organization performance. A complete set of performance measures which include components from all seven criteria accurately reflects the activities of the organization. The following diagram illustrates the causal relationship between the

seven criteria and how vital each one is when measuring overall performance in an organization.

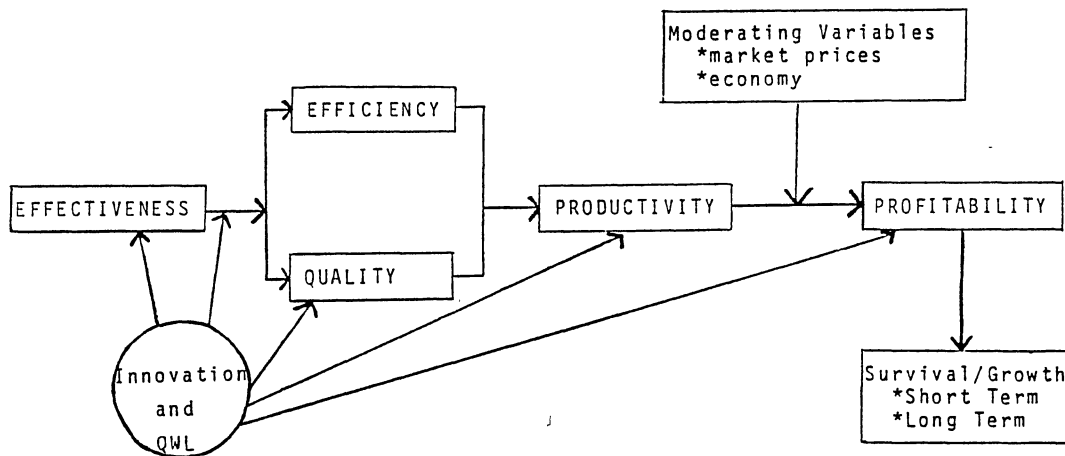


Figure 2. Causal relationship between the seven basic performance criteria. "Performance and Productivity the Art of Creative Score-boards" by D. S. Sink, 1986, Productivity Management, 5, p. 4. Copyright 1986 by Virginia Polytechnic Institute and State University. Reprinted by permission.

Although the seven criteria are synergistic, and the system is evaluated as a whole, each criterion is measured separately to accurately determine the performance levels in each area of the organization. Separate measures are necessary for three important reasons: first, to determine where a business stands in relation to its standards and establish a baseline to measure progress; second, to identify specific problem areas; and third, to justify improvement actions (Fitz-enz 1980).

The importance of measurement to the management process is also exemplified when viewed in the context of the performance/productivity management process. Productivity is one of the hot "buzz words" of the 1980's as few people agree on its definition, yet everyone is certain of one thing -- the more productivity the better. Productivity is a complex concept, as it is one of the performance criteria which act together to increase the value of output faster than the cost of input. Productivity management in organizations involves measurement, evaluation, control and improvement as critical components of the process. Figure 3 depicts the concept of the process. Background concepts for the model are also presented in Figure 4.

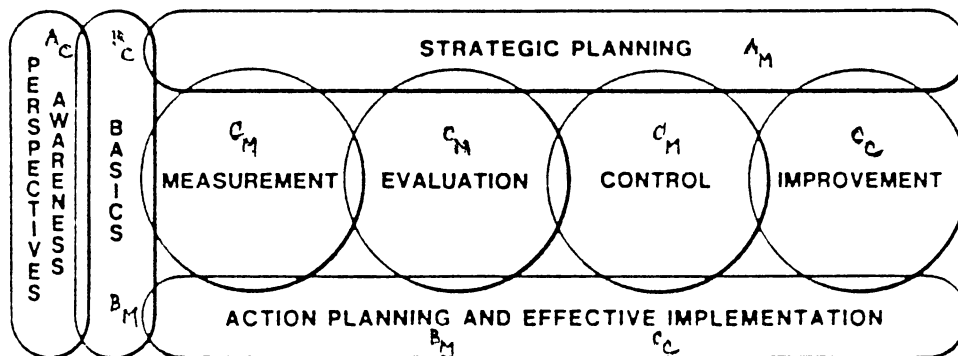


Figure 3. The performance/productivity management process. "Performance and Productivity the Arts of Creative Scoreboards" by D. S. Sink, 1986, Productivity Management, 5, p. 5. Copyright 1986 by Virginia Polytechnic Institute and State University. Reprinted by permission.

According to Sink (1986), the model represents the following:

(1) Reduced to their simplest forms, there exists an ABC's to management and to change (see Figure 4).

(2) Performance and productivity management requires consistent execution of the ABC's of management

(3) We have to move from a mentality that suggests "if it is not broken, do not fix it" to a state of mind that assumes there is always a better way.

The fundamental components of the ABC's of management and change are overlapped on the performance/productivity management process model to show how the two integrate together. Figure 4 defines each component of the ABC's of management and change.

<u>ABC's of Management (M)</u>		<u>(ABC's of Change(C))</u>	
$A_M$	G.O.A.L.S. -- establish clarity and consensus for individual, group and organizational goals and objectives (effectiveness)	$A_C$	Awareness -- establish an awareness of need to change and improve
$B_M$	PATH -- Individuals, groups, and organizations progressing toward goals (efficiency and quality)	$B_C$	Willingness and Ability - ensure there is commitment, willingness and skills to change, know what is change and how
$C_M$	Assessment Criteria -- measure	$C_C$	Pay the price -- execute, hold accountable, effective implementation

Figure 4. Simplest Forms, ABC's of Management and Change and their Interrelationships. "Performance and Productivity the Art of Creative Scoreboards" by D. S. Sink, 1986, Production Management, 5, p. 5. Copyright 1986 by Virginia Polytechnic Institute and State University. Reprinted by permission.



Productivity cycle models that include all four phases were developed for manufacturing companies by the National Science Foundation in January 1983. A similar model for use in the foodservice industry does not exist. The lack of a model has caused many foodservice establishments to suffer financial loss due to inadequate determination of optimum productivity requirements and acceptable levels of performance (Freshwater and Bragg, 1975). This is detrimental to the foodservice industry where there has not been a trend toward productivity increase since 1955 (Zobler and Donaldson, 1970). The problem has two sources: first, most foodservice operators do not understand what a standard productivity measure is and how it can be used, which leads to misinterpreting levels of poor and superior performance; and secondly, the majority of foodservice operators use labor cost ratios (labor cost dollars divided by sales dollars) as a productivity measure. Hence, most foodservice managers are unable to accurately measure productivity due to their lack of understanding of it and the other criteria components of performance (Freshwater and Bragg, 1975). The foodservice industry in general and health care systems specifically, continue to face increases in quality demands as well as rising labor and food costs. In an environment with decreasing productivity rates, the profitability and ultimately the survival of these foodservice operations is slim. A productivity and performance measurement model would help solve this problem by providing information for the effective and efficient use of resources necessary for an optimum balance between input costs and output value. Lord Kelvin (1979, p.2) described the solution best by stating, "When you can measure what you are speaking about and express it in numbers, you know something about it, but when you cannot

express it in numbers, your knowledge is of meager and unsatisfactory kind". Productivity along with the other performance criteria measures are thus the quintessence of organizational success.

The seven organizational performance criteria are the framework by which to categorize and develop control measures. To help clarify the ambiguity that surrounds the criteria and discuss the relationship to performance measurement a brief discussion of each criterion is presented.

### Innovation

Innovation is defined by Sink (1985) as applied creativity. Sink views innovation as the process by which people develop new, better and more functional products and services. According to Szilazyi (1981) innovation refers to the efforts in the basic sciences to develop new technologies, processes, methods and products. Zaltman and Lin (1971) define it as any idea, practice, or material artifact perceived to be new by the adopting organization. Lawrence and Lorsch (1967) feel that the actual theme in innovation is change and newness in ideas, methods or products. A global perception of innovation that encompasses the preceding thoughts is Morton's (1971) view in which innovation is thought of as the renewal or improvement of new capacities of people and the organization in which they are employed. All these ideas of innovation have an undermining thread of change incorporated into them. However, change and innovation are not synonymous, as change is not always beneficial or goal-directed. Innovation differs from change in that innovation is a deliberate, novel, specific change aimed at accomplishing the goals of the system more effectively (Mueller, 1971).

Innovation begins with two tangible assets: people and cash, and is linked with two intangible assets: management and ideas. Steele (1975) believes that a successful innovation process combines these four assets in a way that will produce marketable products, processes and services. The key to innovation according to Eaton (1982) relates to management's role in understanding the innovation ethic and making a commitment toward innovation. Moreover, Drucker (1985) feels that managers need to be informed that innovation does not happen by a "blinding flash" but through the careful implementation of a systematic management discipline. Innovation then, does not just happen; it needs to be supported and managed to flourish (Baron, et al., 1976).

Four characteristics were identified by Bellas and Olsen (1978) as the basis of a systematic management approach to innovation: a managerial commitment to innovation; a means of directing research to achieve organizational goals; a system for testing alternatives and making decisions and a means of implementation, including an organizational climate conducive to change. The most important aspect in this system approach is creating the innovative climate within the organization. According to Ahlbrant and Blair (1986) a corporate culture that encourages people to say "yes" to change will spawn advancements, while one in which "no" is the normal response will stagnate. Organizational conditions that foster a "yes" change type of climate and lead to effective implementation of innovative methods or products are the following:

- 1) Decentralization of authority-responsibility at crucial stages of the implementation process.

2) Involvement and active participation in the process by operating managers.

3) Emulation within a portion of a large organization of the climate and modes of operation of a small entrepreneurally-orientated company.

4) Willingness to "satisfice" with regard to technological choices rather than striving for a technological idea.

5) Willingness to expand evaluation criteria beyond conventional "ROI-type" approaches, to include longer-term strategic considerations.

6) Identification and rewarding of "product champions"-managers deeply committed to the innovation concept, who can carry the project through from the initial stages to commercialization (Ahlbrant & Blair, 1986).

An organization that does not innovate in product, service, and process will likely not be able to compete favorably over the long haul (Sink, 1985). This is reasonable to expect as innovation is strongly associated to profitability. Innovative ideas affect profitability as they identify procedures and processes to better maximize resources, to increase quantity of output, to enhance quality of output and to increase quality of work life through job re-design. Overall, profitability will be either increased or maintained due to the responsiveness of new ideas or innovative solutions which increase productivity. Therefore, innovation is required for an organization to keep up with a constantly changing market and environment, and to maintain profits if it seeks future stability and success.

## Quality of Work Life

Bowditch and Buono (1982) identify one of the burdens placed on managers today is turning their thought process not only toward understanding the technical aspects of work and the work place, but to discern and confront the social perceptions, aspirations, and expectations of the work force as well. The afore mentioned factors influence the way a worker perceives his job. Hackman and Oldmand (1980) believe one of the major influences on organizational productivity is the quality of the relationship between people who do the work and the jobs they perform. The positive fit between people and their jobs so that productive work is a rewarding experience correlates to high quality of work life (QWL). Quality of work life (QWL) can be thought of as both a goal for an organization and also an ongoing process for achieving that goal. In the sense of a goal, QWL is the commitment of the organization to improving work by creating more involved, satisfying, and effective jobs and work environments for all employees. In the process sense, QWL requires efforts to realize this goal from the active involvement of the employees (Burke, 1982).

Lippitt (1978) defines QWL as the degree to which work provides an opportunity for an individual to meet a variety of personal needs -- to survive with security to interact with others, to feel useful, to be recognized for achievement and to have an opportunity to improve one's skills and knowledge. Lawler and Mirvis (1981) view QWL as characteristics of the organization, the work place and the work which influence an employees' satisfaction, well-being and behavior both at and off the job. From these definitions it can be concluded that QWL includes climate establishment, motivation theories, some type of reward

system, and some type of participation with management such as job redesign or quality circles to enhance knowledge and skill. When these aspects are assessed and means determined in which they will produce a favorable behavioral response from the worker, a high quality of work life exists. In this context behavior problems which could have been inhibiting performance will be eliminated. The main objective of QWL is to provide an environment in which performance is not inhibited.

According to Terry and Dar-El (1980), QWL represents the tendency of an individual worker to act in a certain way when confronted with a given set of stimuli from his work environment. If a worker experiences negative stimuli from his environment he most likely will respond with withdrawal and avoidance behavior. In quantifiable terms, this negative behavior can be measured and monitored as absenteeism. Numerous and diverse definitions for absenteeism exist in the literature, however the United States Bureau of Labor Statistics has the most comprehensive definition. The bureau defines absenteeism as,

The failure of workers to appear on the job when scheduled to work which is applicable to time lost because sickness or accident prevents a worker from being on the job, as well as unauthorized time away from the job for personal and civic reasons. Workers who quit without notice are also counted as absentees until they are officially removed from the payroll. (Gaudet, 1963)

While this definition is comprehensive, it does not specifically detail "unauthorized absenteeism". Goodman and Atkins (1984), define absence as the allocation of time across non-work activities when a worker is expected to be working. They view absence from work as an inability, an inappropriateness or an unwillingness to work. In this respect absence events are seen as a sub-class of the events that

constitute the behavior of workers. The major influence on the behavior of workers is motivation to work and also work attitudes. Brayfield and Crockett (1955) and Herzberg et al (1959) both found evidence of a strong relationship between employee dissatisfaction and withdrawal behavior. Hence, motivation or lack thereof and negative work attitudes are reflected through withdrawal behavior expressed as absence that is casual, in which the worker calls in and feigns sickness or the absence that is incurred when the worker is physically present, but not mentally. These types of absences are regarded as "unauthorized absenteeism".

Causes of unscheduled casual absences might include dissatisfaction with the job, compulsory overtime, rigid workschedules, unavailability of small amounts of personal leave for emergencies, or inadequate provision for vacation leave (Mann & Baumgartel, 1952). Causes identified that are assembly line specific include mandatory overtime, poor working conditions, boredom with the job and even the increasing complexity of life (Hedges, 1973). The United States Department of Labor identifies the following factors that lead to employee withdrawal and thus influence absenteeism from a demotivational standpoint; inadequate selecting and assignment methods, inadequate information about job and worker requirements, unsatisfactory working conditions, lack of opportunity for advancement, inadequate or poor supervision, unsound wage classifications, lack of training programs, ineffective grievance procedures, lack of facilities and services and discrimination (U.S. Department of Employment Service, 1972).

The burden of "unauthorized absenteeism" is borne to a greater or less extent by three not necessarily different groups; customers

(industry and economy), the company and employees with good attendance records (Dietsch & Dilts, 1981). Customers share the cost of higher prices due to higher labor costs associated with absenteeism. The economy bears the burden through higher prices and loss to potential gross national product. The company costs are numerous, a few examples are, fringe benefits for absent workers, padded payrolls to provide for "no shows", overtime pay, reduced output, decreased quality, defective products, increased maintenance and production scheduling costs, and plant inefficiency. Employees with good attendance records bear the chronic absentee since they must carry the absentee by subsidizing their poor work habits in addition to covering their scheduled work hours. This can lead to excessive stress, fatigue and decreased moral. Overall, these cost of absenteeism are tremendous and affect virtually everyone involved in the business arena. The best way to minimize these costs is to provide the positive, challenging work environment that the employee will fit into and thus perceive his job with having a high quality of work life.

An indepth discussion of innovation and and QWL is presented as these two criteria are the most important for the successful performance of an operation. When viewing Sinks (1986) conception of the causal relationship between the seven basic performance criteria (see Figure 2), one can see that innovation and QWL are the key components to the performance process as they are the base from which the other criteria flow. If an organization has the innovative culture and a high QWL climate then the rest of the performance criteria should fall into place and guarantee the success in terms of short-term and long-term survival and growth of the organization.



## Effectiveness

Peters (1986) refers to effectiveness as the "quality of management" that requires leadership and focus on doing the right things. Leadership for effectiveness involves assessment, building, and follow up (Toto, 1986). Assessment involves determining where the organization stands and where it wants to go and identifying clear strategic operational goals. Building encompasses the structures, systems and styles that are developed to implement the goals. Follow-up involves monitoring the new structures to measure and consolidate improvements. The concept of effectiveness then is strategic planning, and the real focus is on using all employees to their fullest extent to achieve the companies goals. This scope of effectiveness involves applying the organizations people, systems, investment and the managers themselves to actions that will improve performance and remove barriers to performance. Thus, effectiveness relates both to quality of work; what standards and goals should we be working toward, and quality of work life; does the environment encourage people to work (Peters, 1986). Effective quality changes may be attributed to adjustments in plant lay-out, in production planning and control, in inventory management, in materials handling and in other sections of production management (Gold, 1983). Effective QWL changes may be attributed to team concepts through organizational development (OD) quality circles (QC). Organizational development focuses attention on techniques for enhancing group efforts, personal growth and group leadership, but it does not provide problem solving skills for addressing productivity. However, quality circles must be guided and founded on the needs of the individual workers and not guided only by management as a method to

increase productivity (Gmelch & Miskin, 1986). Effective problem solving approaches use the techniques of both OD and QC to emphasize the importance of people and products to move toward fully collaborative group processes which direct resources toward significant improved productivity.

According to Toto (1986) there are eight crucial elements for organizational effectiveness:

- 1) Purpose and direction
- 2) Performance standards
- 3) Reward and recognition
- 4) Participation and teamwork
- 5) Coordination and cooperation
- 6) Formal support systems
- 7) Human resource development
- 8) Relationship to the external environment

The scope of these elements emphasize that organizational effectiveness is not a set of isolated activities, rather it is ongoing process - a loop that moves from planning for certain ends, to building activities to reach those ends, to seeing how well you did in your effects and back to planning again. In light of this process, Clifford and Cavanagh (1986) believe organizations that perform effectively are those that continually move to correct strategic and organizational problems quickly and creatively.

## Efficiency

Efficiency is defined as resources expected to be consumed divided by actual resources consumed. It is also defined as the relationship between achievement of objectives and consumption of resources (Smalley & Freeman, 1966). Another definition supplied by Johnson (1981) is, progress toward organizational objectives at the least possible cost. From the various definitions a generalization can be made. If an organization is efficient, the result is an overall reduction in unit cost of output. A relationship to profitability exists since the lowering of the input for the same amount of output leads to increased profits. It should be pointed out however, that increased efficiency does not necessarily mean increased profits. An organization may be highly efficient, but if consumers do not buy its products the business will fail and no profits will be realized.

The idea of an organization being efficient and not profitable links in the idea of effectiveness. Efficiency and effectiveness are confusing concepts as many authors see efficiency as a criteria of effectiveness -- one of the organizations goals (Shaw, 1983). To keep the criteria of efficiency and effectiveness straight; efficiency is doing things right -- doing whatever leads to maximization of resources, while effectiveness is doing the right thing -- supplying the right goods to the right market. Drucker (1974) states that efficiency is a minimum condition for survival after effectiveness has been achieved.

## Quality

The approaches to quality are numerous and varied and this has led to a misunderstanding of quality. This is most detrimental to the

service industry where many people have heard cliches' about the meaning of quality so often that some have accepted these abbreviated expressions as complete truths without looking further into the purposes and implications of quality (Hayes, 1985). The primary goal of a service organization should be to tailor its services according to the needs of its customers (Shaw & Kapoor, 1979). In 1984, Wycoff suggested that the service companies look at quality as the degree of excellence desired, and also the control of variability in achieving that excellence. Midas (1981) views quality in two distinct categories. The first is production quality which is the level of production efficiency in meeting the specification, increased by eliminating waste, delays and poor workmanship. The second category is product quality which is the level of relevance, uniformity and dependability satisfactory to the customer, increased by better design specifications. Midas's views on quality are encompassed by the following definitions gathered by Hayes (1985):

the degree of conformance of an item to governing criteria, a composite of characteristics that satisfy an expectation

the highest level of excellence with which one would deliver a product and still be competitive.

efficient production of the quality the market expects

conformance to requirements

the ability to satisfy the customer

possession of some measure of value defined in terms of its performance, its appearance, and its unique ability to satisfy a specific requirement

innate excellence

highest value to the customer

While these definitions are adequate for industrial and service cultures a specific quality definition for food is needed for a complete quality concept in a hospital foodservice system. The American Dietetic Association (ADA Journal, 1974, p. 665) defined food quality as that

which has been selected, prepared, and served in such a manner as to retain or enhance natural flavor and identity; to conserve nutrients; and to be acceptable, attractive, and microbiologically and chemically safe.

To uphold the aspects of this definition a quality control system is essential. On the national level quality is dictated to a certain extent by the Joint Commission on Accreditation of Hospitals. Foodservice departments in hospitals must meet quality standards established by this commission in order to stay in operation. Additional regulations may exist at the state and local levels. One example is the Commission for Administrative Services in Hospitals (CASH) in Los Angeles who have developed their own quality control systems. Some of the objectives of the cash plan are: to provide quality indexes which are part of the ongoing management control process, to provide feedback to allow for correction of problems, and to provide quality assurance upon implementation of systems and workload revisions (Edgecumbe, 1966). Some hospitals may develop their own quality control programs based on the Foodservice Manual for health Care Institutions (Maheffey, et al., 1981). Objectives of quality control plans in this manual are: to control quality of food based on sensory, nutritional, and microbiological criteria, to have planned menus, to have detailed specifications for all items received and their storage

conditions, have an accurate forecasting system, have standardized recipes, ingredient control, proper equipment maintenance and production scheduling to avoid excessive holding of food. Regardless of the origin or type of quality control plan the purpose is the same and that is to develop a method to guarantee that the end products of services are being produced or carried out correctly.

### Productivity

Mali (1978) defines productivity as the measure of how well resources are brought together in organizations and used for accomplishing a desired set of results. Productivity is reaching the highest level of performance with the least expenditure of resources. It can also be thought of as how much output is produced compared to how much input is required for production, where making more for less is the objective (Boss & Shuster, 1981). The most simplistic definition of productivity is output/input.

According to Mali (1978) productivity measurement should be quantified for evaluative purposes. The organization should chose to select its form of evaluation with the aim of assessing the amount of productivity change over time. There are three types of evaluative measures: a ratio which compares outputs to inputs, an index which is a ratio divided by itself from other time period, and surrogate measures which are actually other indicators of organizational performance. Total or partial measures of either a ratio or index may be calculated either statistically or dynamically depending on the unit of analysis (Sink, 1980). Total factor productivity is an entire unit of analysis by which all the outputs are related to all the inputs. By measuring

total factor productivity the overall production of the unit is identified. However, Militzer (1980) has found that macro productivity measures have not proven very useful in achieving improvements in productivity growth because specific unproductive areas go unnoticed as other productive areas create an umbrella effect and hide these areas. Therefore, it is difficult to identify the areas that need improvement. On the other hand, partial productivity measures identify exactly where improvements are possible due to the nature of their components. A partial productivity measure is a output/input ratio in which a single specific output is compared to the specific inputs which were needed or used to create the outputs.

Productivity will improve as a result of management intervening on key transformations or work processes which have been identified through measures as areas where improvements are possible. McTague (1986) reports that Hepner-Tregoe conducted an extensive survey to discover the causes of declining productivity and to identify how this trend could be reversed. The conclusion of the survey was that approximately 85 percent of the variables affecting productivity are internal to the organization and four-fifths of these internal variables can be changed by executive and managerial actions. Hence the importance of productivity measurement is emphasized as it will point to the direction of productivity improvement areas and enable managers to intervene in these areas or manipulate the internal variables to raise productivity levels.

## Profitability

Peter Dukas in Planning Profits in the Food and Lodging Industry states that as the industry continues its 2.5 billion dollar growth annually, (currently in 1986, the figure is over 4 billion dollars) the need for professional understanding and use of quantitative and qualitative data is vital. No foodservice operation large or small, can rely on trial and error methods to survive, much less to prosper (Dukas, 1976). This is where profitability and its measurement key into the survival and growth of an organization.

Many definitions of profitability can be found in the literature. Most of the definitions are based on authors' different approaches to profitability either from a monetary view or from its relationship to productivity. The simplest and most standard definition of profitability is the difference between revenue and expense (Anthony & Herzlinger, 1980). Rausch extrapolates this idea postulating a direct relationship between profitability and earnings. His operational definitions of profitability include; the return on owner's investment (owners equity) or the return earned on all things the business own's (business assets) (Rausch, 1982). These definitions view profitability from a monetary standpoint, while the following definition proposed by Miller views profitability in relation to productivity. He delineates profitability as equaling productivity + price recovery, where price recovery represents the net effect on profits of changes in sales prices and inputs prices, that is its represents inflation (Miller, 1984). This definition identifies the period to period change of profit caused either by price actions or by relative volumes of output quantities versus input quantities (productivity). In terms of measuring the



effect of productivity on profitability, the equation Miller uses is probably the best in determining a direct relationship between the two criteria.

Certain external and internal factors are known to affect the profitability of an organization. Internal factors are; production costs, with innovation and unionization relating directly through a decrease and increase in costs respectively; equipment costs, in which utilization to capacity relates positively to costs; fixed costs, in which low overhead and capital maintenance relate positively; and management, in which style, motivational techniques and climate relate. Of the internal factors organizational climate has the most profound effect on profitability. Shaw and Capoor (1979) identify the following policies as important for management to create a profitable climate;

1. Organization of the operation around the objective of providing services to a distinct market segment
2. Implementation of a top-down management control system that defines and manages standards for quality and productivity.
3. Establishment of operational controls that are responsive to the management control system and linking with the organizational structure of the enterprise.

External factors that affect profitability in an organization are; inflation, market, price actions and competitiveness. The relationship of these factors to profitability can be visualized through application to the business cycle. Dudick (1972) provides the basis for the application. He starts in the cycle at the point where the economy is on the upswing recovery from a recession. At this point business

reaches capacity and profits increase because additional sales volume is obtained with minimum of additional cost. As profits increase businesses expand to handle increased sales which drains the labor pool which leads to higher wages and higher prices. Along with increased sales comes increased inventories accumulated at higher dollars to handle the demand. What follows is that consumers eventually purchase too much, and the demand slows while the consumer "catches-up" on their over expenditure. Inventories and fixed costs appear large because the sales they intended to support have evaporated. Prices are then reduced to dispose of excess inventories. Marginal producers are forced out, driving prices still lower. The lower prices in a non-buyers market a level in which output/input has remained constant significantly decreases profit, leaving a negative effect on profitability. In summary, Lines (1983) see high profitability being closely related to top management judgement and competence and affected to a lesser degree by the product and market chosen and the economic climate. To ensure profitability in an organization managers should implement the internal policies of Shaw and Capoor mentioned earlier.

#### Productivity and Performance Studies:

##### A Historical Perspective

The idea of productivity has been studied intermittently since the beginning of the century. An early study of labortime in relation to meals served was performed in 1929 by the Western Washington Dietetic Association (Washington Dietetic Association, 1934). Few studies were accomplished until the 1950's, when labor time as of major importance in the literature. In the 1960's, emphasis was on work measurement to

evaluate performance of individuals and set productivity time standards. Researchers concentrated on work sampling as it was the only measure thought to be useful for an overall view of the operation. Between 1956 and 1978, time study (Coffey, Spragg, McCunes and Gordon, 1964), time and motion (Mundel 1956; Smith, 1972), predetermined motion times (Brown 1969; Matthews, Waldvogel, Mahaffey and Zemel, 1978), and conceptual estimation (Brown, 1972; Lebeau, 1976) were other types of descriptive research used to measure work in the foodservice industry.

During the 1970's, productivity became even more important in the foodservice industry. Those in control of foodservice systems had to be able to define, measure and analyze productivity. This became a problem as most foodservice employers understood the need to improve productivity, but few had methods to measure it. The development of a meaningful productivity measurement system was important to compare periodic reports of productivity with predetermined goals (Stokes, 1981). Many foodservice managers misunderstood this concept and as a result poor determination of labor requirements and levels of performance caused financial collapse of a large number of foodservice businesses (Freshwater and Bragg, 1975). For a long time the industry tolerated low productivity and used price increases as a substitute in order to survive (Sink, 1981b).

The need to improve productivity in the foodservice industry encouraged the formation of work measurement ratios such as: labor hours/100 customers' and 'minutes/meal' (Blaker and Harris, 1982; Halter and Donaldson, 1957). Productivity in the 1980's is defined as 'output/input' (Sink, 1981). Many foodservice organizations, however, continue to use old work measurement ratios such as; 'labor hours/100

customers' or 'minutes/meal' (Blaker and Harris, 1952; Brown, 1972; Donaldson, 1957; Freshwater and Bragg, 1975; Maclean, 1975; Ostenso and Donaldson, 1966). To clarify 'output/input' all systems receive inputs in the form of labor, materials, energy, capital and data or information from some sources. These inputs are transformed, changed and value added to them to produce certain outputs. The outputs are then marketed or distributed (see Figure 5). According to the 1980 definition, a productivity ratio would be 'meals (output)/labor hour (input)'. Thus, to establish a standard productivity measurement system, implementation and use of the correctly defined ratios is necessary.

In the 1980's, three researchers examined 'output/input' ratios in health care delivery systems, and one examined them in school food-service systems. Kaud (1980) conducted a study in 10 hospitals to determine if the type of foodservice system influenced performance and productivity. One of the ratios he used as 'meals/paid hour'. His findings identified hospitals with centralized production, cook-chill assembly and microwave ovens obtain the highest productivity levels. He also concluded, however, that while the proper type of system is helpful to some degree, the major impact on productivity arises from good management practices. Kaud's conclusion agrees with Newburn's (1972, p. 656) finding that, "increased productivity results more from the efficiency with which labor is used than from the efficiency of the labor itself". Additional studies indicated that 35% of productivity loss was due to poor planning and scheduling, and that 25% was because of unclear or untimely instructions to employees (Industrial Engineering Newsfront, 1980). Kotschevar (1972) stated that the responsibility for productivity was not the workers. He suggested that management create

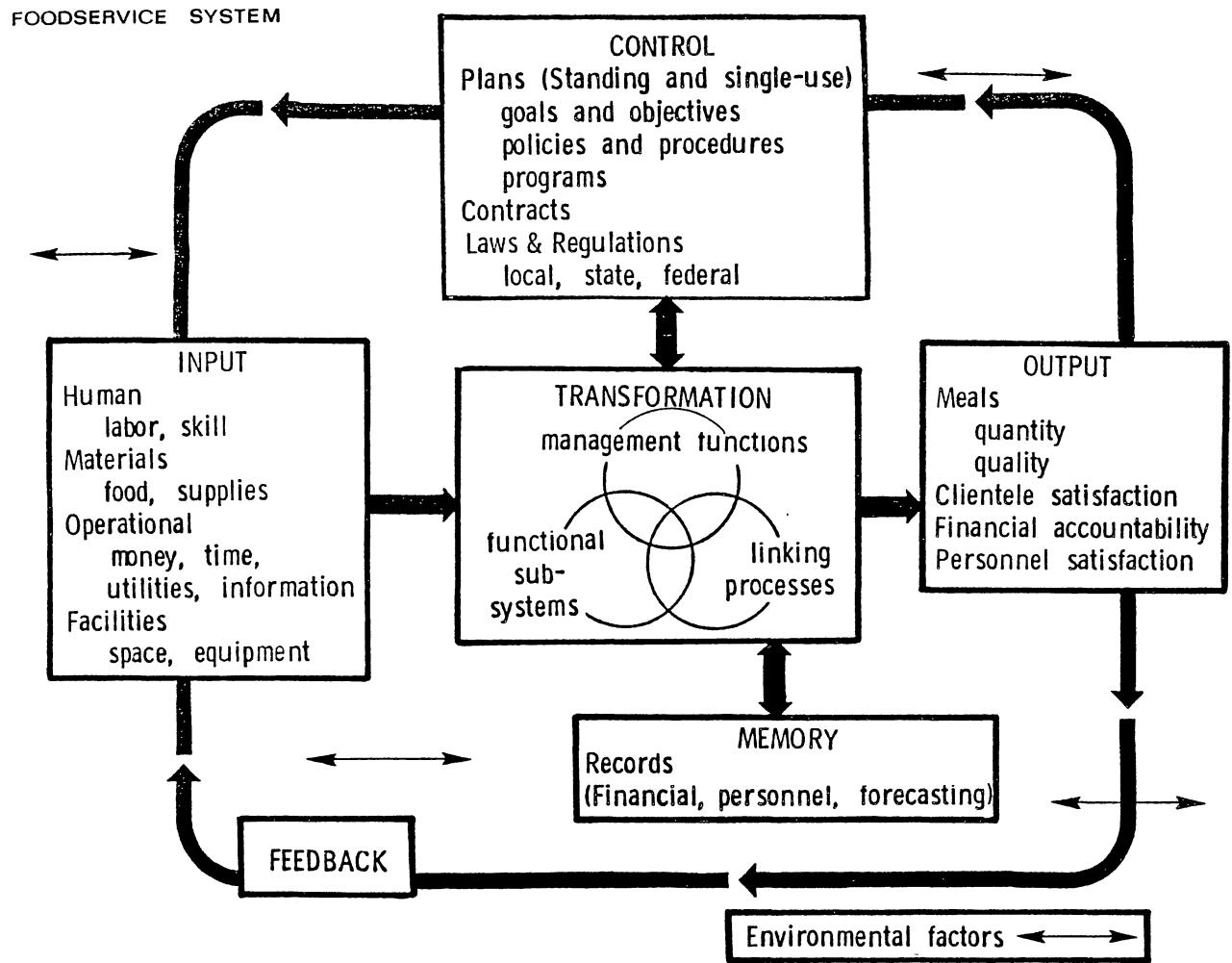


Figure 5. A Foodservice System Model.

the situation which would help workers increase their productivity rate. The findings and statements all indicate that even with use of the most productive system and application of correct productivity ratios to monitor the system, sound management practices are also essential if productivity is to rise.

Weisman (1980) conducted a study that included detailed analysis of cost and performance productivity in health care delivery systems. The following are correct productivity measures (output/input) he used to track "Dietary Employee Proficiency" of nine hospitals over a 12 month period.

$$\frac{\text{Patient meals}^1}{\text{Productive labor hour}}$$

$$\frac{\text{Patient meals}^2}{\text{Paid laor hour}}$$

$$\frac{\text{M.E.}^3}{\text{Productive labor hour}}$$

$$\frac{\text{M.E.}}{\text{Paid labor hour}}$$

$$\frac{\text{Transactions}^4}{\text{Paid labor hour}}$$

$$\frac{\text{Transactions}^5}{\text{Prod. F.T.E./month}}$$

$$\frac{\text{Production work hours}}{\text{Patient day}}$$

$$\frac{\text{Total units of service}^6}{\text{Production labor hour}}$$

<sup>1</sup>Productive labor hour -- identified the labor investment made for those employees on the job.

<sup>2</sup>Paid labor -- total of all incurred labor costs.

<sup>3</sup>M.E. -- meal equivalent value or meal equivalent sales (for non-patient cafeteria).

<sup>4</sup>Transactions -- count recorded on case register with the entry of the sale.

<sup>5</sup>F.T.E. -- full-time equivalent employees working a defined number of hours per month.

<sup>6</sup>Unit of service -- M.E.'s and patient trays.

Mayo (1981) conducted a study to identify variables that affect productivity in school foodservices and developed a model to analyze the designated variables. The following are ratios she used to track productivity in school foodservices. Note, however, that the last three ratios are not true productivity ratios as they are inversed ratios, with 'input/output'.

- |   |   |                  |
|---|---|------------------|
| 1. $\frac{\text{meals produced}}{\text{labor hour}}$    | 4. $\frac{\text{payroll costs}}{\text{meals produced}}$ |                  |
| 2. $\frac{\text{meals served}}{\text{labor hour}}$      | 5. $\frac{\text{payroll costs}}{\text{meals served}}$   | "inverse ratios" |
| 3. $\frac{\text{servings produced}}{\text{labor hour}}$ | 6. $\frac{\text{payroll cost}}{\text{serving}}$         |                  |

The 12 independent variables Mayo hypothesized to have an effect on productivity were the following:

1. Equipment capacity
2. Efficiency of facility layouts and design's
3. Number of menu items
4. Number of preparation steps of menu items
5. Level of employee skills
6. Level of managerial performance
7. Time constraints (include percentage of labor time needed to produce meals)
8. Rate of employee absenteeism
9. Total number of employees available to prepare meals
10. Education level achieved by employees
11. Education level achieved by managers
12. The use of plasticware versus disposable ware

The results of her study indicated that several ratio pairs were highly correlated which meant that either could be used to measure productivity. The following pairs revealed high correlations:

- 1)  $\frac{\text{meals produced}}{\text{labor hour}}$  and  $\frac{\text{servings produced}}{\text{labor hour}}$
- 2)  $\frac{\text{meals produced}}{\text{labor hour}}$  and  $\frac{\text{meals served}}{\text{labor hour}}$
- 3)  $\frac{\text{payroll costs}}{\text{meals served}}$  and  $\frac{\text{payroll cost}}{\text{serving}}$

The results of the hypothesized variables which would effect the productivity ratios were obtained through analysis of variance. The following information was received:

59% variances were accounted for in  $\frac{\text{servings produced}}{\text{labor hours}}$  by 9 significant variables.

51% variances were accounted for in  $\frac{\text{meals served}}{\text{labor hour}}$  by 8 significant variables.

50% variances were accounted for in  $\frac{\text{meals produced}}{\text{labor hour}}$  by 11 significant variables

50% variances were accounted for in  $\frac{\text{payroll costs}}{\text{meals served}}$  by 8 significant variables

48% variance were accounted for in  $\frac{\text{payroll costs}}{\text{meals served}}$  by 7 significant variables

42% variance were accounted for in  $\frac{\text{payroll costs}}{\text{meals produced}}$  by 8 significant variables

Mayo's research identified variables that affected productivity in school foodservice systems. The implication the study revealed to the industry is if the identified variables are monitored and controlled, productivity can increase. In addition, tracking the outcomes or



functions of the variables can be used as a management tool to actually predict productivity and forecast overall performance.

White (1984) conducted a study in Louisiana hospitals to identify operational factors that affected labor productivity. The three labor ratios and information relating to labor calculations that were used are listed below:

1.  $\frac{\text{Labor hours paid}}{\text{Paid patient day}}$
2.  $\frac{\text{Labor hours worked}}{\text{Patient day worked}}$
3.  $\frac{\text{Labor hours worked in patient foodservice}}{\text{Patient day (patient)}}$
4. Payroll records or time cards
5. Midnight census
6. Foodservice director's estimated patient productivity ratio

The 48 operational factors hypothesized to have an effect on labor productivity were placed in categories to form profile descriptions on; patient foodservice operations, foodservice facility, menu, personnel, foodservice materials, foodservice policies, nonpatient foodservice activities, and hospital facility. The descriptors were analyzed to identify the impact on labor productivity ratios. Results of the analysis are listed below according to the category in which each descriptor was placed.

#### Foodservice Operation Profile

- facilities using a conventional food preparation system had a significantly higher paid productivity ratio (#1) than those using semi-conventional systems.
- \*This indicated labor productivity as measured by the paid ratio was higher in facilities using more conventional food items.

- facilities with longer hours of operation had a significantly higher patient productivity ratio (#2) than those have shorter hours.

\*This meant labor productivity was higher in hospitals where the foodservice operates longer hours.

#### Foodservice Facility Profile

- a significant difference existed between mean ratios for all three labor productivity measures based on average length of time to deliver trays from production area to patient area.

\*This indicated that facilities with faster delivery times used more labor in performing the delivery function.

#### Menu Profile

- no significant differences.

#### Personnel Profile

- an inverse relationship existed between paid productivity ratio (#1) and the number of years of full-time experience for the administrative dietitian.

\*This indicated an increase in productivity as the number of full time years of experience increased.

#### Foodservice Materials Profile

- no significant difference.

#### Foodservice Policy Profile

- no significant differences.

#### Non-Patient Foodservice Activities Profile

- no significant differences

### Hospital Facility Profile

- an inverse relationship existed between patient productivity ratio (#3) and bed occupancy ratio

\*This indicated an increase in productivity as the bed occupancy rate increased. More efficient use of labor was obtained when occupancy was high.

Three conclusions were drawn from this study: 1) full time experience of the dietitian affects productivity; 2) the type of foodservice system used in the hospital impacts productivity; 3) and the occupancy rate of a hospital affects productivity. In addition, the concept of management experience having a significant impact on the types of controls used to monitor and improve productivity is similar to Kauds (1980) findings. Findings from both studies support the ideas of Bobbe and Schaffer (1983) who believed that the dimensions of productivity and performance improvement are the responsibility of managers. They believed managers are responsible to create the high performance culture and make performance improvement a routine aspect of everyday management as well as provide the leadership for performance improvement by implementing the disciplines and mechanisms essential to productivity and performance improvement.

#### Productivity and Performance Studies:

##### At Oklahoma State University

Numerous performance measurement systems have been reported in the literature by foodservice reseachers yet, use of the systems by foodservice operators has not been documented into standardized set of performance measures. Due to the lack of this information researchers

at Oklahoma State University began studies with the following purposes; 1) identify the value and use of ratios and measures foodservice operators believe are dimensions of their organizations performance; 2) assess the seven performance criteria (productivity, profitability, efficiency, effectiveness, quality, quality of work life and innovation) and their measurement in the foodservice industry so that standard measures may be devised; 3) and make recommendations for standard performance measures in foodservice units.

### Method

Researchers in the department of Food, Nutrition and Institution Administration realized that before performance could be evaluated and improved it was essential that correct performance measures be identified which would accurately reflect the activities of a foodservice operation. To accomplish this task Robertson (1982) conducted a study to identify partial factor productivity measures used by dietitians with management responsibility in health care delivery systems. The study had three objectives: 1) identify types of partial factor productivity measures used in hospital traylines; 2) identify measures perceived as useful for hospital traylines; 3) and identify the five most important measures for hospital traylines. The results were surprising regarding dietitians knowledge of productivity. Forty four percent of the respondents checked they were using productivity ratios although few wrote down a true productivity ratio. Out of a total of 740 ratio responses, 72 (9.7%) were standard partial factor productivity measures. In addition, many respondents listed output/input (a true productivity ratio) in categories other than productivity. Measures reported in this study

were in agreement with Sumanth's (1981) findings in which companies seem to think they have productivity measures when actually what they mean by 'productivity' is quite different from the formal meaning. This reflects that managements' understanding of productivity is unclear and as a consequence they label surrogate measures (which are actually other performance indicators) collectively as productivity measures. Mallack (1985, p. 21) states

if one were to ask any given group of managers what performance measures they use the response would be an unclear rattling of words associated to productivity, profit, minimum cost and quality. Then if one were to ask the same managers to explain the measures they use, how they use them and why, the response would be an even cloudier answer than before.

Robertson's study confirmed this same misconception among food-service managers. With that thought in mind, five follow-up studies to Robinson's 1980 research were conducted to see how the six other performance criteria (as well as productivity) would be identified and measured when productivity was specifically stated as 'output/input'. The researchers designed similar descriptive status survey questionnaires based on Sink's conceptualization of organization performance criteria (see Figure 2, p. 14).

### Subjects

The subjects surveyed for each study were from various areas of the industry, but all had some type of management responsibility within their foodservice operation. In Table I, a list is presented of the subjects sampled for each study as well as the sample size and response rate.

TABLE I  
ORGANIZATIONAL PERFORMANCE STUDIES AT  
OKLAHOMA STATE UNIVERSITY

Researcher	Area of Industry	Subjects	Sample Size	Useable Questionnaires	Response Rate
Shaw (1983)	Health Care	Dietitians	500	n = 109	21%
Lamb/Pickere1 (1984)	Delivery Systems Missouri Restaurants	Restaurant Managers	1900	n = 55	2.9%
Putz (1985)	College and Univ. Foodservice	Dietitians	242	n = 69	28.5%
Nazarieh (1986)	School Foodservice	Dietitians	593	n = 136	? 23%

### The Instrument

All four instruments (Lamb and Pickere1 used one questionnaire) were closed-questioned surveys that contained demographic questions and questions pertaining to the evaluation and control of organization performance. The performance criteria section of the surveys was divided into seven subsections, each dealing with a specific criteria. Two types of questions were used in this section. In the productivity subsection, a Likert scale was used in which respondents circled from 1 (always) to 5 (never), according to how often they used the control measures listed. In the remaining subsections the respondents checked "yes" or "no" or placed a mark in the blank beside the evaluation or control measure listed that they use in their facility. At the end of the survey, respondents ranked the criteria according to how much time they spent evaluating each and according to how important they felt the

evaluation of each criterion was to the successful operation of their foodservice facility.

### Date Analyses

Data obtained from the five studies were analyzed using the Statistical Analysis System (SAS) (Barr, 1976). Frequency distributions were used to show the occurrence of each method performance evaluation or control. Chi square analyses were used to study the relationship between selected demographic variables and the methods of evaluation and importance to the various types of foodservice operations. The means of each criterion in the ranking questions were determined in order to assign a percentage of total points to each criterion.

### Results

The demographic variables; age, education and experience, had a significant effect regarding which performance measures were used and the types of controls being used. Generally speaking, the amount of productivity training affected the tracking of all four resource areas of capital, labor, materials and energy. In addition, the amount of training also affected if the information obtained from the performance measures was incorporated into ratios and indexed for overall performance assessment.

Table II is a summary of the performance ratios and measures currently being used in the foodservice industry. The table is arranged with like elements across rather than down so comparisons among the four studies can easily be made for each criteria. The measures under each criteria are listed in descending order by importance and time spent

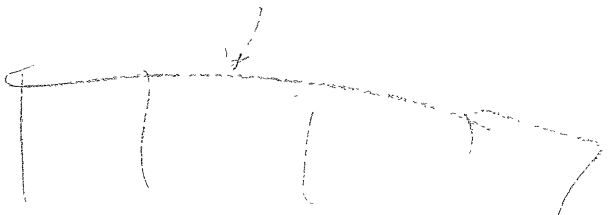


TABLE II

ORGANIZATIONAL PERFORMANCE RATIOS AND MEASURES  
CURRENTLY BEING USED IN THE  
FOODSERVICE INDUSTRY

CRITERIA	Shaw 1983 Dietitians with Mgt. Responsibility in Health Care Foodservice <i>109</i>	Pickere1 1984/Lamb 1984 Missouri Restaurant Managers <i>55</i>	Putz 1985 Dietitians with Mgt. Responsibility in College of University Foodservice <i>59</i>	Nazarieh 1986 Dietitians with Mgt. Responsibility in School Foodservice <i>136</i>
PRODUCTIVITY Ratios	<ul style="list-style-type: none"> <li>Meals/Total Food Cost</li> <li>Meals/Labor Hrs. Paid</li> <li>Meals/Labor Hrs. Worked</li> <li>Patient Days/Labor Hrs. Worked</li> <li>Meals/Man Min.</li> <li>FTE'S/Special Tasks (inverse ratio)</li> <li>Rations Served/Man Min.</li> </ul>	<ul style="list-style-type: none"> <li>Sales/Labor Hrs. Worked</li> <li>Meals/Labor Hrs. Worked</li> <li>Meals/Total Food Cost</li> <li>Customers/Labor Hr.</li> <li>Meals/Labor Hr. Paid</li> <li>Meals Served/Man Min.</li> <li>FTE'S/Special Tasks (inverse ratio)</li> </ul>	<ul style="list-style-type: none"> <li>Meals/Total Food Cost</li> <li>Meals/Labor Hrs. Worked</li> <li>Meals/Labor Hrs. Paid</li> <li>Customers/Labor Hr.</li> <li>Sales/Labor Hrs. Worked</li> <li>Sales/Labor Hrs. Paid</li> </ul>	<ul style="list-style-type: none"> <li>Meals/Labor Hrs. Worked <sup>3</sup></li> <li>Meals/Total Food Cost <sup>1</sup></li> <li>Meals/Labor Hrs. Paid <sup>2</sup></li> <li>Sales/Labor Hrs. Worked</li> <li>Customers/Labor Hr. <sup>4</sup></li> <li>Sales/Labor Hrs. Paid</li> </ul>
EFFICIENCY Resources Controlled	<ul style="list-style-type: none"> <li>Labor</li> <li>Materials</li> <li>Capital</li> <li>Energy</li> </ul>	<ul style="list-style-type: none"> <li>Labor</li> <li>Materials</li> <li>Capital</li> <li>Energy</li> <li>Forecasted Resource Use</li> <li>Resources Used</li> </ul>	<ul style="list-style-type: none"> <li>Materials</li> <li>Labor</li> <li>Capital</li> <li>Forecasted Resource</li> <li>Resources Used</li> <li>Energy</li> </ul>	<ul style="list-style-type: none"> <li>Labor</li> <li>Materials</li> <li>Capital</li> <li>Forecasted Resource Use</li> <li>Resources Used</li> <li>Energy Usage</li> </ul>
EFFECTIVENESS Performance Measures	<ul style="list-style-type: none"> <li>Set Goals</li> <li>Set Subgoals</li> <li>Personnel Stat. Reports</li> <li>Evaluation Meetings</li> </ul>	<ul style="list-style-type: none"> <li>Profit/Loss Statement</li> <li>Sales Volume</li> <li>Set Goals</li> <li>Sales Comparison</li> <li>Percent Profit</li> </ul>	<ul style="list-style-type: none"> <li>Set Goals</li> <li>Profit/Loss Statement</li> <li>Evaluation Meetings</li> <li>Actual vs. Forecasted Performance</li> </ul>	<ul style="list-style-type: none"> <li>Set Goals</li> <li>Profit/Loss Statement</li> <li>Sales Comparison</li> <li>Sales Volume</li> <li>Evaluation Meetings</li> </ul>



TABLE II (continued)

		Evaluation Meetings Actual vs. Forecasted Performance MBO for Mgt. Staff Set Subgoals Personnel Audit	Set Subgoals Admin. Evaluates Goal Attainment Percent Profit MBO for Mgt. Staff Sales Volume Sales Comparison	Actual vs. Forecasted Performance Admin. Evaluated Goal Attainment Percent Profit Set Subgoals Personnel Audit
INNOVATION Performance Measures	Brainstorming Sessions Quality Circles/ Participative Mgt. Incentive Systems Computer Application New Meal Delivery Service New Kitchen/ New Services	New Recipes/Menus New Equipment Employee Participation New Cleaning Agents Brainstorming Sessions Employee Training Sessions Active Suggestion System Computer Application New Benefits Plan Watt Miser Light Bulbs Restaurant Assoc. Meetings/Seminars	New Recipes/Menus New Equipment Employee Training Seminars Computer Application Brainstorming Sessions New Cleaning Agents Active Suggestionq System New Kitchen/New Services New Benefits Plan Quality Circles/ Participative Mgt.	New Recipes/Menus New Equipment Employee Participation Employee Training Seminars Computer Application New Cleaning Agents Brainstorming Sessions New Kitchen/New Services Active Suggestion System New Benefits Plan Quality Circles/ Participative Mgt.
QUALITY Performance Measures	Periodic Survey of customers and parts concerning food and service quality Tray Audits Sanitation Inspec. Checks of Food Delivery Time Temperature Check of Food on Wards	Quality Standards specific to operation Quality Standards Discussed with Employees Use of Fresh Foods Taste Testing/Can Cutting Detailed Employee Instructions Purchasing Specs.	Temperature Checks Menus/Charts/Prod. Schedules Periodic Survey of Customers as to Quality of Food- Service Taste Testing/Can Cutting Purchasing Specs. Sanitation Inspec.	Purchasing Specifications Taste Testing/Can Cutting Menus/Charts/Production Schedules Use of Fresh Foods Sanitation Inspections Temperature Checks Periodic Survey of Customers as a Quality of Foodservice Mger. Inspects Food Delivery Detailed Employee Instruction

TABLE II (continued)

	Mger. Tastes all Food Standards Developed by Mgt. Team Sanitation Inspec. Mger. Inspects Food Deliveries Temperature Checks Written Service Quality Standards Menu/Charts/Prod. Schedules Written Food Quality Standards	Use of Fresh Foods Detailed Employee Instructions Written Food Quality Standards Written Service Quality Standards Mger. Tastes all Food Mger. Inspects Food Deliveries	Mger. Tastes all Food Written Food Quality Stds. Written Service Quality Stds.	
QUALITY OF WORK LIFE Performance	Verbal Recognition Raises Based on Performance Appraisal Suggestion System Commendation Letters Non-monetary Performance Awards Merit Pay Quality Circles Monetary Performance Awards Incentive System	Employee Participation Through Suggestions Verbal Recognition Link Performance to Reward Provision of Supplies, Materials, Assistance Monitor Turnover, Absenteeism, Tardiness Promotion Opportunities Scheduling Preferences Time & Pay Bonuses Merit Pay for Mgt. Staff Measure QWL Job Redesign Enrichment, Task Identification Suggestion System Non-monetary Performance Awards Plaques & Certificates	Verbal Recognition Employee Participation by Suggestion Monitor Turnover, Absenteeism, Tardiness Provision of Supplies Materials Assistance Promotion Opportunities Raises Based on Performance Appraisal Plaques & Certificates Recognition-Newsletter Merit Pay for Mgt. Staff Job Redesign, Enrichment, Task Identification Commendation Letters Non-monetary Performance Awards Scheduling Preferences Job Satisfaction	Employee Participation by Suggestion Verbal Recognition Provision of Supplies, Materials and Assistance Monitor Turnover, Absenteeism, Tardiness Promotion Opportunities Commendation Letters Job Redesign, Enrichment, Task Identification Plaques & Certificates Quality Circles Recognition-Newsletter Non-monetary Performance Awards Raises Based on Performance Appraisals Scheduling Preferences Job Satisfaction Questionnaire Merit Pay for Mgt.

TABLE II (continued)

	Incentive Systems Quality Circles Commendation Letters Recognition-Newsletter Job Satisfaction Questionnaire	Questionnaire Monetary Performance Awards		
PROFITABILITY	Food Cost + Mark Up	Food Cost + Overhead +	Food Cost + Overhead +	Food Cost + Overhead +
Meal Price	Food Cost + Labor Cost	Labor + %Mark Up	Labor + %Mark Up	Labor + %Mark Up
Determinants	No Charge for Pt. meals, or no cafeteria meals	Food Cost + %Mark Up	Food Cost + Mark Up	State Regulated
	Food Cost x2 for labor + 10-15% for waste + Condiments	Cost of Meal + Popularity of item	Food Cost + Labor Cost	Food Cost + Labor Cost
	Hospital Subsidy; Food Cost + Supply Cost + Mark Up	Raw Food Cost + Labor + Traffic Analysis	State Regulated	Cost of Meal + Popularity of Item
	Raw Food Cost x3	Sales Mix	Volume Sold + Cost	Food Cost + %Mark Up
	Food Cost Only	Food Cost + Labor Cost		
	Finance Dept. Determines What Market Will Bear			
	State Regulated			
Exceeding the Budget Results In:	Investigation of Causes and Budget Adjustment Written Justification	Labor Control Inventory Control Sales Analysis Written Justification Volume Increases Price Increases Performance Audits Review of Funds Nothing in Particular Cut Off Funds Demerits	Investigation of Causes and Budget Adjustment Labor Control Inventory Control Portion Control Cut Costs Review of Funds Performance Audits Written Justification Price Increases	Labor Control Investigation of Causes and Budget Adjustment Inventory Control Cut Costs Price Increases Portion Controls Review of Funds Sales Increases Performance Audit

\*Measure and ratios are listed in descending order by importance and/or time spent evaluating each one

evaluating them. This reflects the priority each area of the industry places on the individual measures.

From Table III it can be seen that all areas of the industry ranked quality as number one, but beyond that the ranking differed. In the Putz (1985) study quality and productivity were both ranked the same in terms of time spent on evaluation and perceived importance while the other five criteria were ranked differently depending on time or importance. These results are different from those of Pickere1 (1984), and Lamb (1984) in which all the performance criteria were ranked the same both in evaluation time and perceived importance. Shaw (1983) found similar results in that 11 the performance criteria were ranked the same except for QWL and innovation. Productivity as mentioned, ranked second in the Putz (1985) study and likewise in Shaw's (1983) research, but the Pickere1 (1984) and Lamb (1984) study identified profitability as the second most important criteria with productivity ranked third. Both the Putz (1985) study and the Shaw (1983) study ranked efficiency and effectiveness third and fourth while the Pickere1 (1984) and Lamb (1984) studies ranked them fourth and fifth. In the Putz (1984) study, QWL received the least amount of attention and was ranked six out of seven in terms of perceived importance for a successful operation. This corresponded to the Lamb (1984) and Pickere1 (1984) studies which also placed it last while the Shaw (1983) study placed it fifth. Profitability was ranked last in determining the success of the operation in the Putz (1985) study. As mentioned, the Lamb (1984) and Pickere1 (1984) studies ranked it second. This is not surprising when one considers that the Putz (1985) study was conducted with college and university foodservices and Pickere1 (1984) and Lamb (1984) researched

TABLE III  
 PERFORMANCE CRITERIA RANKING FROM  
 OKLAHOMA STATE UNIVERSITY

Criteria	Shaw, 1983 Health Care Foodservice		Pickere1 1984/Lamb, 1984 Missouri Restaurants		Putz, 1985 College & University Foodservice	
	<u>Time</u>	<u>Importance</u>	<u>Time</u>	<u>Importance</u>	<u>Time</u>	<u>Importance</u>
Quality	1	1	1	1	1	1
Productivity	2	2	3	3	2	2
Efficiency	3	3	4	4	3	4
Effectiveness	4	4	5	5	4	3
Quality of Work Life	6	5	7	7	7	6
Innovation	5	6	6	6	5	5
Profitability	7	7	2	2	6	7

Time = Time Spent in evaluation  
 Importance = Importance to the operation  
 Nazarieh (1986) study not available

Missouri restaurants, while Shaw (1983) studied those in health care delivery systems. The differences exist as each area of the industry has different goals and more emphasis will be given to the most important goal for that particular system. The objective of the research at Oklahoma State University is to develop a standard performance measurement system, although the researchers realize that the system will have to be adjusted to meet the specific goals of each area of the industry. The important point, however, is that a complete system of performance measures might be developed for the industry and each area can then adjust it to their needs as necessary. This methodology will be more effective than the current practices where each area has only a few measures on which to gauge their entire performance.

#### Summary

Productivity and performance are not new concepts as both have been studied since the beginning of the century. Initially, labor was monitored and closely controlled as it was thought to be a key concept of the productivity puzzle in the labor intensive foodservice industry. Today, managers realize that productivity and performance go beyond the functioning of the labor as well as the design of physical facilities and lay-out, the types of food used and technical operation procedures. While these are important pieces of the productivity puzzle, additional aspects are also being considered such as the method of scheduling personnel, system of materials handling, work methods, standards of production and service, degree of training of personnel and general management procedures. All these aspects fit into seven basic performance criteria proposed by Sink (1985). Thus, the seven

performance criteria are the framework by which to categorize and develop control measures for a foodservice system.

To help clarify the confusion that surrounds the criteria, descriptive definitions are used. Effectiveness is doing the right things (Drucker, 1979) or the degree of achievement of objectives (Smalley and Freeman, 1966) while efficiency is doing things right (Drucker, 1974) or the ratio of resources expected to be consumed to resources actually consumed (Sink, 1985). Quality is defined on two levels: the degree of the systems conformance to requirements, specifications and expectations (Sink, 1985), or at the consumer level, fitness for use (Furan and Gryna, 1980). Innovation involves a deliberate, novel, specific change aimed at accomplishing the goals of the system more effectively (Mueller, 1971). Productivity is the relationship of quantities of outputs to quantities of inputs for the same time period (APC, 1979), while profitability is defined as the difference between revenue and expenses and also includes budgetability in which adherence to a planned budget is assessed (Sink, 1985). Quality of work life encompasses the degree to which work provides an opportunity for an individual to meet a variety of personal needs, to survive with security, to interact with others, to feel useful, to be recognized for achievement, and to have an opportunity to improve one's skill and knowledge (Lippitt, 1978).

Although numerous performance systems were reported in the literature, use by foodservice operators had not been documented into a standard set of performance measures. Research began at Oklahoma State University based on the seven performance criteria to identify measures being used in the industry. The goal of this study is to validate the identified measures from the previous OSU research and develop a

standard set of performance measures to be used throughout the foodservice industry.



## CHAPTER III

### METHOD

In 1983, Shaw examined productivity and the six other performance criteria in health care foodservice systems. Findings indicated hospital foodservice managers are controlling inputs and outputs in their departments, but standard ratios and measures are needed to assess the performance. To help establish standards, Lamb (1984) and Pickere1 (1984) examined the methods used by the restaurant industry to measure performance, while Putz (1985) examined the methods used by dietitians in college and university foodservices. In late 1985, Nazarieh replicated the Putz study in school foodservice systems. The purpose of this study is to synthesize ratios and measures identified as dimensions of performance from the five previous studies. Thirty two performance ratios and measures will be examined for their relevance and validity as performance indicators. The indicators which most accurately reflect performance will establish a base from which a model for measurement could be built. The research design, sample, data collection and data analysis will be included in this chapter. Due to the low response rate only descriptive analysis was performed on the data, however the planned statistical analysis will be mentioned in this chapter to assist future researchers.

## Research Design

Descriptive status survey was the most appropriate method of data collection to meet the objectives of this study. According to Joseph and Joseph (1979), descriptive research is that which systematically describes a situation, area of interest, series of events, opinions, attitudes, variables or sets of variables in a factual and accurate manner. In addition, the description in this type of research is based on data collection from a representative sample without bias. Therefore, a descriptive survey was chosen to reach a group of foodservice directors with diverse backgrounds who have management responsibilities in large hospitals.

## Population and Sample

The population was all foodservice directors in United States hospitals. The sample was all 561 foodservice directors in accredited United States hospitals with 500 or more beds as published in the 1984 edition of the American Hospital Association Guide to the Health Care Field (American Hospital Association, 1984). This group was chosen as they were predicted to most likely monitor the information needed for the research project, and the information probably would be easy to access through management information systems.

## Data Collection

### Preliminary Study

A pilot study on organizational performance measures was mailed to two Oklahoma hospitals in November 1985 (Appendix A). Oklahoma Memorial

hospital in Oklahoma City, Oklahoma was chosen as it represents a large institution with over 500 beds. McAlester Regional hospital in McAlester, Oklahoma, although representative of a small hospital with under 200 beds, was included as they are known to be using performance measures in assessing productivity of their foodservice. Content validity and clarity of the instrument were also reviewed by a panel of Oklahoma State University graduate faculty members from the Departments of Food Nutrition, and Institution Administration; Hotel and Restaurant Administration and Statistics. Results from the pilot study as well as the inputs from the panel were tabulated and a new instrument which incorporated the results and suggestions was developed.

#### The Instrument

The survey instrument was based on the indexes and measures identified as dimensions of productivity and organization performance from the five previous foodservice studies conducted at Oklahoma State University. The questionnaire was designed to obtain information about demographic data, performance indexes, and performance measures.

In the demographic section, selected personal and institutional variables were identified. Personal variables included the respondents age, education background, number of years in a managerial position, membership in professional organizations and amount of training received in productivity measures. General institution variables included type of hospital and foodservice control, type of medical service provided, hospital size and location, type of foodservice system, average yearly revenues and management training provided. These selected variables were used as the independent variables in the research analysis.

In the performance index section, respondents were asked to supply numeric figures from their department for 24 performance criteria over four time periods. The research population was randomly assigned to receive a questionnaire requesting either monthly figures from January, April, July, and October of 1985 (N = 272), or yearly figures from 1982, 1983, 1984 and 1985 (N = 289). Monthly figures would identify the fluctuations in performance due to seasonal variability while the yearly figures would identify long term performance. This section was constructed to identify the patterns obtained when performance criteria is tracked over time and to determine if two or more criteria follow the same pattern.

Under the performance measure section, respondents were asked to provide information which described the current procedures used in their department in regard to 19 performance measures. For each measure, the following information was requested: a "yes"/"no" response to the question "Is a standard form or procedure utilized?", a fill-in response to the frequency of the activity, and a fill-in response of the person in charge of the activity. The instrument was printed on five sheets of paper of which the first two pages were yellow, colored bond. The first sheet was a cover letter explaining the project and instructing the respondents on how to complete and return the questionnaire. The second sheet was an information module sent to enhance respondents understanding of productivity. The actual questionnaire was printed on two sheets of blue paper. Mailing information and codes (along with return postage) were printed on a separate sheet and placed at the back of the last page of the instrument (Appendix C). This format allowed the instrument to be mailed on February 5, 1986 without being placed in

an envelope and returned by refolding and stapling. The questionnaire was distributed and returned by First Class Mail. On March 1, 1986 a letter requesting response with a copy of the instrument was sent to individuals who had not yet returned the questionnaires (Appendix B).

### Data Analyses

Data collected from the survey were coded and entered into the computer using the software program PC-File III (Button, 1984). The information was then analyzed using the Statistical Analysis System (SAS) (Barr, 1976). From this analysis frequency tables were built for the demographic variables and frequency distributions were used to show the occurrence of each method of performance measurement. The results were then analyzed and discussed. The proposed statistical tests not actually performed are as follows: chi square analyses to study the relationship between selected demographic variables and performance measures, frequency distributions to show the occurrence of each method of performance measurement, the frequency of the measurement and the person responsible for the measurement, simple linear regression with correlation coefficients to identify the relationship between patterns of various performance indexes tracked over time, and from the data obtained in this test, regression analysis to determine which two or three performance indexes out of the group could predict the others. A five percent level of significance would have been used in this study.

## CHAPTER IV

### RESULTS AND DISCUSSION

Data for the study was obtained via the described method in Chapter III. The research questionnaire was mailed to all accredited United States hospitals with 500 or more beds as published in the 1984 edition of the American Hospital Association Guide to the Health Care Field (American Hospital Association, 1984). The population survey was 561 hospitals of which 70 (12%) returned questionnaires. The response rate for analysis was approximately 10 percent (N = 55 for demographic analysis and N = 56 for performance ratio and performance measures analyses) Two percent (N = 14) of the survey respondents returned blank questionnaires stating their hospital did not want to participate in the study due to time constraints and the complex data required to complete the survey.

Due to the low response rate, the researcher and research committee decided to use only descriptive analysis to report the data rather than the planned statistical analysis. Descriptive analysis hopefully will benefit future studies that may use this research as a model to analyze organization performance.

## Characteristic of Survey Participants

### Age and Years of Education

Respondents are primarily in the middle age range. Two (4%) of the respondents are between 20-29 years of age, 29 percent (N = 16) are between the ages of 30-39, 27 percent (N = 15) are between 40-49 years of age, 27 percent (N = 15) are between the ages of 50-59, and 13 percent (N = 7) are 60 years of age or older.

Fifty-six percent (N = 31) of the respondents have a bachelor of science degree as their highest degree earned. Twenty-seven percent (N = 15) have a master's degree, 13 percent (N = 7) have an MBA degree, while only one respondent has a three year accounting certificate as their highest degree earned. The following table (Table IV), is a list of the type of degrees held by the respondents. Approximately 44 percent (N = 27) of the degrees are in the food and nutrition and dietetics area. Over 20 percent (N = 13) of the degrees are from the foodservice management area of hotel and restaurant administration and foodservice systems management. Less than 15 percent (N = 9) of the degrees are from the general management area. Many of the bachelor of science, food, nutrition and dietetic majors received management training by earning master's degrees in business administration. This reflects that eventhough the percent of foodservice management degrees is low, a majority of respondents have foodservice and management backgrounds. The respondents with foodservice management backgrounds exhibited little difficulty in completing the instrument in addition to providing more numerical data as opposed to respondents with degrees in the other areas of home economics as well as areas outside the realm of home

TABLE IV  
TABLE OF DEGREES

Major	Degree			
	Total	BS	M.S.	Ph.D.
Food and Nutrition	17	17		
Food Service Management	10	4	5	1
Dietetics	10	10		
Management	9	1	8	
Home Economics Education	3	1	2	
Hotel and Restaurant Adm.	4	4		
Nutrition and Science	5	3	2	
Public Health Nutrition	1		1	
Biology	1	1		
Accounting	1	1		

Note: Not all the respondents provided "degrees" obtained, information across columns is not mutually exclusive.



economics. Perhaps the respondents in the latter groups did have difficulty understanding the instrument or did not monitor all areas of their operation and as a result could not provide the information and numerical data requested due to their limited knowledge in foodservice management.

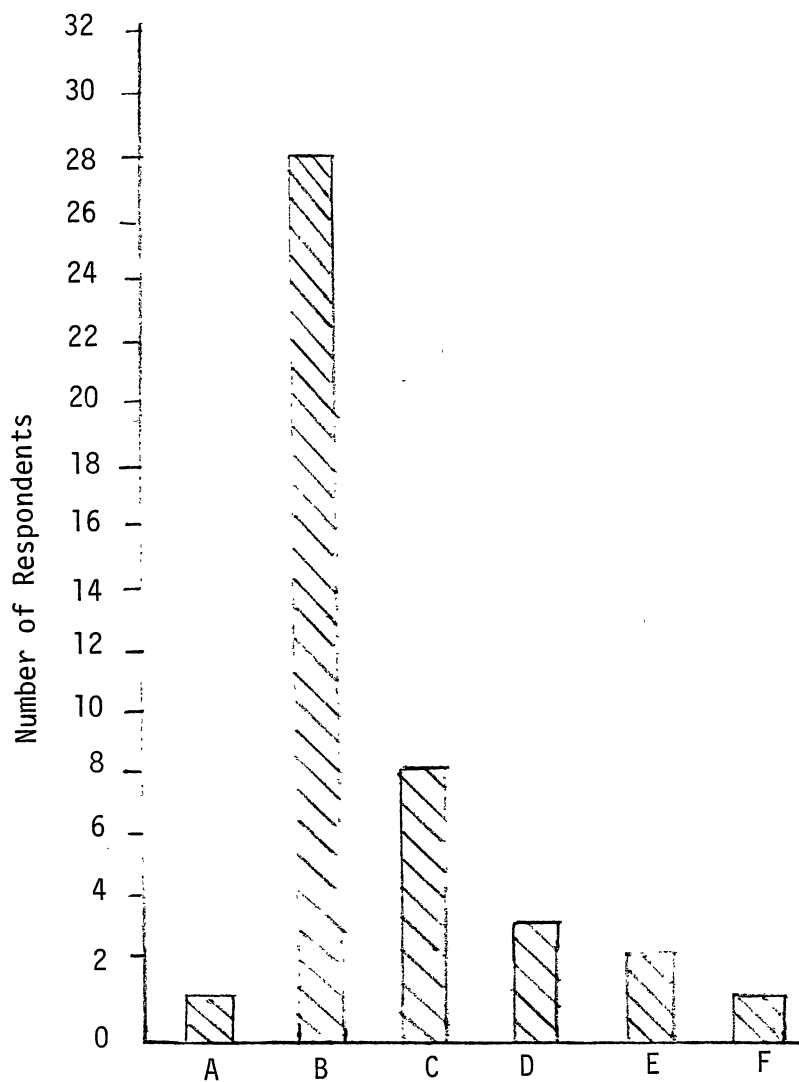
#### ADA Registration Status and Route to ADA

Seventy-eight percent (N = 43) of the survey participants are registered dietitians, while the remaining 22 percent (N = 12) are not. The route to ADA memberships for the respondents varied, although the majority completed a dietetic internship (Figure 6). About one-fifth of the survey participants obtained registration eligibility through a three year preplanned work experience. No significant difference is observed between the respondents with registration status to those without (i.e. HRAD majors) in completing the survey instrument.

#### Position Title, Salary, and Years of Experience

The predominant position title is that of foodservice director (89%, N = 46). Nine percent of the respondents (N = 5) hold the title of assistant or associate director and six percent (N = 3) are titled as administrative dietitians. One respondent checked the "other" category and listed "principal dietitian" as their title.

The annual salaries of the respondents range from below \$20,000 to above \$50,000, and approximately 15 of the 54 who gave this information earn from \$30,000-35,000, as shown in Table V. Salary is observed to be correlated with years of experience as the majority of respondents



- A = CUP Program  
B = Internship  
C = Three years preplanned work experience  
D = M.S. and six months work experience  
E = Grandfather clause (Did not provide specific route, but obtained R.D. status prior to 1969)  
F = One year traineeship

Figure 6. Route to ADA Membership/Registration

TABLE V  
ANNUAL SALARY EARNED BY RESPONDENTS

Annual Salary in \$	Number of Respondents N = 54 <sup>1</sup>	Percent
20,000 and below	1	2%
20,000-24,999	1	2%
25,000-29,999	11	20%
30,000-34,999	15	28%
35,000-39,999	4	7.5%
40,000-44,999	12	22%
45,000-49,999	4	7.5%
50,000 and above	6	11%

<sup>1</sup>One respondent did not answer the question.

cluster in the middle to upper ranges of annual salaries and clustering is also observed in the upper ranges of years of experience.

Years of experience in the health care industry range from one to over 16 years (Figure 7). Nine percent (N = 5) of the respondents have accumulated one to five years of management experience, while 42 percent (N = 23) have 16 or more years of experience. Perhaps the reason for the high response rate among managers with 16 or more years of experience is due to their interest in the area as they probably received limited training in productivity since it was not a main topic 20 years ago. Another reason could be that through their 16 or more years of experience, they realize productivity and performance analysis, or indicators thereof, are crucial to the success and ultimate survival of their operation in the competitive times of today's market.

#### Productivity Training and Professional Membership

Ninety-six percent (N = 53) of the respondents have received some type of training in productivity measurement, while four percent (N = 2) have received no prior training (Figure 8). An assumption could be that those with productivity training were more inclined to answer the questionnaire. Regardless, the findings reflect an increase in the amount of training in productivity as compared to the earlier OSU studies which found training to be much lower: health care, 1983, 44 percent (N = 48); restaurants, 1984, 30 percent (N = 16); and college and universities, 1985, 42 percent (N = 28). Productivity training in the health care area appears to be the strongest with a 44 percent training level in 1983, (Shaw, 1983) and then the additional increase to a 96 percent training level in 1986. Part of the increase in training

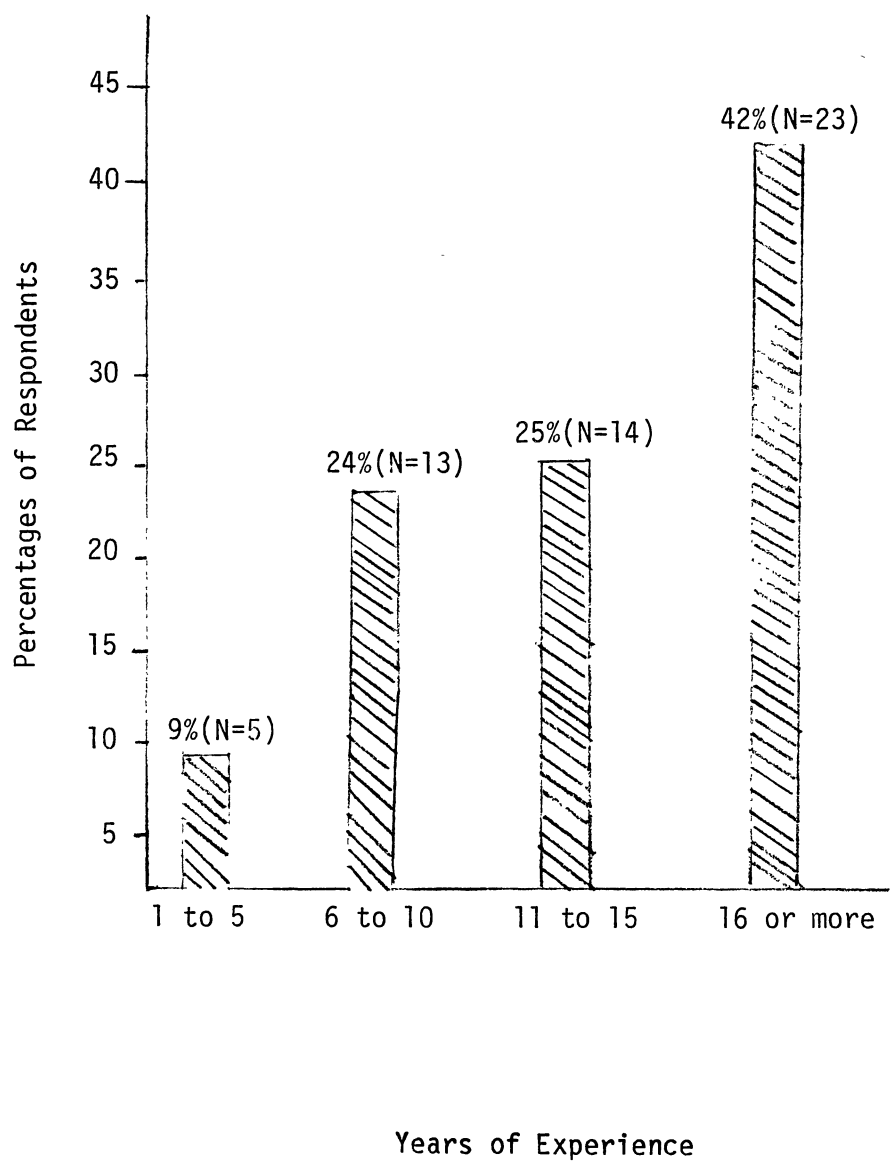
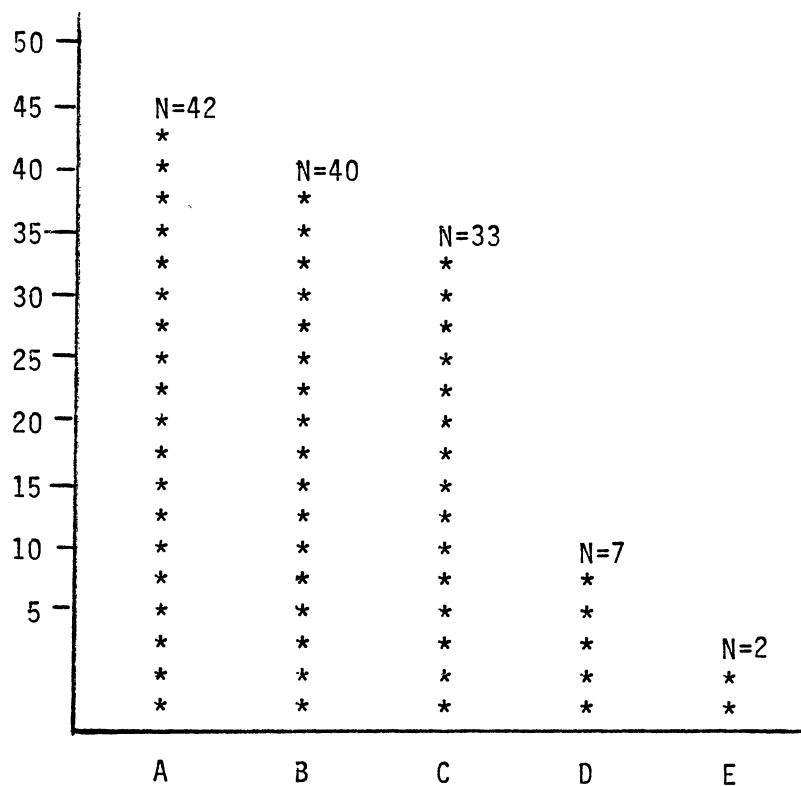


Figure 7. Years of Experience in Foodservice Management



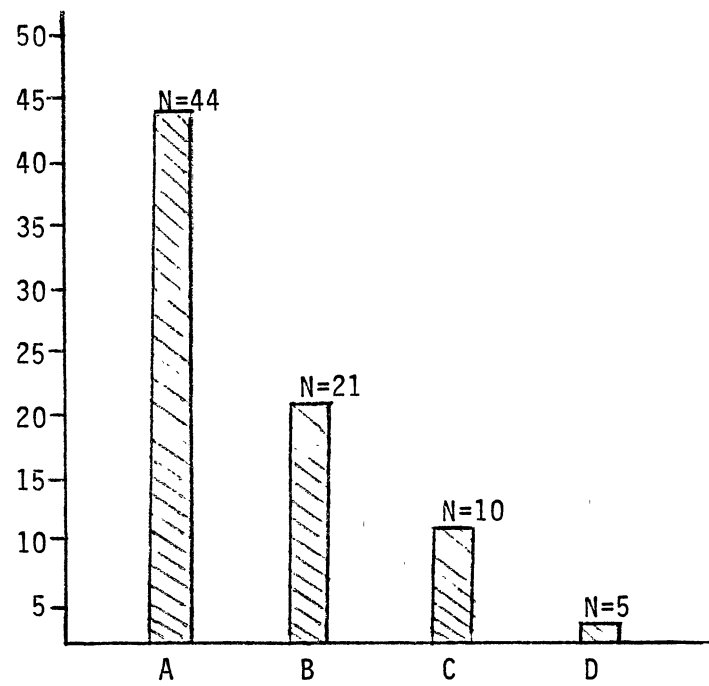
A = Seminar Training  
 B = One-the-Job Training  
 C = Workshop Training  
 D = Coursework  
 E = None

\*Training categories are not mutually exclusive; a respondent may or may not have a combination of different types of training.

Figure 8. Training in Productivity Measures

levels may be due to the fact that the ADA practice group, 'Dietitians with Management Responsibilities in Health Care Facilities' have held regional workshops on productivity measurement. Or perhaps this segment of the foodservice industry receives more pressure to obtain higher levels of productivity due to the nature of their service structure. The health care operators are faced with the challenge to provide high quality, nutritionally sound, therapeutic foods to a captive market at a low cost in light of rising labor, food and energy expenses. As a consequence, the need to improve productivity may be more urgent in health care settings. Despite the facts of the necessity for high productivity in the industry and high productivity training among respondents, the researcher questions the validity and practical application of the training received due to the incomplete data obtained from questionnaires when respondents were asked for specific information or numerical figures relating to productivity measures. Thus, the need for standard productivity measures and a standard educational productivity model exists.

Ninety-one percent (N = 50) of the respondents are members of one or more professional organizations, while nine percent (N = 5) have no professional affiliation at all (Figure 9). Besides ADA and ASHSFA, respondents listed membership in the following organizations: NRA (National Restaurant Association), Chicago Nutrition Association, Food Service Systems Association, SAFSR (Society for Advancement of Food Service Research) and AHEA (American Home Economics Association).



A = ADA (American Dietetic Association)  
B = ASHFSA (American Society for Hospital  
Food Service Administration)  
C = Other Organizations  
D = No Membership

Memberships are not mutually exclusive;  
a respondent may or may not belong to  
more than one organization.

Figure 9. Professional Organization Memberships



## Characteristics of the Institutions

### Type of Hospital, Size and Location

Sixteen percent (N = 9) of the respondents are employees in federally owned, non-profit hospitals, 64 percent (N = 35) are employed in non-federal, (state, county, city) non-profit hospitals and 20 percent (N = 11) are employed in non-government, (church affiliated) non-profit hospitals. Forty-five percent (N = 25) of the respondents indicated that their hospital provides general medical services, while the remaining 55 percent (N = 30) indicated having specialized medical services such as psychiatric/mental health care, long term cancer care, organ transplant, cardiac care and tertiary care. Of the specialized service institutions approximately 73 percent (N = 22) provide psychiatric or mental health services. The high response from this type of institution may reflect a need for further productivity training due to their interest in the area or urgency of obtaining higher productivity levels because of increasing financial constraints in state operated institutions.

Eighty percent (N = 44) of the respondents indicated that their hospital does have 500 or more beds, while 20 percent (N = 11) have less than 500 beds. All of the institutions chosen for the study are listed in 1984 edition of the American Hospital Association Guide to the Health Care Field as having 500 or more beds. In the time lapse between publication of the guide and the current research, 20 percent or more, (speculating on hospital size of non-respondents) of the hospitals have decreased in size. This fact further exemplifies the need to improve productivity in health care settings as the challenge to obtain more

output with less resources is a consequence for hospitals that have decreased their market size with fewer beds available for capital resources.

Sixty percent (N = 33) of the respondents designated that their hospital is located in a metropolitan area, 33 percent (N = 18) are in urban areas, while seven percent (N = 4) are in rural areas. Metropolitan area on the questionnaire was defined as 50,000 or more inhabitants, urban as 2,500 to 49,999 and rural as 1 to 2,499 inhabitants. The four respondents located in rural areas are probably large Veteran's Medical Centers or State Psychiatric Centers. These large institutions are sometimes located in less populated areas.

#### Type of Foodservice Management and Foodservice System

Ninety-three percent (N = 51) of the respondents are employed by institutions that have independent, non-contract management, while seven percent (N = 4) of the respondents are employed by institutions that contract their foodservice to a foodservice management company. The low response rate among institutions with contract management may have been caused by their inability to release or obtain the information requested on the questionnaire. Or perhaps the contract management companies have their own performance measures in place and the foodservice director has no interest in identifying more measures. This is a severe limitation to performance research as no set of measures is perfect and there is always room to identify better parameters of performance.

Eighty-five percent (N = 47) of the survey participants manage conventional foodservice systems. Only fifteen percent (N = 8) manage

departments with satellite units, cook/chill and cook/freeze foodservice systems.

### Foodservice Budget and Training Programs

Twenty-four percent (N = 12) of the respondents have a budget under one million dollars to work with for the current fiscal year, while 78 percent (N = 43) have budgets in excess of one million dollars (Table VI). Eighty percent (N = 44) of the respondents indicated that their institution offers training programs for management staff, while 20 percent (N = 11) of the institutions do not have any training programs available. Of those that did have training programs available, approximately seven percent (N = 3) provide in-house training by the Personnel Department of other departments, 15 percent (N = 7) made allowances for outside attendance to workshops and seminars, while the majority of institutions (78%, N = 35) provide training for their staff through a combination of both. The researcher believes that more training in productivity measures specific to each institution is called for. In addition, training programs for all foodservice employees regarding productivity and performance is warranted. Perhaps if this type of training had been implemented previously, foodservice operators would have a better understanding of productivity and monitor all activities of their department and consequently could have responded more completely to the survey instrument.

### Performance Measures

Section III of the research instrument pertained to procedures used in the foodservice units. The respondents were presented with 30

TABLE VI  
CURRENT YEAR BUDGET FOR FOODSERVICE

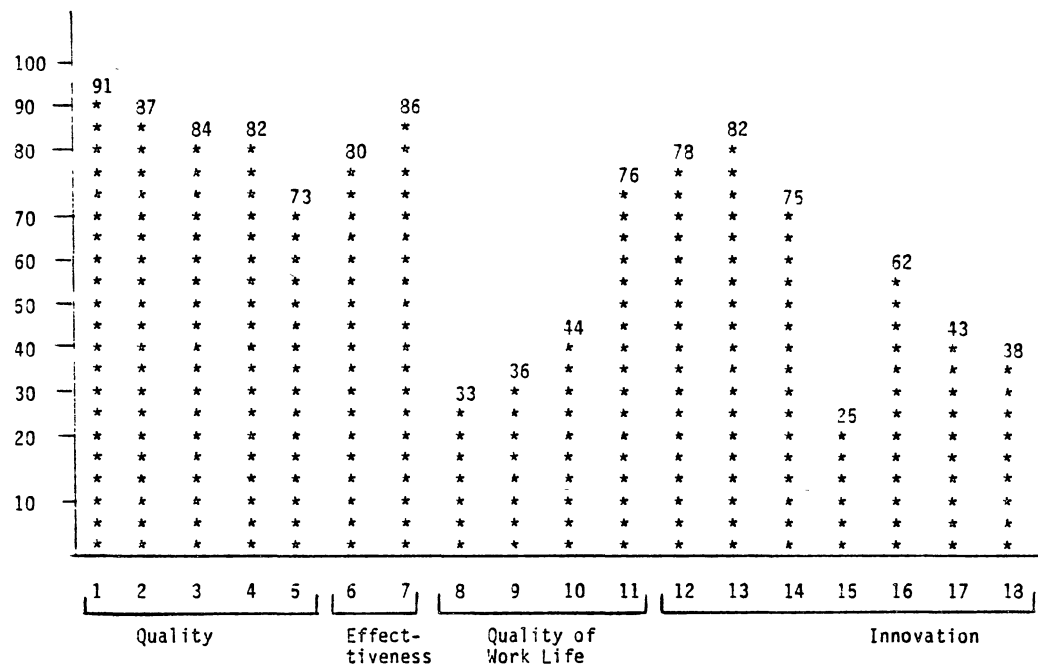
Budget in \$	Number of Institutions	Percent'
499,999 and below	3	6%
500,000-999,999	9	16%
1,000,000-2,499,999	12	22%
2,500,000-4,999,999	20	36%
5,000,000 and above	11	20%

'percent of respondents

performance measures and were asked to 1) identify the measures being used in their operation, 2) state the frequency with which the measure was used and 3) indicate who was responsible for use of the measure. The percent of each measure currently being used is presented in Figure 10a and 10b. Due to sparse and incomplete data in the columns on frequency of the measure activity and person in charge of the activity, no statistical tables were prepared. Instead, a general discussion will be included regarding the two frequency columns for each measure. For analysis purposes the 30 measures will be categorized and discussed under the performance criteria of which they are a part.

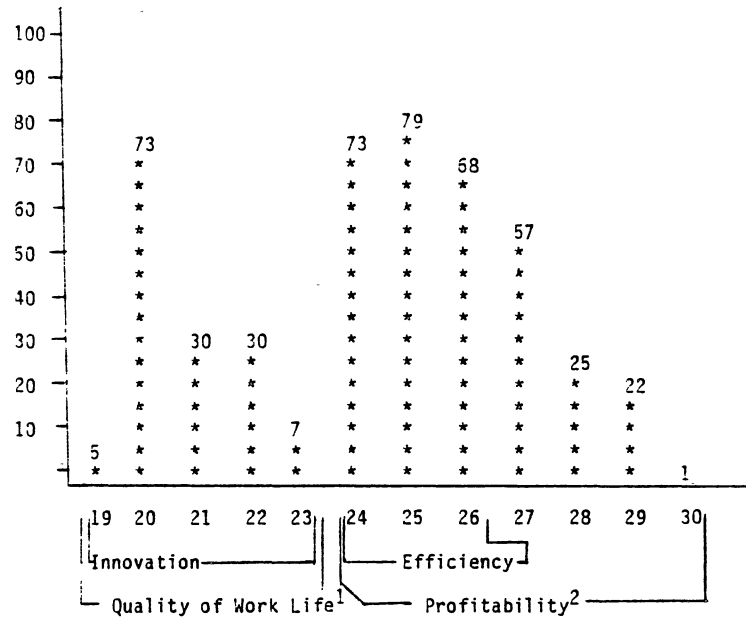
### Quality Measures

Quality in this research is defined as the degree of the system's conformance to requirements, specifications, and expectations (Sink, 1985). The common quality measures identified from previous OSU research are temperature checks, tray audits, patient surveys and quality food checks both prior to service and through product specifications. On the average, 83 percent of the survey participants use one or more of the quality measures. (83 percent is an average of the quality measures 1 thru 5, Figure 10a). Similarly, Shaw (1983), Pickere1 (1984) and Putz (1985) found that 98 percent, 96 percent and 92 percent respectively, of their survey participants use these specific quality measures. The fact that a large number of respondents monitor quality should not be surprising as the previous studies indicated that foodservice operators rank quality as number one in terms of time spent in evaluation and importance to the success of their operation (Table III).



1. Temperature Checks on the Trayline
2. Tray Audits
3. Patient Surveys
4. Quality Food Check Prior to Service
5. Quality Food Check by Product Specifications
6. Statement of Department Goals
7. MBO or Personnel Evaluations
8. Monetary Reward System
9. Non-Monetary Reward System
10. Suggestion System
11. Employee Recognition
12. New Recipe Implementation
13. Menu Analysis - Revision
14. Captial Equipment Review
15. Participative Management through Quality Circles
16. Participative Management through Brainstorming
17. Computer Application in Nutrition Services
18. Computer Application in Foodservice

Figure 10a. Use of Performance Measures by Respondents.



- 19. Profit Sharing
- 20. Health Benefits
- 21. Cafeteria Benefits
- 22. Scheduling Preferences
- 23. Sick Time to Vacation Conversion
- 24. Meal Price Analysis
- 25. Budget Analysis
- 26. Inventory Turnover Analysis
- 27. In-House Catering
- 28. Satellite Catering
- 29. Public Catering
- 30. Nursing Home/Shared Catering

<sup>1</sup>Incentive systems are considered measures of both Innovation and QWL  
<sup>2</sup>Analysis systems are considered measures of both Efficiency and Profitability

Figure 10b. Use of Performance Measures by Respondents (cont.)

Conducting a temperature check of the food is the quality control most frequently used (91%, N = 50) by the survey participants. Four percent (N = 2) of the survey participants do not use this measure, while six percent (N = 3) did not respond to this question. The high use of this measure is probably due to the fact that food temperature is one of the first things a patient notices and also, temperature can have a great effect on the flavor and appearance of some foods. In addition, this measure is one of the easiest to track and monitor conformance to standard food temperatures. The frequency of this activity ranges from twice a meal, per meal to once a day. Institutions with high quality standards probably monitor temperature twice a meal or six times per day. The position of the person in charge of this activity varies from the cook, the foodservice supervisor, the diet technician and also the administrative dietitian. The most logical people to monitor this measure would be the cooks since they have the responsibility of preparing the food for service. In this respect if the food did not meet temperature standards the cook would receive immediate feedback and would feel obligated to take corrective actions.

The second most frequently used quality measure is a tray audit (87%, N = 48). Eight percent (N = 4) of the respondents do not use this measure, while six percent (N = 3) did not answer this question. Shaw's (1983) study found a positive correlation between the use of tray audits and dietitians over the age of 39 and with 10 or more years of experience. In addition the tray audits were found to be more commonly used in large hospitals than in small hospitals, a fact which may be related to the loss of control associated with a larger volume of output. The high use of this measure should not be surprising then, as the majority



(67%, N = 37) of respondents to the current study are over age 39 and likewise the majority (67%, N = 37) have 11 or more years of experience (Figure 7). Moreover this study surveyed large hospitals which are more apt to use tray audits to maintain control of their large volume output. The frequency of this activity ranges from per meal, once per day to once a week. The person responsible for this activity is usually the assistant director, the dietitian, or the foodservice supervisor. To be effective tray audits should be conducted per meal by the trayline supervisor. This way immediate feedback plus task responsibility is delegated to the individual with the most control over the input and the final output of which the measure assesses.

Patient surveys are the third most frequently used quality measure (84%, N = 46). Nine percent (N = 5) of the survey participants do not use this measure, while seven percent (N = 4) did not respond to the question. Shaw (1983) found a significant association between training and periodic survey of customers and patients as to quality of food and service. Since training levels of participants in this research is high (96%, N = 53 of some type of training, Figure 8) a similar correlation may exist. The frequency of surveys ranges from daily, quarterly to biannually with biannual being the most common. The responsibility for conducting surveys ranges from employees within the foodservice department; diet technician, dietary volunteer to employees outside of foodservice in either patient services or personnel. Since patient surveys are a status assessment of quality, those responsible for producing the quality items or services (i.e. the foodservice department) should be conducting the surveys themselves.

A large percentage of respondents (82%, N = 45) use quality food checks prior to service as a quality control measure. Seven percent (N = 4) of the study participants do not use this measure, while 11 percent (N = 6) did not respond to this question. The high non-response may reflect uncertainty over this measure as people without foodservice backgrounds may not know what a quality food check is. Of those that conduct quality checks, the activity is performed either per meal or per day and is the responsibility of the cooks, the dietitian or the food-service supervisor.

Less than three-fourths (73%, N = 40) of the respondents use product specifications to control their food quality. Approximately 13 percent (N = 7) do not use this control, while 15 percent (N = 8) did not respond to the question. In Shaw's (1983) study 98 percent (N = 107) of the respondents had written quality standards which included product specifications. Pickerel (1984) and Putz (1985) likewise found over 90 percent of their participants had written standards. However, standards were found to be correlated to franchise restaurants and contract foodservice management. The low response of contract foodservice units (7%, N = 4) in this research may have affected the lower use of product specifications as quality measures. Of those that use this measure, conformance to specifications is checked daily or per order usually by the buyer, storeroom clerk, or director.

### Effectiveness Measures

The definition for effectiveness in this research is the degree of achievement of objectives (Smalley & Freeman, 1966). The previous foodservice studies delineate statement of department goals and

management by objectives (MBO) as effectiveness measures. Over 80 percent of the survey respondents use one or both measures.

Approximately 80 percent (N = 44) of the respondents formally state department goals, while 7 percent (N = 4) do not, and 13 percent (N = 7) did not answer this question. Statement of goals were found to be correlated with training in the Shaw (1983) study and with lower to middle salary ranges in the Putz (1985) study. Training can be postulated to have an affect on statement of goals as the majority of respondents in the current study (96% N = 53) have received some type of training (Table 8). This relationship could be tied in to highest education degree attained. Since goal setting is a much discussed topic in higher education and at continuing education seminars, one could assume that the more training a respondent receives, the more likely they would be to set goals and measure effectiveness. Of those that do state department goals, the activity is carried out annually and most commonly by the department director.

Eighty-six percent (N = 47) of the respondents use MBO or personnel evaluations to evaluate effectiveness, while 10 percent (N = 5) do not, and six percent (N = 3) did not answer this question. The following factors were found to have a positive correlation on the use of MBO and evaluation techniques in previous studies; training (Shaw, 1983), revenues in excess of \$1,000,000 and years of experience (Pickerel, 1984) and respondents 39 years of age and younger (Putz, 1985). Training in this study could be postulated to have an effect on use of MBO and evaluation techniques as well as those institutions with budgets over \$1,000,000 and those respondents with more experience in the field. These correlations indicate the benefits of knowledge and experience on

management performance. The more familiar the respondents are with MBO and evaluation (from training) as well as with the business itself (experience), the greater is their tendency to measure the effectiveness of their operation. Of those respondents who use MBO and evaluation techniques, the activity is performed annually by the foodservice director.

#### Quality of Work Life Measures

Quality of Work Life (QWL) in the research is defined as work with meaning (Mali, 1978). The common quality of work life measures identified from previous studies are; monetary reward system, non-monetary reward system, suggestion system and employee recognition. Overall, the use of any one of these QWL measures was very low (average use 47% an average of QWL measures 8 thru 11, Figure 10a). Similarly, Shaw (1983), Pickere1 (1984) and Putz (1985) found that 66 percent, average of 36 percent and 40 percent respectively of their survey participants use these specific QWL measures. The low number of respondents using QWL techniques could be caused by the newness of the technique for use in foodservice departments. In addition, as most of the survey participants in this study are older (67%, N = 37 over the age of 39) they probably did not receive QWL techniques in their education training.

Monetary and non-monetary rewards are the least used QWL measures (33%, N = 18 and 36%, N = 20 respectively). Over 40 percent of the respondents do not use either of these measures, while over 20 percent of the respondents chose not to answer to these two questions which probably reflects their lack of knowledge regarding reward systems, the low

response to use of monetary rewards correlates to the trend of moving away from dollar incentives as money is not as large of a motivator as once thought to be. Of those that use a reward system it is usually conducted either quarterly or annually and the responsibility belongs to the foodservice director or hospital administrator.

Approximately 44 percent (N = 24) of the respondents use a suggestion system, while 38 percent (N = 21) do not and 18 percent (N = 10) of the respondents did not answer this question. In Shaw's (1983) study suggestion systems were the most popular type of QWL technique used by respondents. This correlates to Putz's (1985) finding in which 88 percent of her respondents encourage suggestion systems. Of those respondents who did use a suggestion system in the current study, the most common frequency of use is "as submitted" and the responsibility for monitoring the system belongs to the foodservice director in most cases. The researcher believes that the suggestion systems in use are very informal and unstructured based on the frequency of the activity given. Shaw (1983) postulated that loosely structured suggestion systems and those not linked to a reward or have a vague reward are not likely to be successful. This fact probably has an influence on the low percent of respondents who use suggestion systems.

Over three-fourths (76%, N = 42) of the respondents use employee recognition to enhance QWL. Approximately 7 percent (N = 4) of the respondents do not use this measure, while a high percent (17%, N = 9) did not respond to the question. The non-response could be due to the ambiguity of the term "employee recognition" or lack of management knowledge in using this QWL technique. Types of employee recognition identified in previous studies include; commendation letters, verbal

recognition, plaques and certificates and employee of the month program. The previous studies revealed positive correlations to recognition with amount of training of respondents and years of experience. A correlation could also be postulated in this study as the majority of respondents have received some type of training as well as have been in the field for more than ten years. Therefore, the high response to use of this measure could be based on the emphasis it was given in training and years of experience have proven that it does produce positive results in addition to the ease with which it can be performed (i.e. verbal recognition) as part of the daily management regime. Frequency of this activity varies from daily to quarterly to annual. This probably is dependent on the type of recognition given, with verbal recognition performed daily and commendation letters, plaques etc. being given quarterly or annually. In most instances the director of foodservice is responsible for giving recognition however supervisors do perform some of this task (i.e. verbal recognition) as well as the hospital administrator - probably for awarding plaques and certificates.

### Innovation Measures

The definition for innovation in this research is any deliberate, novel, specific change aimed at accomplishing the goals of the system more effectively (Mueller, 1971). Numerous innovative measures were identified in previous research which include new types of methods, processes and management techniques and incentive systems. In this study use of the innovative measures fluctuates drastically from an 82 percent use of new menus to a five percent use of profit sharing incentive system. Overall, an average of 46 percent of the respondents

use one or more of the innovative measures (46 percent is an average of innovation measures 12 thru 23, Figure 10a & 10b). Similar findings were obtained from the previous foodservice studies with over 50 percent of the respondents using one or more of the innovation measures.

New recipe implementation is in use as an innovative measure by 78 percent (N = 43) of the survey participants. Thirteen percent (N = 7) of the participants do not implement new recipes, while 9 percent (N = 5) did not answer to this question. Although it is hard to believe that a foodservice does not use new recipes perhaps the participants who answered in this way do not actually devise the recipes and are told when to use new recipes given to them, as in contract foodservice units. Or perhaps due to the use of government commodities developing new recipes that incorporate such items is difficult and there is little leadway in the budget to experiment with new recipes. Such the case might be found in state and county operated institutions of which a majority of respondents (64%, N = 35) in this study are classified under. Of those that do use new recipes, they are implemented usually monthly or quarterly and the responsibility is that of the cooks, production dietitian or foodservice supervisor.

Menu analysis and revision is conducted by 82 percent (N = 45) of the survey respondents and is the most commonly used innovation measure. Only nine percent (N = 5) of the respondents do not use this measure, while an additional nine percent (N = 5) did not respond to this measure. In contrast, dietitians in college and university foodservice units in the Putz (1985) study all responded to using this innovation measure. Perhaps the different market segments the foodservice units provide for explains this difference. College students

are more apt to demand changes in menu because they are a captive consumer longer than the average patient hospital stay. In addition, menu analysis and revision is a costly change in hospitals as cycle menus are mass printed and distributed to patients daily for food selections. Of those hospitals that use menu analysis and revision, the changes are implemented either quarterly or yearly and the task is the responsibility of the production dietitian, the assistant director or the director.

Capital equipment review is performed by three-fourths (75%, N = 42) of the study participants. Approximately 11 percent (N = 6) do not use this measure, while over 14 percent (N = 8) did not answer to this measure. The high non-response to this measure could be due to the vagueness of the term capital equipment. Those without foodservice backgrounds may not know what is meant by capital equipment and those with foodservice backgrounds may not have remembered the cost definition for capital equipment, (equipment with cost in excess of \$500.00) and thus were uncertain as how to respond to the question. Putz (1985) found a high correlation between productivity training and equipment review and postulated that the managers with training realize the importance of work improvement methods and of providing their employees with the necessary tools to complete their assigned tasks. The same correlation could likewise be true in this study as a high percentage of respondents (96%, N = 53) have received some type of training. Another correlation might be that the budgets the foodservice units have to purchase equipment. Larger operations, as in this study may be in a better financial position to purchase equipment and consequently review their equipment needs regularly. Those units that review equipment have



either a quarterly or annual review and this responsibility is given primarily to the foodservice director.

Participative management through the use of quality circles is performed by only one-fourth (25%, N = 14) of the survey participants. More than one-half of the respondents (54%, N = 30) do not use this measure, while over 21 percent (N = 12) did not respond to this measure. These findings are similar to Putz's (1985) and Pickere1's (1984) studies in which less than 20 percent of their respondents reported using this measure. Quality circles (QC) is not a new concept in business settings, however the use of this management technique is relatively new to foodservice units. As most of the respondents in this study are older (67%, N = 37 are over the age of 39) they probably did not receive education training regarding this technique and therefore do not know how to use it. No specific frequency was identified for those who do use this measure as most respondents use it "as needed" or continuously. The activity is conducted either with management staff or a committee.

Brainstorming is the other participative management method viewed as an innovative measure. Twice as many respondents (61%, N = 34) use this measure than those who use quality circles. Twenty-three percent (N = 13) of the respondents do not use this measure, while 16 percent (N = 9) did not answer to this measure. The higher use of this measure is likewise observed in the other OSU studies; Shaw (1983), Pickere1 (1984) and Putz (1985) all with over 50 percent of their respondents reporting to use the measure. In addition, brainstorming was highly correlated to training in productivity and large operations in all three studies. It may be assumed that the same factors influence the use of brainstorming

in this research as almost all the respondents have received training and all respondents work in large operations. The use of brainstorming techniques are most beneficial to large operations due to the large number of employees with unlimited resource ideas which may cross over from one position to the other, or one area of the department to another. The frequency with which this measure is used is as vague as the use of quality circles. Those respondents who practice this technique do it monthly or "as needed". This activity usually involves either a committee or just upper-level management (i.e. director, assistant director, and systems dietitian).

Less than half of the respondents employ computer application in the nutrition service or the foodservice units of their dietary department. Forty-three percent (N = 24) use computers in their nutrition services and 43 percent (N = 24) do not use them in their foodservice, while no response was given by 18 percent (N = 10) and 20 percent (N = 11) for computer use in nutrition services and foodservice respectively. The results of computer use are different from the previous foodservice studies, as over half of the respondents in the other studies use computers in their operations. Correlations to computer use in the other studies were; productivity training, large volume of meals prepared, large size of establishment, higher annual salary and master's degree plus six month work experience as route to ADA membership. Similar correlations probably exist in the current research as a majority of respondents have training of some type, receive high annual salaries and work in large hospitals with high volume of meals prepared. The lower percent of computer use in this study as compared to the others, could be caused by the older age of the respondents who had

received their formal education before computer technology was introduced. In addition, the cost of implementing computer systems is very high and since the majority of respondents work in state and county institutions (64%, N = 35) there probably is not room in their budget for such a large purchase. Naturally the frequency of computer use is daily for those who have such systems and the people responsible for the activity are those whose jobs are directly related to the type of application, for example; the clinical dietitian or dietetic technician for nutrition services and the administrative dietitian or director for the foodservice.

#### Innovation and Quality of Work Life Measures

As mentioned in the review of literature, the performance criteria are not mutually exclusive and some are highly correlated to each other. Therefore, certain performance measures may reflect, or be a part of more than one criteria. Such is the case with the various incentive systems used in the foodservice industry. The incentives may reflect innovation or QWL or both. The following are the foodservice incentive systems identified from previous research; profit sharing, health benefits, cafeteria benefits, scheduling preferences and sick time to vacation conversion. The use of these measures is extremely low with only a 29 percent average among all five incentive systems (29 percent is an average of the innovation and QWL measures 19 thru 23, Figure 10b). Similar low responses in regards to incentive systems were observed in the previous research: Shaw (1983), nine percent (N = 10); Pickere1 (1984), 28 percent (N = 15); and Putz (1985), 22 percent (N = 15).

Only three (5%) of the survey participants are involved in profit sharing systems, while the majority 75 percent (N = 42) do not have access to such a system and 20 percent (N = 11) did not respond to this measure. The majority of respondents do not have access to a profit sharing system probably because the financial goal of the institution in which they work is non-profit, as was the case for practically all of the respondents. The most likely type of institution to have a profit sharing plan is one that has contracted its foodservice to a contract foodservice management company. In this situation the financial goal is to create a profit for the management company and as an incentive the foodservice director receives part of profit as a bonus. An increasing trend in profit sharing systems may be seen in the future as the number of institutions contracting out their foodservice is increasing. Of those institutions that use profit sharing, only the director is eligible to participate and they receive the benefits of this measure annually or in some cases quarterly.

Health benefits are the most common type of incentive system offered to the respondents. Over 73 percent (N = 41) of the research participants have access to such a system, while nine percent (N = 5) do not, and a large percent (18%, N = 10) did not respond to this measure. The non-response was probably due to the ambiguity of the term 'health benefits' and lack of information stating what health benefits include on the research instrument. In contrast, the high use of this incentive may be due to the fact that a health care facility can provide this type of benefit to its employees at minimal cost. However, this type of benefit may decrease in the future as hospitals tighten up their budgets in low economic times. Of those that have access to health

benefits, it is on a daily basis and the type of system is determined either by the hospital administrator or personnel department.

Surprisingly only 30 percent (N = 17) of the respondents have access to cafeteria benefits, while half of the respondents (50%, N = 28) do not, and 20 percent (N = 11) chose not to answer this measure. The non-response may again be attributed to the unclear term 'cafeteria benefits' as respondents may not have known what type of benefits may be allowed due to the non-profit structure of most foodservice operations. In these situations the revenues received in excess of costs may not be enough to compensate for benefit programs within the department. Those that can receive benefits do so daily, and either hospital administration or the foodservice director decides on the type of benefits allowed.

Scheduling preferences are available to 30 percent (N = 17) of the survey participants, while 50 percent (N = 28) are not allowed preferences and 20 percent (N = 11) did not respond to this measure. Perhaps respondents were confused as to what was meant by scheduling preferences on the instrument and consequently left this question blank. On the contrary, respondents not allowed preferences could be due to the type of the foodservice systems in use, the number of foodservice employees and the realm of tasks and duties assigned to the foodservice workers. Some respondents possibly view the complex task of incorporating employees' preferences as being too difficult to schedule and chose not to use this measure. Those who do use this measure plan scheduled preferences weekly, biweekly or monthly depending on the time period the schedule covers. Responsibility of scheduling personnel is usually

given either to the foodservice supervisor or the Administrative Dietitian.

Approximately seven percent (N = 4) of the respondents can convert unused sick leave to vacation time. The rest of respondents 93 percent (N = 52) can not do so, or chose not to write in anything in the "other" measure, where space is provided on the questionnaire. This measure is one of the best QWL measures as employees have direct control over the amount of award they receive for their performance, sick leave is usually converted to vacation time on an annual basis, and the responsibility for this activity belongs to the personnel department.

#### Efficiency Measures

Efficiency is defined in this study as doing things right (Drucker, 1974). Thus, measures of efficiency will reflect proper use of resources. Since proper use of resources is directly related to profitability (revenue-costs) based on minimal cost, a large number of respondents (73% average; obtained from averaging efficiency measures 24-26 on Figure 10b) use one or more of the identified efficiency measures. Efficiency measures identified in previous research are; meal price analysis, budget analysis and inventory turnover analysis.

Seventy-three percent (N = 41) of the respondents perform meal price analysis in their units, while nine percent (N = 5) do not, and 18 percent (N = 10) of the respondents did not answer to this question. Perhaps the non-response was due to a lack of knowledge regarding meal price analysis. Most likely respondents without foodservice backgrounds are not familiar with this measure or do not understand the concept and

chose not to respond on the questionnaire. The majority of respondents, however, realize the value of this measure and monitor their costs and adjust for mark-ups on a weekly, monthly or quarterly basis. Usually the foodservice director is responsible for this task.

Budget analysis is the most common efficiency measure in use. Seventy-nine percent (N = 25) of the respondents use this measure, while five percent (N = 3) do not and 16 percent (N = 9) of the respondents chose not to answer this measure. Perhaps respondents were confused as to what was meant by budget analysis on the research instrument and therefore chose not to answer. Budget analysis was also found to be a popular efficiency measure in the other foodservice studies: Shaw (1983), 67 percent (N = 74); Lamb (1984), 41 percent (N = 20); and Putz (1985), 69 percent (N = 47). Foodservice managers in all areas of the industry realize that budget analysis is the best method to identify if the limits of the current budget were not exceeded through comparison of resources forecasted to be used to actual resource use. This measure is conducted monthly or quarterly depending on the budget period and in most cases the foodservice director is responsible for completing this task.

Inventory turnover analysis is computer by 68 percent (N = 38) of the study participants, while equal numbers (16%, N = 9) either do not use this efficiency measure or did not respond to the question. Inventory turnover is an important efficiency measures as its identifies the direction of some of the cash flow in the institution. In a positive direction with low inventory and high turnover, the cash flow will go to the bank to gather interest. In a negative direction with a high inventory and low turnover, the cash flow will be tied up in inventory

gathering dust rather than interest (interest being another source of revenue which influences profit). Inventory turnover is computed weekly, biweekly, or quarterly and the task is the responsibility of either the director, buyer, or dietitian.

### Profitability Measures

Profitability is defined in this research as measures relating total revenues to total costs. To make a profit one must generate more revenue as opposed to the costs incurred. One means of doing this in a hospital foodservice is to expand markets and customers using relatively the same amount of labor in production and the existing capital resource - the result is catering services. The majority of respondents, 57 percent (N = 32) provide in-house catering for their hospital, while 27 percent (N = 15) do not and approximately 16 percent (N = 9) did not answer to this question. Less than half as many of the respondents (25%, N = 14) offer satellite catering as opposed to in-house, while 50 percent (N = 28) do not offer this type of catering and the remaining 25 percent (N = 14) did not respond to the measure. Public catering is the least offered service as only 21 percent (N = 12) of the respondents provide it, while 57 percent (N = 32) do not and the other 21 percent (N = 12) choosing not to respond. Perhaps this large percent of respondents did not understand what was implied by public catering as marketing to the public is a new concept, and therefore left this measure blank on the questionnaire. One respondent did fill in the "other" category and is providing nursing home and shared catering services, however, this type of service could have been classified under satellite catering. Catering services are usually offered on a daily



basis or as requested and the responsibility is given to the production supervisor, the administrative dietitian or the foodservice supervisor.

### Performance Ratios

Thirteen performance ratios could be built from the numerical figures provided by respondents in the performance index section of the research instrument. The components of each ratio were listed and respondents were to provide either monthly January, April, July and October 1985 figures from their operation, or yearly 1982, 1983, 1984, 1985 figures. Two problems arose from this format of data collection. First, not all respondents gave data for the exact period listed. For example, one institution gave their 1981, 1982, 1983 and 1984 figures for data analysis. Since the objective of collecting data in the aforementioned format is to identify patterns or trends when performance is tracked over time, any time period may be used as long as they are of the same duration as the others, (i.e. month to month, or year to year). Therefore, the different periods in which data was given did not prove to be a significant limitation. The second problem was that many respondents did not completely fill out this section of the questionnaire and as a result either a numerator or denominator for a ratio was missing. Consequently, few ratios were built and results may not be a true reflection of the performance levels in the dietary departments of large hospitals.

### Productivity Ratios

Seven ratios can be made to specifically measure productivity. The ratios are as follows:

- |  |  |
|--|--|
| 1) $\frac{1}{6} \frac{\text{total meals prepared}}{\text{total labor hours worked}}$     | 5) $\frac{9}{10} \frac{\text{total meals prepared}}{\text{total food cost}}$       |
| 2) $\frac{2}{6} \frac{\text{total meals served}}{\text{total labor hours worked}}$       | 6) $\frac{1}{8} \frac{\text{total meals prepared}}{\text{total labor hours paid}}$ |
| 3) $\frac{3}{6} \frac{\text{total servings prepared}}{\text{total labor hours worked}}$  | 7) $\frac{4}{5} \frac{\text{patients served}}{\text{trays prepared}}$              |
| 4) $\frac{9}{10} \frac{\text{sales (cafeteria)}}{\text{labor hours worked (cafeteria)}}$ |  |

Note: Numbers to the left of the ratio components correspond to the place on the research instrument from which the figures were obtained for these ratios, as well as those that follow.

The ratio in which the most respondents gave information was for the second ratio; N = 15 for monthly figures and N = 5 for yearly figures (see Table 7. for monthly data and Table 8. for yearly data). Perhaps the respondents were more likely to monitor 'total meals served' based on patient census and thus most had this figure readily available. Total meals prepared' should have been just as easily obtained from production sheets and just as many ratios built. Possibly respondents are not using their production sheets as a management tool to control food resources. If respondents choose to monitor both 'total meals prepared' and 'total meals served' over total labor hours worked they could monitor the efficiency of their forecasting and food production by observing the spread or the correlation of the two ratios. On the other hand, certain productivity ratios resembled each other in terms of the patterns obtained over time. It can be postulated that the measurement of one ratio will reflect the other, thus either ratio can be used to measure productivity. The ratios with high correlation are the following:

- 1)  $\frac{\text{total meals prepared}}{\text{total labor hours worked}}$  and 3)  $\frac{\text{total servings prepared}}{\text{total labor hours worked}}$

- 2)  $\frac{\text{total meals served}}{\text{total labor hours worked}}$  and 4)  $\frac{\text{total meals prepared}}{\text{total labor hours paid}}$

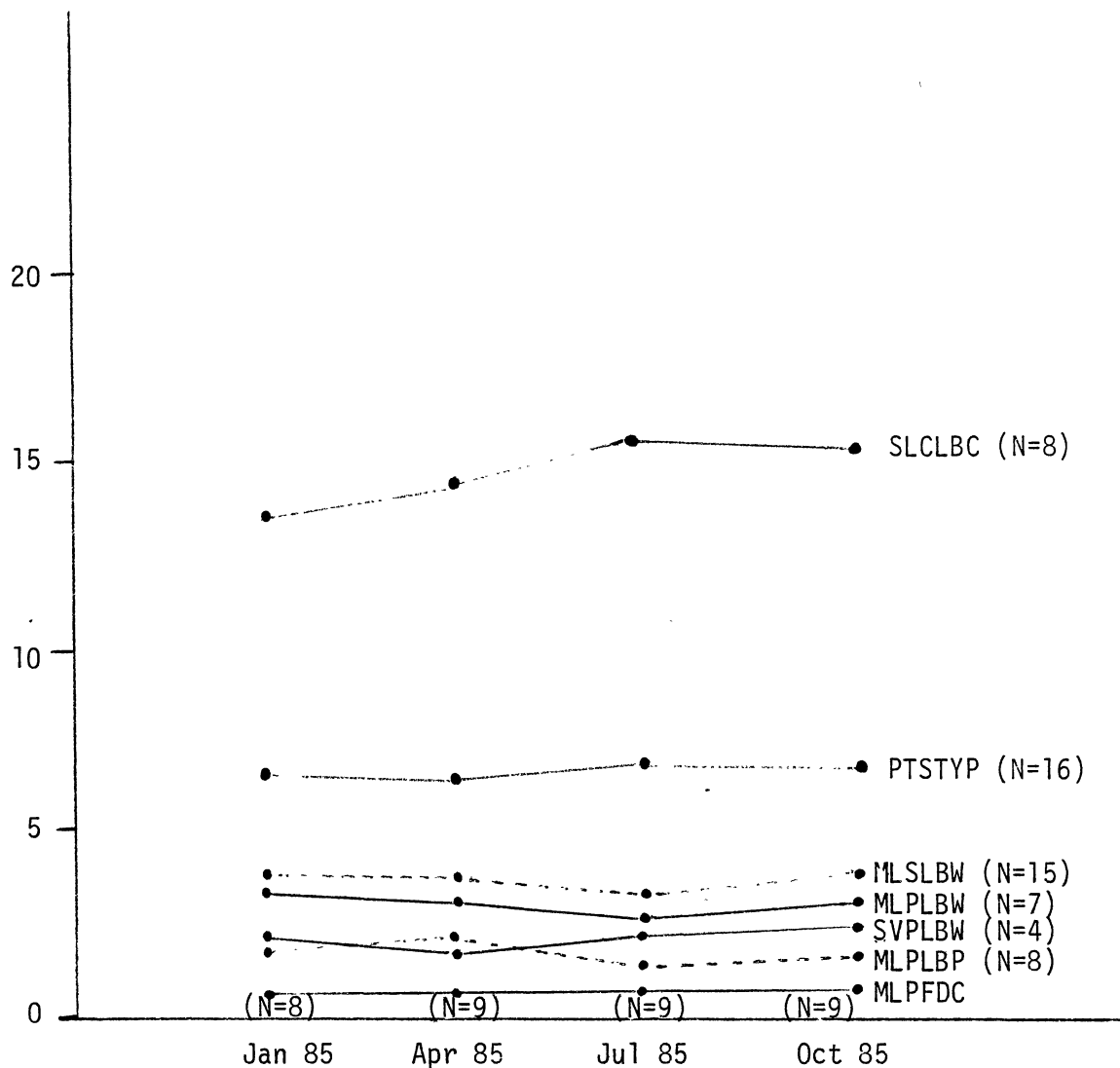
These findings are identical to Mayo's (1981) study which was conducted in school foodservice units. This proves that productivity can be tracked and monitored throughout the industry and that a concise set of productivity measures can be developed. However, the measures should be devised for monthly control as drastic fluctuations are observed with the yearly ratios (Figure 12) as opposed to the monthly ratios (Figure 11). These fluctuations could be attributed to the number of ratios built for each period, but also they are caused by the length of the period in which the ratio covers. With monthly measures an institution will obtain more accurate information which will be a better indication of the actual productivity levels within the foodservice department.

#### Effectiveness/Profitability Ratio

The effectiveness ratio had very little input data and as a result a maximum of six ratios could be made for the monthly figures, and a maximum of four could be made for the yearly figures. The effectiveness ratio is:

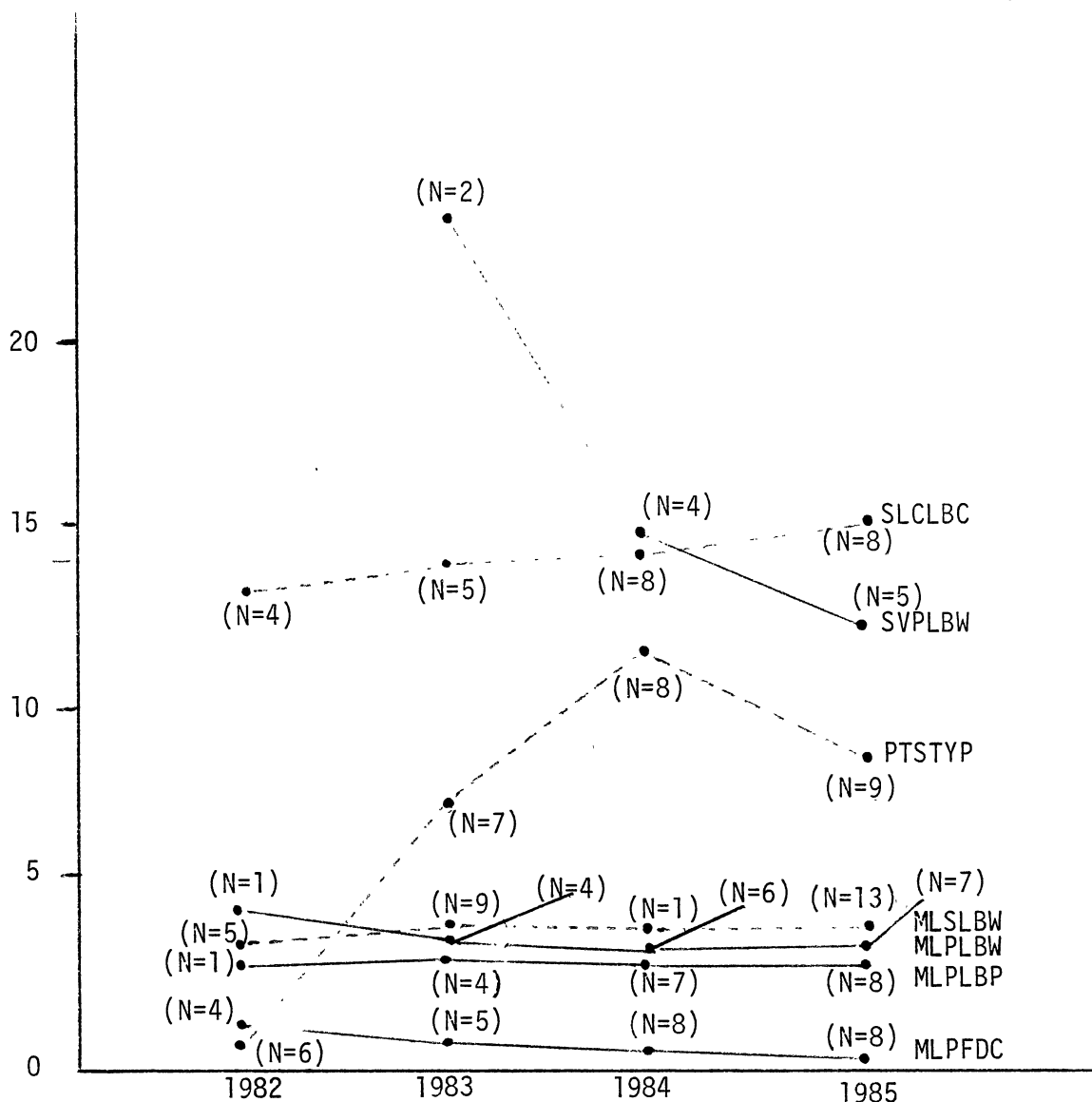
$$\frac{{}^{12}\text{forecasted volume of sales}}{{}^{11}\text{actual volume of sales}}$$

From the monthly trend (Figure 13) it is observed that effectiveness decreases in the second period, increases in the third and begins to decrease again in the fourth period. This information could be beneficial to the purchasing agent and the foodservice director in terms of decreasing inventory levels with decreasing needs or indicating times for foodservice promotions and cafeteria specials. The yearly



- MLPLBW =  $\frac{\text{Total Meals Prepared}}{\text{Total Labor Hours Worked}}$
- MLSLBW =  $\frac{\text{Total Meals Served}}{\text{Total Labor Hours Worked}}$
- SVPLBW =  $\frac{\text{Total Servings Prepared}}{\text{Total Labor Hours Worked}}$
- SLCLBC =  $\frac{\text{Sales (Cafeteria)}}{\text{Labor Hours Worked (Cafeteria)}}$
- MLPFDC =  $\frac{\text{Total Meals Prepared}}{\text{Total Food Cost}}$
- MLPLBP =  $\frac{\text{Total Meals Prepared}}{\text{Total Labor Hours Paid}}$
- PTSTYP =  $\frac{\text{Patients Served}}{\text{Trays Prepared}}$

Figure 11. Monthly Trends of Productivity Ratios



- MLPLBW =  $\frac{\text{Total Meals Prepared}}{\text{Total Labor Hours Worked}}$
- MSLBWB =  $\frac{\text{Total Meals Served}}{\text{Total Labor Hours Worked}}$
- SVPLBW =  $\frac{\text{Total Servings Prepared}}{\text{Total Labor Hours Worked}}$
- SLCLBC =  $\frac{\text{Sales (Cafeteria)}}{\text{Labor Hours Worked (Cafeteria)}}$
- MLPFDC =  $\frac{\text{Total Meals Prepared}}{\text{Total Food Cost}}$
- MLPLBP =  $\frac{\text{Total Meals Prepared}}{\text{Total Labor Hours Paid}}$
- PTSTYP =  $\frac{\text{Patients Served}}{\text{Trays Prepared}}$

Figure 12. Yearly Trends of Productivity Ratios

trend (Figure 14) with a continuous decline could be important information for the foodservice director as well as the hospital administration in terms of making decisions regarding the future of the foodservice department.

Overall, it is observed that many hospital foodservice units do not forecast their volume of sales. This is detrimental to a foodservice unit as without a forecasted goal motivation to achieve a high sales volume and ultimate profit is minimal.

### Efficiency Ratios

Four ratios can measure the efficiency in which resources are used. The ratios are the following:

- 1)  $\frac{14 \text{ money budgeted for materials}}{13 \text{ money spent for materials}}$
- 2)  $\frac{16 \text{ money budgeted for labor}}{15 \text{ money spent for labor}}$
- 3)  $\frac{18 \text{ money budgeted for captial improvements}}{17 \text{ money spent for captial improvements}}$
- 4)  $\frac{20 \text{ money budgeted for utilities}}{19 \text{ money spent for utlities}}$

Respondents gave the most information for the efficiency ratio regarding materials. A maximum of 14 ratios could be built with the monthly figures, while a maximum of 13 ratios could be built with the yearly figures. The ratio with the least amount of input data is the utility ratio and as a result only two ratios can be made with the monthly figures and none can be made for the yearly data. These findings are exactly the same as the other OSU foodservice studies in which researchers found that materials and labor are closely monitored and therefore controlled, while utilities are ignored. This leads to

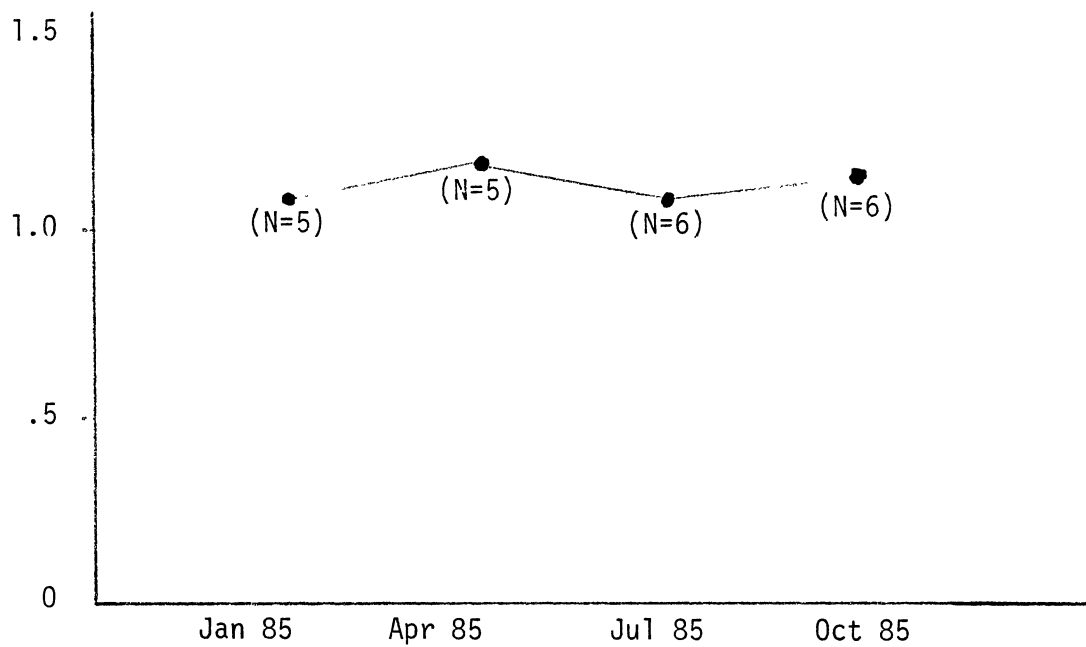


Figure 13. Monthly Trend of Effectiveness/Profitability Ratio

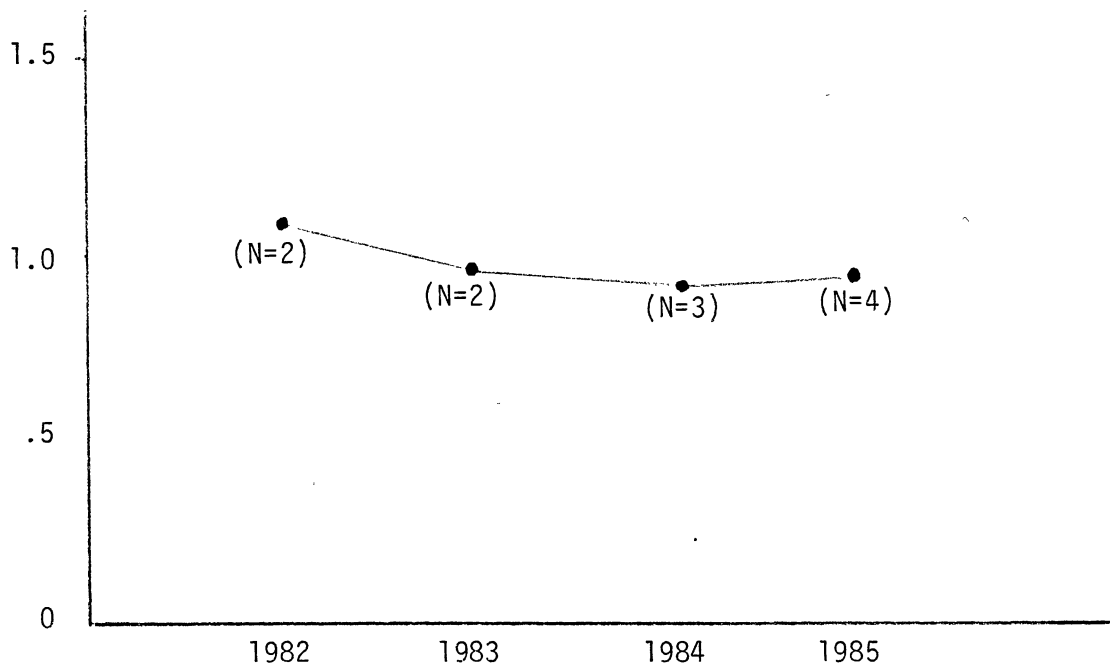
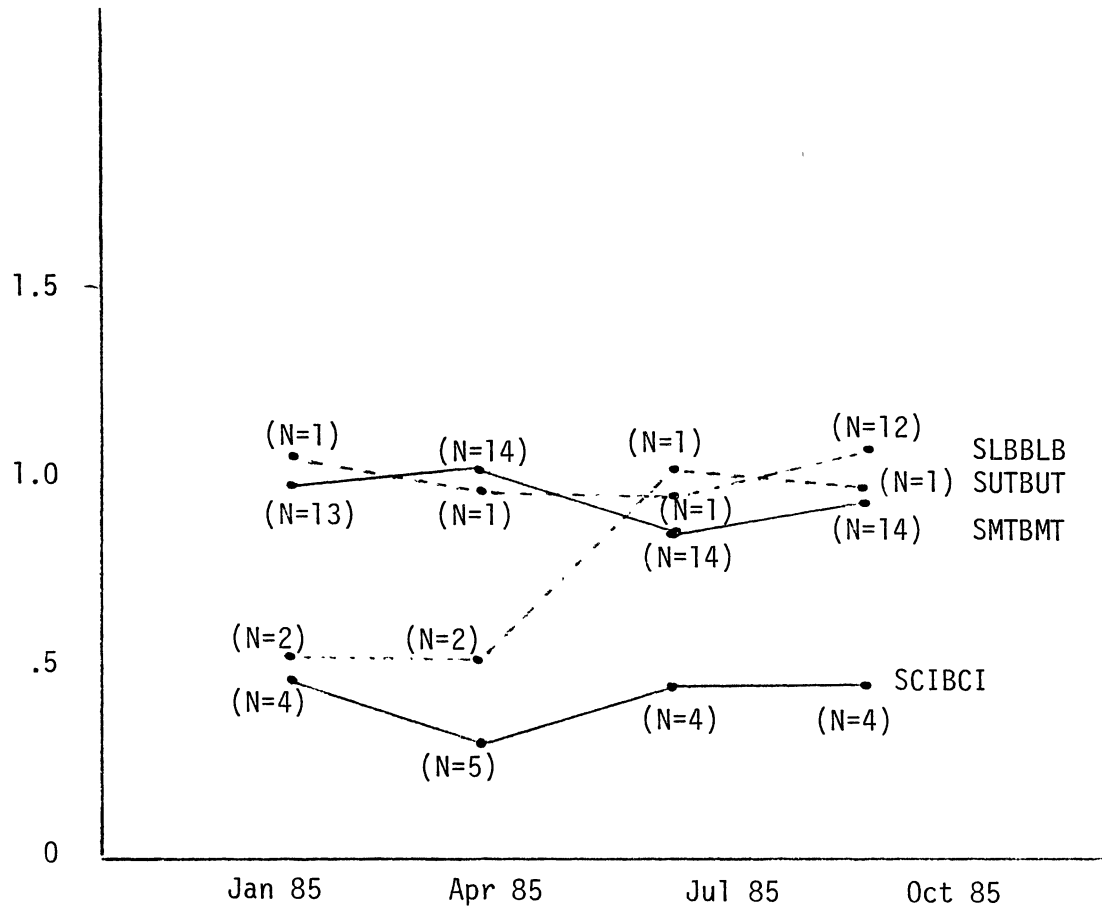


Figure 14. Yearly Trend of Effectiveness/Profitability Ratio



SMTBMT =  $\frac{\text{Money Spent for Material}}{\text{Money Budgeted for Materials}}$   
 SLBBLB =  $\frac{\text{Money Spent for Labor}}{\text{Money Budgeted for Labor}}$   
 SCIBCI =  $\frac{\text{Money Spent for Captial Improvements}}{\text{Money Budgeted for Capital Improvements}}$   
 SUTBUT =  $\frac{\text{Money Spent for Utilities}}{\text{Money Budgeted for Utilities}}$

Figure 15. Monthly Trends of Efficiency Ratios



the misallocation of resources in the unit which can be detrimental to the foodservice department and reflect a distorted analysis of performance. Tracking these figures monthly as opposed to yearly will ensure that each resource area is using the appropriate percentage of the budget that was allocated to it for the whole fiscal year. Figure 16 represents a distorted analysis of capital improvement performance for the yearly figure of 1983 as one institution most likely was renovated. Thus, monthly measures will most accurately reflect resource consumption in regards to efficient use.

### Absenteeism Ratio

The absenteeism ratio is complex and as a result only three ratio's could be made with yearly figures. The ratio is as follows:

$$\text{Absenteeism} = \frac{A}{(H) (D) (E)}$$

where:

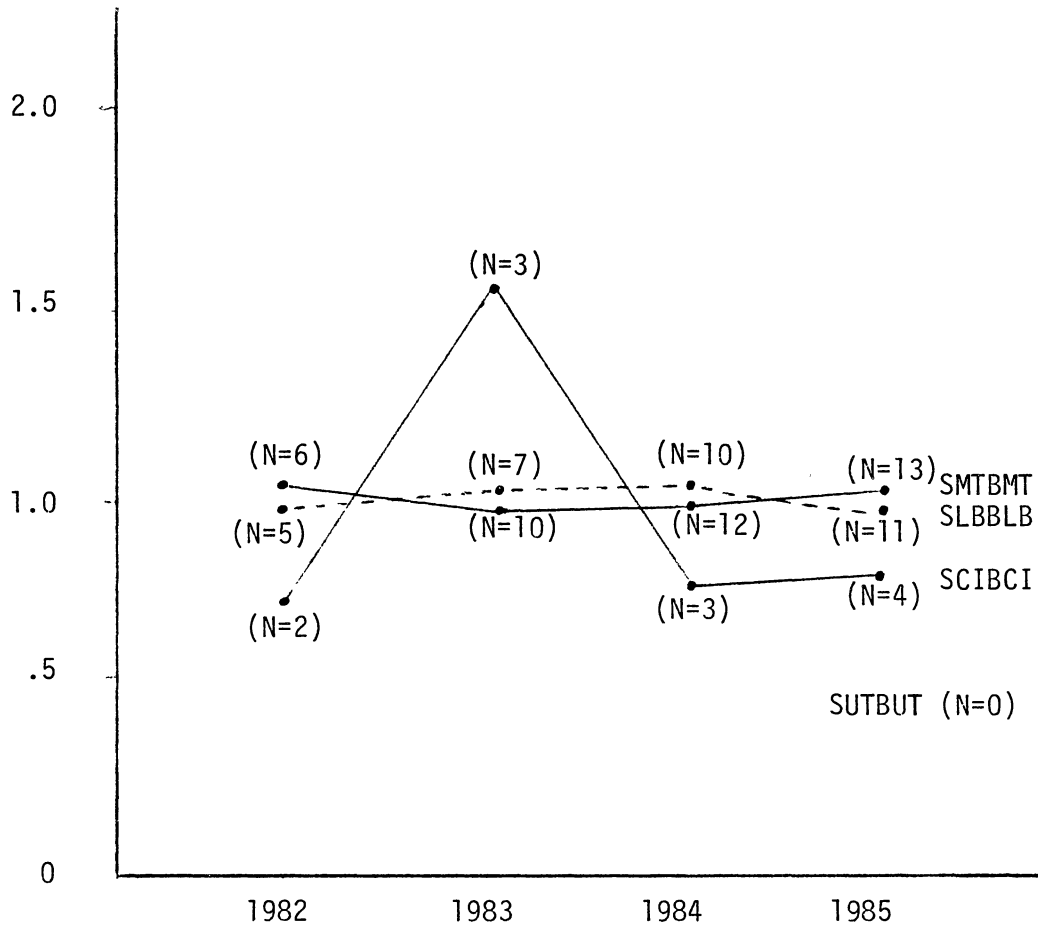
A = total unauthorized absentee hours for the time period

A = average daily hours for employees

D = number of days during the time period

e = average number of employees on the payroll

This ratio is developed to differentiate between casual or unauthorized absences and those being incurred as paid absences. However, since most respondents do not separate unauthorized absence from holidays, vacation and annual leave, very few ratios could be made. In Figure 17 it is observed that there is a drastic increase in the absence among foodservice workers. This trend could be caused by the increased number of ratio built as time moves on or more than likely it reflects an increasing dissatisfaction among workers. The latter is probably true as an average of only 47% of the respondents had some type



$$\text{SMTBMT} = \frac{\text{Money Spent for Material}}{\text{Money Budgeted for Materials}}$$

$$\text{SLBBLB} = \frac{\text{Money Spent for Labor}}{\text{Money Budgeted for Labor}}$$

$$\text{SCIBCI} = \frac{\text{Money Spent for Capital Improvements}}{\text{Money Budgeted for Capital Improvements}}$$

$$\text{SUTBUT} = \frac{\text{Money Spent for Utilities}}{\text{Money Budgeted for Utilities}}$$

Figure 16. Yearly Trends of Efficiency Ratios

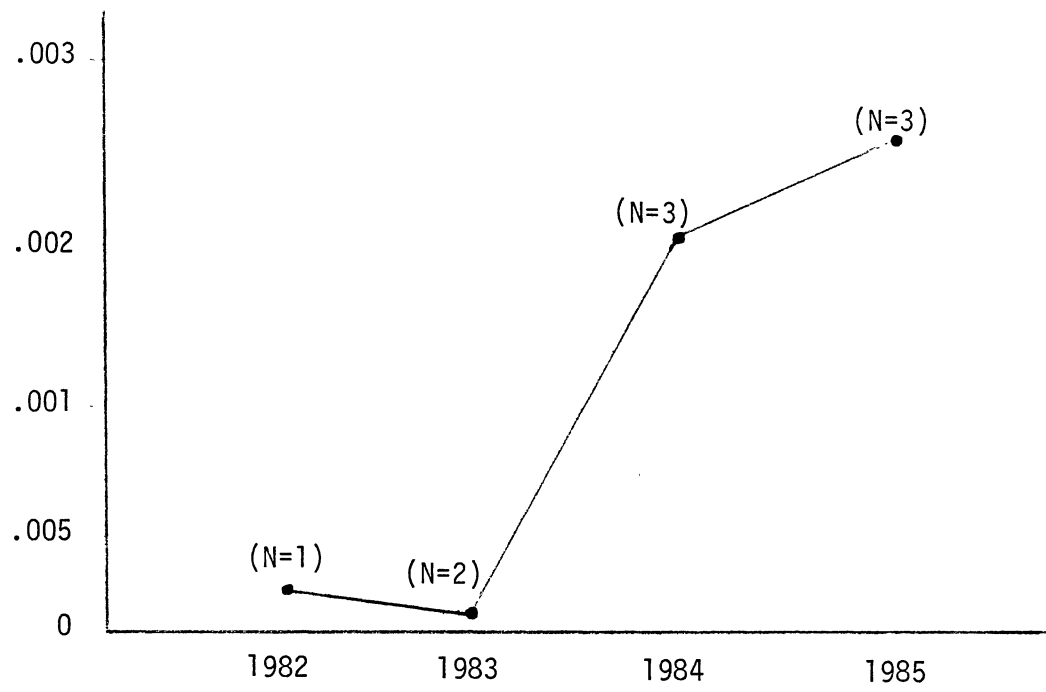


Figure 17. Yearly Trend of Absenteeism Ratio

of measure to enhance QWL for their employees. This is detrimental to the foodservice department as negative QWL perceptions lead employees to withdrawal behaviors such as unauthorized employee absences which add up to tremendous costs for the foodservice department.

### Implications

Past performance improvements in foodservice were thought to be a function of physical facilities and lay-out, types of food used and technical operation procedures. Presently, performance improvements take a more humanistic and wholistic approach as they are thought to be functions of scheduling personnel, system of materials handling, work methods, standards of production and service, degree of training of personnel and general management procedures (Robertson, 1982). The proposed model incorporated the current thought by providing ratios to measure performance and criteria to monitor and control the aforementioned functions. It is the intent of the author of the model to be a data base in which foodservice managers can compare their own department performance as well as compare against their competitor's performance. A standardized model such as this one benefits the whole foodservice industry by creating a competitive within the industry through the setting of output goals and preventing the ineffective and inefficient use of labor, materials and energy.

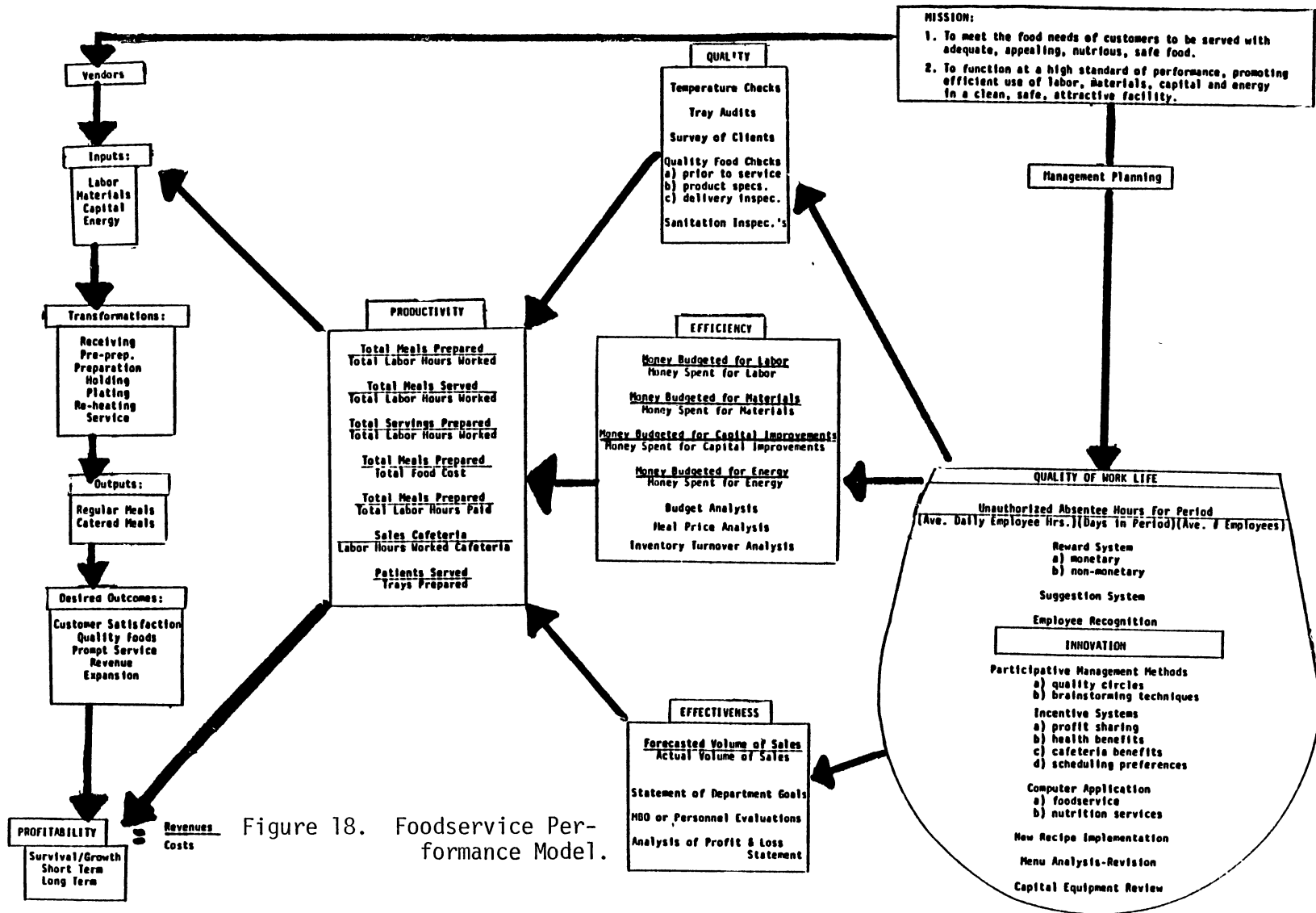


Figure 18. Foodservice Performance Model.

## CHAPTER V

### SUMMARY, RECOMMENDATIONS, AND IMPLICATION

The objectives which guided this study were: to validate 32 performance indicators over a specific time period; to discover which of the 32 indicators most accurately reflects organizational performance; to develop a concise list of standard measures of productivity, profitability, efficiency, effectiveness, quality, quality of work life and innovation which will help establish a base for strategies to improve foodservice systems; to identify factors which hinder attainment of optimum organizational performance; to make suggestions as to how performance standards can be used by hospital foodservice managers; and to propose a performance model for use in the foodservice industry.

To accomplish these objectives, a closed-question instrument was mailed to the foodservice directors of all accredited United States hospitals with 500 or more beds. The population surveyed was 561 hospitals of which 70 returned questionnaires. However, the response rate for analysis was approximately 10 percent (N = 55 for demographic analysis and N = 56 for performance ratio and performance measure analysis) as two percent (N = 14) of the survey participants returned blank questionnaires stating their hospital did not want to participate in the study due to time constraints and the complex data required to complete the survey. Because of this low response rate it was decided to use only descriptive analysis to report the data rather than the planned

statistical analysis. Descriptive analysis hopefully will benefit future studies that may use this research as a model to analyze organization performance.

#### Description of the Sample

Sixty-seven percent of the survey participants were 40 years of age or older, while 33 were 39 years of age or less. Fifty-six percent of the respondents had earned a bachelors degree, while 40 percent had earned either a master's or an MBA degree. One respondents had earned a Ph.D., and one respondent has a three year accounting certificate (Table III).

Seventy-eight percent of the respondents were registered dietitians whereas 22 percent were not registered. An internship was the most frequently used route to ADA registration (65%) while close to one fifth of the participants used a three year preplanned work experience. The CUP program was the least used route (Figure 5).

Eighty-four percent of the respondents held position titles of director, nine percent were titled assistant or associated director and six percent were titled as administrative dietitian. Over one-fourth (18%) of the sample earned between \$30,000 and \$34,000 annually, while 24% received \$29,000 or below and 48 percent received \$35,000 or above (Table V). Forty-two percent of the respondents had 16 or more years of experience, one-fourth had 11 to 15 years of experience, 24 percent had 6 to 10 years of experience and nine percent had one to five years of experience. Ninety-six percent of the participants had received training in productivity measurement in contrast to a mere 2 percent who had not received such training. Ninty-one percent of the respondents were

members of one or more professional organizations, while nine percent had no professional affiliation at all.

Institutions represented were all non-profit and included 64 percent non-federal (state, county, city) 20 percent non-government (church affiliated and 16 percent federally owned. Fifty-five percent of the institutions provided specialized services, (of this number 73% provide psychiatric or mental health services) and the remaining 45 percent provided general medical services. Ninety-three percent of the respondents were employed by institutions that have independent, non-contract management, while seven percent were employed in institutions with a contract foodservice management company. Eighty-five percent of the institutions had conventional foodservice systems, while only 15 percent had departments with satellite units, cook/chill and cook/freeze foodservice systems.

#### Performance Measures

The common quality measures identified from previous OSU research were: temperature checks, tray audits, patient surveys and quality food checks both prior to service and through product specifications. On the average, 83 percent of the survey participants used one or more of the quality measures. Similarity, Shaw (1983), Pickere1 (1984), and Putz (1985) found that 98 percent, 96 percent and 92 percent respectively, of their survey participants used these specific quality measures. Conducting a temperature check of the food was the quality control most frequently used (91%), whereas written product specifications was the least used (73%) quality control measure.



Measures for assessing effectiveness are statement of department goals and management by objectives. Over 80 percent of the survey participants used one or both measures. MBO or personnel evaluations were used more often by respondents (86%) than statements of department goals (80%).

Quality of work life (QWL) measures identified in previous studies were: reward systems both monetary and non-monetary, suggestion system and employee recognition. Overall, the use of any one of these QWL was very low with an average use of 47 percent. Similarly, Shaw (1983), Pickere1 (1984) and Putz (1985) found that 66 percent, 36 percent and 40 percent respectively of their survey participants used these specific QWL measures. Monetary and non-monetary rewards were the least used QWL measures (33% and 36% respectively), while employee recognition is the most frequently used (76%) QWL measures.

Numerous innovative measures were identified in previous research which include: new types of methods, processes, management techniques and incentive systems. Use of the innovative measures fluctuated drastically from an 82 percent use of new menus to only a 25 percent use of quality circles as a participative management technique. Overall, an average of 46 percent of the respondents used one or more of the innovative measures. Similar findings were obtained from the previous OSU foodservice studies with over 50 percent of the respondents using one or more of the innovative measures.

Certain performance measures may reflect, or be a part of more than one criteria. Such is the case with the various incentive systems used in the foodservice industry. The incentives may reflect innovation or QWL or both. Foodservice incentive systems identified from previous

research included; profit sharing, health benefits, cafeteria benefits, scheduling preferences and unused sick leave conversion to vacation time. Use of these measures was extremely low with only a 29 percent average among all five systems. Similar low responses in regards to incentive systems were observed in the previous research: Shaw (1983), nine percent; Pickere1 (1984), 28 percent; and Putz (1985, 22 percent. Profit sharing in the present research was the least used (5%) incentive system, whereas health benefits was the most commonly used (73%) incentive system.

Efficiency measures identified in previous research were; meal price analysis, budget analysis and inventory turnover analysis. Since proper use of resources is directly related to profitability (revenue-costs) based on minimal cost, a large number of respondents (73%) used one or more of the identified efficiency measures. Budget analysis was the most commonly used (79%) efficiency measure among respondents. Budget analysis was also a popular efficiency measure in the other foodservice studies: Shaw (1983), 67 percent; Lamb (1984), 41 percent; and Putz (1985), 69 percent.

Profitability measures in hospital foodservice systems can actually be the source of the profits. In this research catering services were identified as being a profit source. More than half of the respondents (57%) capitalized on in-house catering of their hospital. Public catering was the least offered service as only 21 percent of the respondents provide it for customers outside of the hospital.

## Performance Ratios

Thirteen performance ratios were built from the numerical figures given by respondents in the performance index section of the research instrument. Many respondents did not completely fill out this section of the questionnaire and as a result either a numerator or denominator for a ratio was missing. Consequently, few ratios were able to be built and results may not be a true reflection of the performance levels in dietary departments of hospitals.

Seven ratios were constructed to specifically measure productivity. The ratios are as follows;

- |  |  |
|--|--|
| 1) $\frac{1 \text{ total meals prepared}}{6 \text{ total labor hours worked}}$     | 5) $\frac{9 \text{ total meals prepared}}{10 \text{ total food cost}}$       |
| → 2) $\frac{2 \text{ total meals served}}{6 \text{ total labor hours worked}}$     | 6) $\frac{1 \text{ total meals prepared}}{8 \text{ total labor hours paid}}$ |
| 3) $\frac{3 \text{ total servings prepared}}{6 \text{ total labor hours worked}}$  | 7) $\frac{4 \text{ patients served}}{5 \text{ trays prepared}}$              |
| 4) $\frac{9 \text{ sales (Cafeteria)}}{10 \text{ labor hours worked (Cafeteria)}}$ |  |

Note: the numbers to the left of the ratio components correspond to the place on the research instrument from which the figures were obtained

The ratio in which the most respondents (N = 15 for monthly figures and N = 5 for yearly figures) provided information for was the second ratio. Productivity ratios which correlated with each other in terms of the pattern obtained over the time were the following:

- |  |     |   |
|--|-----|---|
| 1) $\frac{\text{total meals prepared}}{\text{total labor hours worked}}$ | and | 3) $\frac{\text{total servings prepared}}{\text{total labor hours worked}}$ |
| 2) $\frac{\text{total meals served}}{\text{total labor hours worked}}$   | and | 6) $\frac{\text{total meals prepared}}{\text{total labor hours paid}}$      |

These findings are identical to Mayo's (1981) study which was conducted in school foodservice departments. From this standpoint it can be postulated that the measurement of one ratio will reflect the other, which means either ratio can be used to measure productivity. Hence the groundwork for developing a concise list of productivity measures has begun.

The one effectiveness ratio received very little input data and as a result a maximum of 6 ratios were constructed for the monthly figures, and a maximum of 4 were constructed for yearly figures. The effectiveness ratio used was:

$$\frac{11 \text{ actual volume of sales}}{12 \text{ forecasted volume of sales}}$$

From the data it was observed that many hospital foodservice units do not forecast their volume of sales. This can be detrimental to an operation because without a forecasted goal stated motivation to achieve a high sales volume is minimal.

Four ratios measured the efficiency with which resources are used in an operation. The ratios are as follows:

- 1)  $\frac{14 \text{ money budgeted for materials}}{13 \text{ money spent for materials}}$
- 2)  $\frac{16 \text{ money budgeted for labor}}{15 \text{ money spent for labor}}$
- 3)  $\frac{18 \text{ money budgeted for captial improvements}}{17 \text{ money spent for captial improvements}}$
- 4)  $\frac{20 \text{ money budgeted for utilities}}{19 \text{ money spent for utilities}}$

Respondents provided the most data for efficiency ratio number one regarding materials and a maximum of 14 ratios were constructed with the monthly figures, while a maximum of 13 ratios were constructed with the

yearly figures. The least amount of data was provided for ratio number four regarding utilities and as a result a maximum of two ratios were constructed with the monthly figures and no ratios could be formed with the yearly figures. These findings are similar to the other OSU foodservice studies which found that material and labor costs are closely monitored while utilities are virtually ignored. This is also detrimental to a foodservice operation as cash will flow from measured to unmeasured areas resulting in the inefficient use of funds with no specific means to identify where the funds are going because all the resource areas are not being monitored.

The absenteeism ratio was complex and as a result only three ratios were constructed with the yearly figures. The ratio and components are as follows:

$$\text{Absenteeism} = \frac{A}{(H) (D) (E)}$$

where:

A = total unauthorized absentee hours  
for the time period

H = average daily hours for employees

D = number of day during the time period

E = average number of employees on the  
payroll

This ratio was chosen since it would be the most accurate to determine 'casual absences' or unauthorized absences. However, most of the respondents do not separate these absences from the paid absences such as holidays, vacation and annual leave. Again, this is detrimental to the foodservice operation as management is not monitoring the level of perceived QWL among employees. Negative QWL perceptions lead employees

to withdrawal behaviors such as unscheduled absences which add up to tremendous costs to the foodservice departments.

## Recommendations

### Questionnaire

A major limitation of this study was the low response rate. Although this survey instrument was examined for clarity and understanding, many respondents were confused or uncertain of a large number of terms and data requested. In addition, many respondents were overwhelmed by the complexity of the instrument and the vast amount of data required to complete it. Even with a productivity module enclosed to facilitate understanding of the instrument and a second mailing to over 500 non-respondents, the response rate was extremely low. One possible solution to this problem would have been to break the study into smaller parts and not require so much data from each respondent.

### Recommendations Based on the Results of the Study

1. The majority of respondents stated they had received some type of productivity training; however many experienced difficulty in completing the questionnaire. Additional training via seminars or educational material on performance/productivity measurement should be promoted within the foodservice industry. In addition, the curriculum and content matter of existing education on productivity needs to be assessed and evaluated for its effectiveness in relaying knowledge.

2. Because of the low response rate, additional studies are needed to validate existing ratios and measures and identify their effectiveness in monitoring organizational performance.

3. Dietitians need to be encouraged to become more knowledgeable with administrative controls available to monitor organizational performance. Once they realize the benefits of these controls dietitians can start implementing improvement strategies for their foodservice operation.

4. The results of this study and the previous foodservice studies indicate respondents measure outputs and inputs of their foodservice systems, however they did not appear to incorporate the information into performance ratios or intervene with performance measures to control and improve their service operations. The following performance model was designed by the author to monitor and control a foodservice system. The proposed model has the functions of a foodservice system interwoven with the seven performance criteria and the ratios and measures listed to control and monitor each criteria.

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APPENDIXES



APPENDIX A

PRELIMINARY STUDY QUESTIONNAIRE



10. Financial goals of hospital:  
 (1) Profit  (2) Non-Profit
11. Type of hospital control:  
 (1) Federally owned  
 (2) Non-federal (state, county, city)  
 (3) Non-government, non-profit (church)  
 (4) Investor-owned, for profit (private, partnership, corp.)  
 (5) Other, please specify \_\_\_\_\_.
12. Type of medical service provided:  
 (1) General  
 (2) Special, please specify \_\_\_\_\_.
13. Size of hospital:  
 (1) < 450 beds  (3) 501-550 beds  
 (2) 451-500 beds  (4) 551 and above
14. Hospital location:  
 (1) Rural (1 - 2,499 inhabitants)  
 (2) Urban (2,500 - 49,999 inhabitants)  
 (3) Metropolitan (50,000 and above inhabitants)
15. Type of foodservice management:  
 (1) Contract  (2) Non-Contract
16. Type of foodservice system:  
 (1) Conventional  
 (2) Other, please specify \_\_\_\_\_.
17. Current year budget for foodservice:  
 (1) < \$499,999  
 (2) \$500,000-999,999  
 (3) \$1,000,000-2,499,999  
 (4) \$2,500,000-4,999,999  
 (5) \$5,000,000 and above
18. Training program for management staff available:  
 (1) Yes  (2) No
19. If answer to number 18 is yes, are the trainings:  
 (1) Provided in-house by Personnel Dept. or other dept.  
 (2) Outside attendance to workshops, seminars, ect.

10. Financial goals of hospital:  
 (1) Profit  (2) Non-Profit
11. Type of hospital:  
 (1) General  (3) Specialized  
 (2) Community  (4) University
12. Hospital location:  
 (1) Urban  
 (2) Suburban  
 (3) Rural
13. Type of foodservice management:  
 (1) Contract  (2) Non-Contract
14. Type of foodservice system:  
 (1) Conventional  
 (2) Other, please specify \_\_\_\_\_.
15. Average yearly revenue of foodservice:  
 (1) < \$499,000  
 (2) \$500,000-999,999  
 (3) \$1,000,000-2,499,000  
 (4) \$2,500,000 and above
16. Training program for management staff available:  
 (1) Yes  (2) No
17. If answer to number 16 is yes, are the trainings:  
 (1) Provided in-house by Personnel Dept. or other dept.  
 (2) Outside attendance to workshops, seminars, ect.

## II. PERFORMANCE MEASURES

Directions: Please provide your Jan-June and July-December 1985 percentages for the following performance measures. If you do not currently use these measures we ask that you supply the numbers so they can be computed.

	<u>Jan-June</u>	<u>July-Dec</u>
1. % Turnover $\frac{\text{number of employees who left department}}{\text{total employees}} \times 100$		
2. % Absenteeism $\frac{\text{number of employee absences}}{\text{number of scheduled employees}} \times 100$		

Directions: Please provide your January, April, July, and October 1985 figures for the following ratios. If you do not currently use these ratios we ask that you supply the numbers so they can be computed.

	<u>January</u>	<u>April</u>	<u>July</u>	<u>October</u>
1. <u>Meals Prepared</u> <u>Labor Hours Worked</u>				
2. <u>Meals Served</u> <u>Labor Hours Worked</u>				
3. <u>Servings</u> <u>Labor Hours Worked</u>				
4. <u>Sales (Cafeteria Only)</u> <u>Labor Hours Worked (Cafeteria Only)</u>				
5. <u>Meals Prepared</u> <u>Total Food Cost</u>				
6. <u>Meals Prepared</u> <u>Labor Hours Paid</u>				
7. <u>Patients Served</u> <u>Trays Prepared</u>				
8. <u>Actual Volume of Sales</u> <u>Forecasted Volume of Sales</u>				
9. <u>Actual Utilization of Materials</u> <u>Forecasted Utilization</u>				
10. <u>Actual Utilization of Labor</u> <u>Forecasted Utilization</u>				
11. <u>Actual Utilization of Capital</u> <u>Forecasted Utilization</u>				
12. <u>Actual Utilization of Energy</u> <u>Forecasted Utilization</u>				

IV. STANDARD FORMS UTILIZED FOR PERFORMANCE MEASURES

Directions: Please respond by checking the appropriate column when answering the following question:  
"Do you have or use a form for measuring the following?"

	<u>YES</u>	<u>NO</u>
1. Temperature Checks		
2. Tray Audits		
3. Patient Surveys		
4. Quality Food Checks		
5. MBO		
6. Menu Analysis		
7. Equipment Review		
8. Suggestion Form		
9. Meal Price Analysis		
10. Budget Analysis		
11. Inventory Analysis		

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Please check to see if you have completed five pages.

\*Please feel free to write in any suggestions or comments relating to productivity in the space below.

THANK YOU FOR YOUR PARTICIPATION

APPENDIX B  
CORRESPONDENCE



*Oklahoma State University*

DEPARTMENT OF FOOD, NUTRITION AND INSTITUTION ADMINISTRATION  
COLLEGE OF HOME ECONOMICS

STILLWATER, OKLAHOMA 74078  
HOME ECONOMICS WEST 425  
(405) 624-5039

February 5, 1986

Dear Colleague:

In the early 1970's "productivity" was best understood by the economist and the industrial engineer. Now, in the 1980's, "productivity" measurement and improvement strategies are becoming better understood by managers and foodservice administrators. Although productivity measurement and evaluation models are available for manufacturing companies, no such model exists for the evaluation and improvement of productivity and ultimately performance in the foodservice industry. Thus, a dire need exists for the development of a standard organizational performance model to curtail the declining productivity rates in the foodservice industry.

This study will synthesize the ratios and indexes identified as measures of productivity from four previous studies at Oklahoma State University in the foodservice systems of health care, school foodservice, college and universities, and restaurants. In validating measures of productivity, we would like to know your performance figures which fit into the indexes, and how you evaluate performance measures in your foodservice department. A brief module is provided to assist in your understanding of productivity. The information you convey to us will be held in strict confidence. At no time will you or the facilities you serve be identified in the research report. The code number on your questionnaire is to facilitate response follow-up. If you would like your performance results calculated into productivity ratios for your own departmental analysis, please indicate so on the last page of the questionnaire. Your results would be mailed to you in April.

We hope you are fascinated with the idea of developing a productivity model. Such a model will make the competitive difference by setting output goals and preventing ineffective and inefficient use of labor, materials, and energy. Kindly re-fold, staple, and return completed questionnaire by February 28, 1986. Your input will be highly beneficial to this research endeavor. If you have any questions please feel free to call us, (405) 624-5039. Thank you for your time and professional assistance.

Sincerely,

*Mary Kay Lischke*  
Mary Kay Lischke, R.D.  
Graduate Research Assistant

*Lea L. Ebro*  
Lea L. Ebro, Ph.D., R.D.  
Professor and Interim Head  
Department of Food, Nutrition  
and Institution Administration







*Oklahoma State University*

DEPARTMENT OF FOOD, NUTRITION AND INSTITUTION ADMINISTRATION  
COLLEGE OF HOME ECONOMICS

STILLWATER, OKLAHOMA 74078  
HOME ECONOMICS WEST 425  
(405) 624-5039

March 1, 1986

Dear Colleague:

Three weeks ago we sent you a productivity measurement research questionnaire. We believe improving productivity is a worthwhile and constant goal of good management.

The information you provide will assist in validating ratios and indexes identified as measures of productivity from four previous studies conducted at Oklahoma State University. We really need your input to validate our proposed productivity measures.

Kindly refold, staple, and return completed questionnaire by March 15, 1986. If you have already returned the questionnaire, thank you once again for your cooperation and professional assistance.

Sincerely,

*Mary Kay Lischke*  
Mary Kay Lischke, R.D.  
Graduate Research Assistant

*Lea L. Ebro*  
Lea L. Ebro, Ph.D., R.D.  
Professor and Interim Head  
Department of Food, Nutrition  
and Institution Administration



APPENDIX C  
RESEARCH INSTRUMENT

## PRODUCTIVITY INFORMATION MODULE

## I. Purpose

The purpose of productivity measurement is to determine how well resources are brought together in an organization and utilized for accomplishing a desired set of results. The ultimate goal of measurement is to reach the highest level of performance with the least expenditure of resources. Measurement is an important tool since it can determine whether the best mixture of labor, capital, and materials is present in a foodservice operation. In addition, if measurement figures are compared over time, management can determine when productivity improvement occurs or better yet, when it needs to occur.

## II. Objective

The objective of productivity measurement is to improve operational performance. Improvement results from managing and intervening upon key transformations or work processes. Productivity improves when:

- 1) ↑ Output, ↓ Input
- 2) ↑ Output, — Input (input remains constant)
- 3) ↑ Output, ± Input (input increases at a slower rate)
- 4) — Output, ↓ Input (output remains constant)
- 5) ↓ Output, √ Input (input decreases at a faster rate)

## III. Scope

The specific measures of organizational performance are comprised of seven criteria. Each criterion is defined as follows:

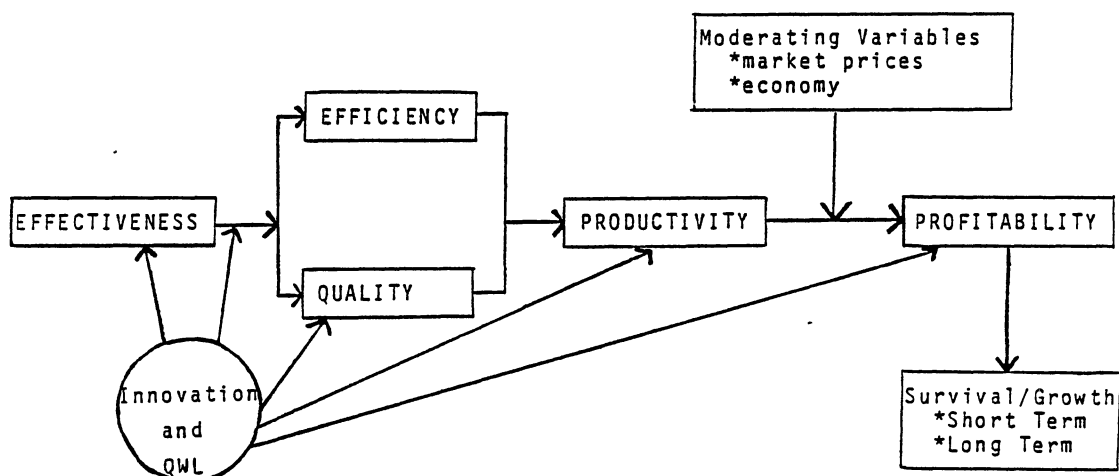
- 1) Productivity: Ratio of quantities of outputs to quantities of inputs. These outputs and inputs must be for the same unit of time.
- 2) Effectiveness: "Doing the right things", or the degree of achievement of objectives.
- 3) Efficiency: "Doing things right", or the ratio of resources expected to be consumed to resources actually consumed.
- 4) Quality: The degree of the system's conformance to requirements, specifications, and expectations.
- 5) Quality of Work Life: The degree to which work provides an opportunity for an individual to meet a variety of personal needs, to survive with security, to interact with others, to feel useful, to be recognized for achievement, and to have an opportunity to improve one's skill and knowledge.
- 6) Innovation: Deliberate, specific change (ex. introduction of new products/processes), aimed at accomplishing the goals of the system more effectively.
- 7) Profitability/Budgetability: Various financial measures relating total revenues to total cost; budgetability measures are used to assess adherence to a planned budget.

Within the realm of these seven criteria, performance can be measured and evaluated through ratios and indexes. For example, a productivity ratio would be:

$$\frac{\text{Meals Prepared}}{\text{Labor Hours Worked}}$$

An evaluation can be made by indexing the ratio, which is dividing the ratio by itself over time. The evaluation is then based on the change in productivity over time.

The measurement and evaluation of only one criterion, such as profitability, does not provide a realistic nor wholistic picture of organizational performance. Rather, a complete set of performance measures which includes all seven criteria provides the manager and the organization a group of system parameters that can be monitored for diagnosis and ultimately improvement. The following diagram illustrates the causal relationship between the seven criteria, and the necessity for including each one in measuring organizational performance.



Past productivity improvements in foodservice were thought to be a function of physical facilities and lay-out, types of food used and technical operational procedures. Presently, productivity improvement takes a more humanistic and wholistic approach as it is thought to be a function of the method of scheduling personnel, system of materials handling, work methods, standards of production and service, degree of training of personnel and general management procedures. This study incorporates the current thought by measuring the outcomes of the afore mentioned functions. With your assistance, we hope to validate our set of performance measures and establish a functional productivity model which would benefit the whole foodservice industry.





II. PERFORMANCE INDEXES

Directions: Please provide your 1982, 1983, 1984, and 1985 figures for the following performance indexes. Unless otherwise indicated, all figures are total figures from catering, employee, snack shop feeding, etc., as well as patient feeding.

	1982	1983	1984	1985
1. Total Meals Prepared				
2. Total Meals Served				
3. Total Servings Prepared				
4. Total Patients Served				
5. Total Trays Prepared				
6. Total Labor Hours Worked				
7. Total Labor Hours Paid				
8. Total Food Cost				
9. Sales (Cafeteria only)				
10. Labor Hours Worked (Cafeteria only)				
11. Actual Volume of Sales (\$)				
12. Forecasted Volume of Sales (\$)				
13. Money Spent for Materials*				
14. Money Budgeted for Materials				
15. Money Spent for Labor				
16. Money Budgeted for Labor				
17. Money Spent for Capital Improvements				
18. Money Budgeted for Capital Improvements				
19. Money Spent for Utilities**				
20. Money Budgeted for Utilities				
21. Number of Employees Who Left Department				
22. Number of Foodservice Employees				
23. Total "Unauthorized" Absentee Hours for Period				
24. Avg. Daily Employee Hours for Department				

\*Materials include items such as; papergoods/china/flatware/glassware/linens, etc.

\*\*Utilities include all energy costs such as; gas/electricity/water/etc.

II. PERFORMANCE INDEXES

Directions: Please provide your January, April, July, and October 1985 figures for the following performance indexes. Unless otherwise indicated, all figures are total figures from catering, employee, snack shop feeding, etc., as well as patient feeding.

	1985			
	Jan.	April	July	Oct.
1. Total Meals Prepared				
2. Total Meals Served				
3. Total Servings Prepared				
4. Total Patients Served				
5. Total Trays Prepared				
6. Total Labor Hours Worked				
7. Total Labor Hours Paid				
8. Total Food Cost				
9. Sales (Cafeteria only)				
10. Labor Hours Worked (Cafeteria only)				
11. Actual Volume of Sales (\$)				
12. Forecasted Volume of Sales (\$)				
13. Money Spent for Materials*				
14. Money Budgeted for Materials				
15. Money Spent for Labor				
16. Money Budgeted for Labor				
17. Money Spent for Capital Improvements				
18. Money Budgeted for Capital Improvements				
19. Money Spent for Utilities**				
20. Money Budgeted for Utilities				
21. Number of Employees Who Left Department				
22. Number of Foodservice Employees				
23. Total "Unauthorized" Absentee Hours for Period				
24. Avg. Daily Employee Hours for Department				

\*Materials include items such as; papergoods/china/flatware/glassware/linens, etc.

\*\*Utilities include all energy costs such as; gas/electricity/water/etc.



III. PERFORMANCE MEASURES

Directions: Please provide the following information which most accurately describes the current procedures utilized in your operation.

	Is Standard Form or Procedure Utilized?		Frequency of Activity (fill in with Daily, Biweekly, Monthly, Yearly)	Position of Person in charge of activity
	Yes	No		
1. Temperature Checks				
2. Tray Audits				
3. Patient Surveys				
4. Quality Food Checks				
a) Prior to service				
b) Product specifications				
5. Statement of Dept. Goals				
6. MBO or Personnel Evaluations				
7. Reward System				
a) Monetary				
b) Non-Monetary				
8. Suggestion System				
9. Employee Recognition				
10. New Recipe Implementation				
11. Menu Analysis-Revision				
12. Capital Equipment Review				
13. Participative Mgt. Methods				
a) Quality Circles				
b) Brainstorming				
14. Computer Application				
a) Nutrition Services				
b) Foodservice				
15. Incentive Systems				
a) Profit Sharing				
b) Health Benefits				
c) Cafeteria Benefits				
d) Scheduling Preferences				
e) Other, Specify _____.				
16. Meal Price Analysis				
17. Budget Analysis				
18. Inventory Turnover Analysis				
19. Catering				
a) In-House				
b) Satellite				
c) Public				
d) Other, Specify _____.				

Please check to see if you have completed four pages.

PLEASE INDICATE BELOW IF YOU WOULD LIKE YOUR PERFORMANCE RESULTS. → *if yes, what's how?*  
 \_\_\_\_\_ (1) yes      \_\_\_\_\_ (2) no

THANK YOU FOR YOUR PARTICIPATION!

APPENDIX D

FREQUENCY TABLES OF PERFORMANCE MEASURES

FREQUENCY TABLES FOR PERFORMANCE MEASURE STANDARD FORM  
ITEMS NUMBERED 1-30, I.E., ITEM 4B IS NUMBERED AS #5, ETC

10 08 THURSDAY, JULY 10, 1986 1

PMSO1	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
	1			
0	2	3.6	2	3.6
1	50	90.9	52	94.5
2	3	5.5	55	100.0

PMSO2	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
	1			
0	4	7.3	4	7.3
1	48	87.3	52	94.5
2	3	5.5	55	100.0

PMSO3	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
	1			
0	5	9.1	5	9.1
1	46	83.6	51	92.7
2	4	7.3	55	100.0

PMSO4	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
	1			
0	4	7.3	4	7.3
1	45	81.8	49	89.1
2	6	10.9	55	100.0

PMSO5	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
	1			
0	7	12.7	7	12.7
1	40	72.7	47	85.5
2	8	14.5	55	100.0

PMSO6	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
	1			
0	4	7.3	4	7.3
1	44	80.0	48	87.3
2	7	12.7	55	100.0

FREQUENCY TABLES FOR PERFORMANCE MEASURE STANDARD FORM  
ITEMS NUMBERED 1-30, I. E., ITEM 4B IS NUMBERED AS #5, ETC

10 08 THURSDAY, JULY 10, 1986 2

PMS07	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
	1			
0	3	5.5	3	5.5
1	47	85.5	50	90.9
2	5	9.1	55	100.0

PMS08	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
	1			
0	24	43.6	24	43.6
1	18	32.7	42	76.4
2	13	23.6	55	100.0

PMS09	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
	1			
0	23	41.8	23	41.8
1	20	36.4	43	78.2
2	12	21.8	55	100.0

PMS10	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
	1			
0	21	38.2	21	38.2
1	24	43.6	45	81.8
2	10	18.2	55	100.0

PMS11	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
	1			
0	4	7.3	4	7.3
1	42	76.4	46	83.6
2	9	16.4	55	100.0

PMS12	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
	1			
0	7	12.7	7	12.7
1	43	78.2	50	90.9
2	5	9.1	55	100.0

FREQUENCY TABLES FOR PERFORMANCE MEASURE STANDARD FORM  
ITEMS NUMBERED 1-30, I.E., ITEM 4B IS NUMBERED AS #5, ETC.

10:08 THURSDAY, JULY 10, 1986 3

PMS13	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
0	1	9.1	1	9.1
1	45	81.8	50	90.9
2	5	9.1	55	100.0

PMS14	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
0	6	10.7	6	10.7
1	42	75.0	48	85.7
2	8	14.3	56	100.0

PMS15	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
0	30	53.6	30	53.6
1	14	25.0	44	78.6
2	12	21.4	56	100.0

PMS16	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
0	13	23.2	13	23.2
1	34	60.7	47	83.9
2	9	16.1	56	100.0

PMS17	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
0	22	39.3	22	39.3
1	24	42.9	46	82.1
2	10	17.9	56	100.0

PMS18	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
0	24	42.9	24	42.9
1	21	37.5	45	80.4
2	11	19.6	56	100.0

FREQUENCY TABLES FOR PERFORMANCE MEASURE STANDARD FORM  
ITEMS NUMBERED 1-30, I.E., ITEM 4B IS NUMBERED AS #5, ETC

10:08 THURSDAY, JULY 10, 1986 4

PMS19	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
0	42	75.0	42	75.0
1	3	5.4	45	80.4
2	11	19.6	56	100.0

PMS20	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
0	5	8.9	5	8.9
1	41	73.2	46	82.1
2	10	17.9	56	100.0

PMS21	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
0	28	50.0	28	50.0
1	17	30.4	45	80.4
2	11	19.6	56	100.0

PMS22	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
0	28	50.0	28	50.0
1	17	30.4	45	80.4
2	11	19.6	56	100.0

PMS23	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
0	45	80.4	45	80.4
1	4	7.1	49	87.5
2	7	12.5	56	100.0

} No answer, same as no response  
when "other" category is listed.

PMS24	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
0	5	8.9	5	8.9
1	41	73.2	46	82.1
2	10	17.9	56	100.0

FREQUENCY TABLES FOR PERFORMANCE MEASURE STANDARD FORM  
ITEMS NUMBERED 1-30, I.E., ITEM 4B IS NUMBERED AS #5, ETC

10:08 THURSDAY, JULY 10, 1986 5

PMS25	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
0	3	5.4	3	5.4
1	44	78.6	47	83.9
2	9	16.1	56	100.0

PMS26	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
0	9	16.1	9	16.1
1	38	67.9	47	83.9
2	9	16.1	56	100.0

PMS27	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
0	15	26.8	15	26.8
1	32	57.1	47	83.9
2	9	16.1	56	100.0

PMS28	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
0	28	50.0	28	50.0
1	14	25.0	42	75.0
2	14	25.0	56	100.0

PMS29	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
0	32	57.1	32	57.1
1	12	21.4	44	78.6
2	12	21.4	56	100.0

PMS30	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
0	47	83.9	47	83.9
1	1	1.8	48	85.7
2	8	14.3	56	100.0

APPENDIX E

FREQUENCY TABLES OF PERFORMANCE RATIOS



TABLE VII

TABLE OF MEANS OF 13 PERFORMANCE RATIOS  
DURING FOUR MONTHLY PERIODS

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OBS	RATIO	NJAN	RJAN	NAPR	RAPR	NJUL	RJUL	NOCT	ROCT
1	MLPLBW	7	3.5021	7	3.3535	7	2.5659	7	2.7116
2	MLSLBW	15	3.8436	15	3.6149	15	3.3000	15	3.4245
3	SVPLBW	4	2.1354	4	1.9698	4	2.1690	4	2.4731
4	SLCLBC	8	13.8315	8	14.3352	8	15.5767	8	15.5312
5	MLPFDC	8	0.8579	9	0.7097	9	0.6804	9	0.6793
6	MLPLBP	8	2.1681	8	2.0829	8	1.3022	8	1.4620
7	PTSTYP	16	6.7988	16	6.6097	16	6.8116	16	6.6175
8	AVSFVS	5	1.0811	5	1.1691	6	1.0894	6	1.1368
9	SMTBMT	13	0.9558	14	1.0086	14	0.8695	14	0.9345
10	SLBBLB	12	1.0147	12	0.9935	12	0.9885	12	1.0652
11	SCIBCI	4	0.4983	5	0.3088	4	0.4686	4	0.4686
12	SUTBUT	2	0.5227	2	0.5174	1	1.0153	1	0.9920
13	ABSRAT	7	0.0000	7	0.0000	7	0.0000	7	0.0000

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TABLE VIII  
 MEANS OF 13 PERFORMANCE RATIOS  
 DURING FOUR MONTHLY PERIODS

OBS	RATIO	N82	R82	N83	R83	N84	R84	N85	R85
1	MLPLBW	1	4 0179	4	3.9703	6	3 3260	7	3 3570
2	MLSLBW	5	3 3014	9	3.7299 <i>data error</i>	11	3.3748	13	3.5480
3	SVPLBW	1	52 2324	2	30.2740	4	14 8828	5	12.2595
4	SLCLBC	4	13 2737	5	14.0334	8	14.6279	8	15.2488
5	MLPFDC	3	0 7049	6	0.6649	8	0.6065	8	0.6043
6	MLPLBP	1	3.2933	4	3.8908	7	3 2948	8	3.2953
7	PTSTYP	6	0.5661	7	7.6401	8	11.5649	9	8.9218
8	AVSFVS	2	1 0681	2	0.9399	3	0 9023	4	0.9063
9	SMTBMT	6	1 0241	10	0.9636	12	0.9682	13	0.9971
10	SLBBLB	5	0.9946	7	0.9914	10	1 0094	11	0.9581
11	SCIBCI	2	0.7107	3	1.5436	3	0 7685	4	0.7874
12	SUTBUT	0		0	.	0		0	.
13	ABSRAT	1	0.0002	2	0.0001	3	0 0021	3	0.0025

VITA

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