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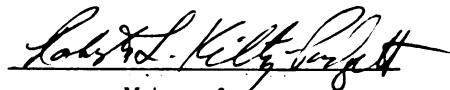
**Employee Satisfaction With The Work Environment :  
Importance of Facility Services**

presented by

**Sandra S. Kloth**

has been accepted towards fulfillment  
of the requirements for

**Master of Arts** degree in **Interior Design and  
Facilities Management**

  
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**EMPLOYEE SATISFACTION WITH THE WORK ENVIRONMENT:  
IMPORTANCE OF FACILITY SERVICES.**

**By**

**Sandra Sue Kloth**

**A THESIS**

**Submitted to  
Michigan State University  
in partial fulfillment of the requirements  
for the degree of**

**MASTER OF ART**

**Department of Human Ecology**

**1996**

## **ABSTRACT**

### **EMPLOYEE SATISFACTION WITH THE WORK ENVIRONMENT: IMPORTANCE OF FACILITY SERVICES.**

**By**

**Sandra Sue Kloth**

The emergence of facility management within the business community has been increasingly apparent in recent years. This study was a prefatory attempt at examining the contribution of satisfaction with facility services in explaining overall satisfaction with the work environment.

A post-occupancy evaluation (POE) was designed to measure employee satisfaction with the building environment and the services provided by an in-house facility service provider. The POE consisted of employee questionnaires, and physical measures of the environment. The study sample included employees within an office setting. A model of environment satisfaction was created for this study illustrating the possible effects work environment and facility service constructs can have on overall satisfaction with the work environment. Multiple-Regression analyses of the data extracted from the questionnaires indicated a strong relationship between the work environment and facility service constructs. Satisfaction with facility services explained 36% of the variance in overall satisfaction with the work environment. The results indicated that further research of the relationship between work environment and facility services is warranted.

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## **ACKNOWLEDGMENTS**

As with any endeavor of this sort, there are many people who have actively supported this effort. I would like to thank the members of my Graduate Committee, Associate Professor Roberta Kilty-Padgett, Associate Professor Ann Slocum, and Assistant Professor Richard Spreng for all their support and collective knowledge. I owe a great debt of gratitude to my employer, who provided financial and professional support during the data collection and writing portions of this study. A special thanks goes to Maury Keiser whose facility management expertise was invaluable.

## **TABLE OF CONTENTS**

LIST OF TABLES.....	VII
LIST OF FIGURES.....	VIII
CHAPTER 1	
LITERATURE REVIEW .....	1
Introduction .....	1
Theoretical Framework.....	2
Summary.....	14
CHAPTER 2	
STATEMENT OF THE PROBLEM.....	17
Rationale.....	18
Hypotheses.....	19
Operational Definitions.....	20
Limitations.....	24
Assumptions.....	25
CHAPTER 3	
METHODS.....	26
Sample.....	26
Measures.....	26
Data Collection.....	28
Data Analysis.....	29
CHAPTER 4	
RESULTS AND DISCUSSION.....	30
Sample.....	30
Measurements of the Environment.....	31
Data and Tests.....	32
CHAPTER 5	
CONCLUSIONS AND RECOMMENDATIONS.....	46



FOOTNOTES.....	51
BIBLIOGRAPHY.....	52

## **LIST OF TABLES**

Table 1.	Description of the Sample.....	31
Table 2.	Mean Differences Between Measures For Gender and Position.... - Immediate Workspace	34
Table 3.	Mean Differences Between Measures For Gender and Position.... - Facility Services	34
Table 4.	Mean Differences Between Measures For Gender and Position... - Dependant Variables	35
Table 5.	Construct Reliabilities - Immediate Workspace.....	37
Table 6.	Construct Reliabilities - Facility Services.....	38
Table 7.	Descriptive Statistics and Correlation Matrix.....	40
Table 8.	Factors Influencing Satisfaction With the Immediate..... Workspace	44
Table 9.	Factors Influencing Satisfaction With the Facility Services.....	44
Table 10.	Factors Influencing Overall Satisfaction With the Work..... Environment	45

## **LIST OF FIGURES**

Figure 1.	Differences Between Services and Physical Goods.....	11
Figure 2.	A Model of Work Environment Satisfaction.....	16
Figure 3.	An Alternative Model of Work Environment Satisfaction.....	50

## **CHAPTER I: LITERATURE REVIEW**

### **Introduction**

The emergence of facility management as a valuable function within the corporate world is increasingly apparent in recent years, and as a result, more attention has been placed on the importance of having a work environment that meets the needs of the environment's users. Over the past thirty years, a large collection of environmental research has been devoted to identifying ways to provide healthy, productive work environments for employees. Research has focused on both office and industrial settings. The intention of this study was to build upon the existing information regarding the effects environmental factors have on employees within an office setting. The information from this study will then extend that work by identifying facility services as an environmental factor influencing employee perceptions of their satisfaction with the work environment.

Customer satisfaction with services is important to organizations at the management level, as well as at the service encounter level. Competition with other organizational units is increasing, as all try to secure a bigger piece of the resource pie. The customer's perception of the quality of service received is an important factor in the overall success of an organization (Gronroos, 1990). Facility management organizations are often looked at as cost centers. With the popularity of outsourcing

rising (Becker, 1990), facility managers must develop methods that create a need for their unit by illustrating the importance of their contributions.

The attitudes and behavior displayed by employees are in part responses to the environment. These individual perceptions are dependent on standards by which the employee compares present service with that received in the past, including past experiences, levels of service others receive, or levels the employee wanted to receive (Marans & Spreckelmeyer, 1982).

The primary purpose of this study was to distinguish facility services as an environmental factor. The investigator suggests that this factor influences individual perceptions of the work environment and therefore should be included in employee evaluations of office environments.

### **Theoretical Framework**

Environment - Behavior Theory (E-B) has its roots in organizational development theory. It was first classified under the heading of socio-physical organizational development (Steele, 1973), and evolved into organizational change theory. This is not surprising considering that a fundamental characteristic of the office environment is the "high degree" of environmental change (Spreckelmeyer, 1993). One of the first attempts at documenting the history of E-B research was conducted by Fred Steele in 1973. Steele demonstrated forethought by stating that "the environment is changing rapidly and the impact of this change on organizational structure and process must be clearly understood if organizational development efforts are to remain relevant to organizational realities" (Steel, 1976, p.4).

The historical connection between organizational development and the physical environment reached a milestone in 1939 with the Hawthorne studies. These studies were the first to emphasize the "human relations" connection between management, individuals, and work groups by using social influence research (Sundstrom, 1986). These experiments were designed to measure the impact of changes in the environment (i.e., lighting) had on worker performance. The study became famous from both an implicit and explicit standpoint. Implicitly, the results from the study showed that changes in lighting levels effected the performance of the workers. Explicitly, the results also indicated that behavior changed when the employees felt they were being treated differently from other workers (i.e., status satisfaction). The study confirmed that environmental factors do have a bearing on organizational development theory.

Post-Hawthorne research was composed of various theories and research movements including, the efficiency experts of the 1940's and 50's, the socio-technical systems approach, the office landscape movement, and finally the emergence of environmental psychology in the late 1960's (Steele, 1973). Environmental research over the past three decades has primarily focused on identifying solutions for the problems created by organizational, physical and social changes in the workplace, while maintaining employee satisfaction and performance levels (Sprecklemeyer, 1993).

### **Employee Satisfaction With the Work Environment**

“A healthy office environment can be defined as the combining of environmental factors and needs of each employee to create a work place which

supports the activities that go on within it" (Vischer, 1989, p.25). The physical work environment contributes to organizational effectiveness in both direct and indirect ways. Employee satisfaction with environmental factors influence individual task performance and the work process as a whole. At the macro level, environmental factors contribute to two aspects of satisfaction, satisfaction with the work environment and satisfaction with the job. The design of the work environment has the potential to detract from employee job performance (Allen & Gerstberger, 1975; Harris, 1978), as well as strengthen the job satisfaction of workers (Lunden, 1972; Locke, 1976). These studies have identified a collection of environmental factors that can be used as predictors of worker perceptions (Sprecklemeyer, 1993). An example of some of these factors follows: furniture (i.e., amount of worksurface, chair comfort, storage space), thermal comfort (i.e., temperature, humidity, stuffy air), luminance (i.e., level of lighting, shadows in workspace), noise (i.e., background noise from others, noise from equipment), privacy (i.e., exposure to others, ability to hear others), appearance (i.e., signage, decor, landscaping). A majority of the research has shown a stronger relationship between satisfaction and environmental factors when the worker is able to control and effectively manipulate the immediate setting (Spreckelmeyer, 1993).

Environmental factors within the office setting can be "conceptually" divided into two categories of variables: properties and attributes (Archea, 1977). This approach to definition is referred to as the *Environment-Behavior Systems Approach* to environment-behavior studies and focuses on three interacting components, or

subsystems within the office: organization, individuals, and physical settings (Ferguson & Weisman, 1986).

### Properties

Properties exemplify "those intrinsic, defining characteristics of a thing or class of things that make it what it is" (Archea, 1977). The physical environment properties focused on in this study include: thermal comfort, luminance quality, noise, and immediate workspace. Each of those mentioned are "objective, measurable" (Ferguson & Weisman, 1986), qualities of the office setting.

Thermal comfort has many parameters, such as an individual's activity or clothing requirements (i.e., uniforms). Individuals cope with thermal stress by physiological and behavioral responses. Responses can be an immediate adjustment, (i.e., putting on a piece of clothing to keep warm), or a longer term adaptation. Thermal comfort can be defined as a complex psychophysical state of satisfaction that occurs within a narrow range of physiological and behavioral responses (Ruck, 1989).

Air quality is an important part in the human comfort equation. Many air quality problems originate from attempts to deal with energy conservation. This was predominant during the energy crisis of the 1970's. Methods of reducing energy consumption during this crisis included: sealing up buildings to decrease the amount of air that leaked out, and reducing ventilation to reduce power consumption (Lueder, 1987). Most of the air pollutants affect the human body by way of the respiratory systems, therefore a close link between air quality and ventilation systems exist (Ruck, 1989). Although no individual satisfaction data has been recorded, a Klitzman and



Stellman (1989) study showed that the physical environmental factors seem to influence work environment satisfaction more than global satisfaction with their job.

Psychological-social working conditions were also found to be more strongly related to job satisfaction. Air quality was one of the strongest predictors of psychological well-being in the workplace (Klitzman & Stellman, 1989).

A myriad of worker's compensation claims have created a need for management to evaluate the work environment. Indoor air pollution and ventilation problems are associated with a variety of respiratory, visual, dermatological and other non-specific complaints. Physical characteristics of VDTs and surrounding workstation, such as lighting, glare, seating, and the position of the worksurface are linked with musculoskeletal and visual strain of operators (Klitzman & Stellman, 1989).

In terms of luminance quality, numerous studies have shown that better lighting increases performance (Katzev, 1992). The relationship between luminance quality and task performance does have a saturation point. This means that "equal step" increases in lighting levels are related to decreases in improvements of task performance until eventually no improvement occurs. At this point, further improvements in task performance can only be achieved by changing other variables of the environment.

Noise also contributes to environment dissatisfaction and job dissatisfaction. Laboratory research has found degraded performance of complex tasks when exposed to noise (Sundstrom, 1986). Noise may also disrupt job performance through stress, distraction or overload (Sundstrom, Town, Rice, Osborn, & Brill, 1994). Noise, especially unpredictable noise, may place demand on the employee's ability to cope with the environment - making it an "ambient stressor" (Campbell, 1983).

The effects of the immediate workspace on employee satisfaction with the work environment has primarily focused on aspects of one attribute, architectural privacy (Sundstrom, 1986; Fried, 1990; Zalesney & Farace, 1987). Properties representing the immediate workspace include furniture comfort, storage space, and layout. There are studies regarding these properties, but not to the same extent as architectural privacy. For example, storage space within a workspace is an important predictor of employee satisfaction with the work environment (Marans & Yan, 1989). As satisfaction with storage increases, so does job performance (O'Neill, 1989). O'Neill also found storage to be a predictor of job satisfaction.

### Attributes

Early E-B research focused predominantly on the properties within the office setting, as they are highly measurable and enduring features, to explain individual employee behavior. Attributes, on the other hand, are "those extrinsic, relational characteristics of things or class of things that relate them to other things for specific purposes" (Archea, 1977, p.119). Examples of attributes are: privacy, comfort, crowdedness, and security. Attributes are the result of experiences individuals have within the organization and setting. Organization variables, such as task performance and communication, combine with those attributes to influence individual perceptions and behaviors with the work/office environment (Ferguson & Weisman, 1986, 1987). Variables of the social environment are referred to primarily as attributes. These are difficult to measure, and difficult to define alone. The attribute variable examined in this study is privacy.

Privacy can be defined as "the ability of individuals or groups to satisfactorily regulate their accessibility to others" (Sundstrom, 1982). There are different types of privacy referred to in E-B research, including psychological and architectural privacy. Architectural privacy, the primary focus of this study, refers to "the extent to which an employee's individual workspace is accessible to the intrusion of others" (Oldham & Rotchford, 1983, p.213). Some predictors of architectural privacy include: door present in the workspace, co-workers not visible, and coworkers not within ten (10) feet (Duvall-Early & Benedict, 1992). The number one predictor of employee perceived privacy is the number of enclosed sides in the work space (Sundstrom, 1982; Sundstrom, Burt, & Kemp, 1980). Privacy is threatened by office layout, insufficient, ineffective or poorly installed doors and walls (i.e., causing sound leaks), and inappropriate interior finishes that have low acoustic characteristics (Block & Stokes, 1989).

It has been found that overall, employees express more satisfaction with their job if they work in a private environment. (Duvall-Early & Benedict, 1992, Sundstrom, Herbert, & Brown 1982; Oldham, 1988). As privacy increases, so does employee satisfaction with the work environment (Sundstrom, 1986; Wineman, 1986).

Sundstrom et al. (1980) found a positive relationship between the presence of partitions and doors and employee satisfaction with the work environment. Other factors include openness, perceived privacy, and aural distraction (Sundstrom et al., 1980; Canter, 1972; Ives & Ferdinand, 1974). In terms of performance, the relationship between task difficulty and privacy is mixed. Block and Stokes (1989), found that the more complex the task became, satisfaction increased in conjunction with

privacy. However, some studies state that employees are generally more satisfied in private places, making them perform better regardless of task (Sundstrom, 1982). More research is needed to support either position. Research benefits when attributes and properties are related to one another (i.e., privacy and noise), but this type of research is difficult to generalize between like settings and organizations.

In terms of overall job satisfaction, a positive relationship exists between the following factors: job satisfaction and an employee's satisfaction with the work environment (Canter, 1972; Sundstrom et al., 1980), architectural and psychological privacy (Sundstrom, 1980, 1982), number of workers within a space (Canter, 1972, 1968), and relocation to an office landscape (Oldham & Brass, 1979). Although, these relationships do not indicate causation (the techniques used to analyze reported only significant correlations among users), they do merit further research (Ferguson & Weisman, 1986). A direct link between environmental factors and global job satisfaction has yet to be confirmed (Ferguson & Weisman, 1986).

### **Employee Satisfaction With Facility Services**

This section may benefit in clarity by changing the title to "Customers Satisfaction with Facility Services". Customer satisfaction is an attribute on which E-B research has recently begun focusing on (Cotts & Friday, 1994; Becker, 1990; Davis, Becker, Duffy & Sims, 1985). All too often organizations define customers as the external end users of the product or service provided. Employees of an organization can be classified as customers to a variety of organizational units. If one looks specifically at an organizational chart, it may consist of various service/product

providers. Organizational units such as Administrative and Telecommunication Departments provide services to internal customers (i.e., employees), to insure work may be performed. Ultimately the external customer is provided with the service or product it requires. The customer is not only defined as external, but internal as well, with both contributing to the organization's "bottom line".

Most research literature on customer satisfaction has evolved from the marketing-based consumer research sector. Studies were predominantly based in the production of goods (i.e., Leonard & Sasser, 1982; Takeuchi & Quelch, 1983; Garvin, 1983), and are not entirely applicable to services. The service sector differs from goods in three significant ways, measurement, consistency, and inseparability (See Figure 1).

The intangibility of services results in the difficulty in setting standards of uniform quality. Because of its intangibility, service is perceived in a subjective manner and not easily quantified (Gronroos, 1990). Unlike goods, which can be compared against one another based on set specifications, when a service is performed, the customer does not receive any physical evidence, but rather a feeling or perception of a level of satisfaction. The service provider's actions and attitudes presented at the time are not easily measured. Nor are they measured the same from customer to customer. It is also difficult to understand how customers perceive the service they receive (Parasuraman, Zeithaml & Berry, 1985).

	<u>Physical Goods</u>	<u>Services</u>
<i>measurement</i>	Tangible	Intangible
<i>consistency</i>	Homogeneous	Heterogeneous
<i>inseparability</i>	Production and distribution separated from consumption	Production and distribution and consumption simultaneous processes
Source: Gronroos, C. (1989): <u>Service Management and Marketing.</u> , Lexington, MA: Lexington Books: p. 28.		

**Figure 1. Differences Between Services and Physical Goods**

Service is also very heterogeneous. Service varies by provider, customer and time (Parasuraman et al., 1985). This is predominant in labor intensive activities where the service provider may change frequently and behavior is harder to control. Consistency is difficult to insure due to those factors. The heterogeneity of services makes it difficult to create and maintain a consistent, evenly distributed level of service to customers (Gronroos, 1989).

A service can be defined as "an activity or a series of activities which take place in interactions with a contact person or a physical machine and which provides customer satisfaction" (Lehtinen & Lehtinen, 1982, p.21). Services are typically produced and consumed simultaneously (Gronroos, 1989), and as the definition states, in a series of activities. The processes are therefore combined, inseparable, and hard to measure alone.

Customer satisfaction is a key concept in marketing theory in that the consequences of customer satisfaction include word of mouth, repeat purchase and

complaint behaviors (Yi, 1990). Definitions of customer satisfaction may vary, but it is generally accepted to be an evaluative process, resulting from a consumption experience (Yi, 1990). Satisfaction is the value that has been added to the bottom line of the customer. If the bottom line is productivity or lifestyle value, such as comfort or convenience, satisfaction puts more of that value there (Hannan & Karp, 1989). Satisfying employees at work reduces administrative burdens and allows attention to be focused on the primary function (i.e., meeting external customers needs).

There have been numerous attempts to model customer satisfaction formation (i.e., Tse & Wilton, 1988; Miller, 1977; Cadotte, Woodruff & Jenkins, 1987; Westbrook & Reilly, 1983; Bitner, 1990; Sirgy, 1984; Spreng & Olshavsky, 1993). The dominant model in customer satisfaction research to date has been the disconfirmation of expectations model. This model offers that customers make a post-consumption comparison between pre-consumption expectations and the performance received (Churchill & Suprenant, 1982; Oliver, 1980). Although support for this model is present in literature (Bearden & Teel, 1983; Churchill & Suprenant, 1982; Oliver, 1980), the model is not accepted by all (LaTour & Peat, 1979; Westbrook & Reilly, 1983, Cadotte et al., 1987; Churchill & Suprenant, 1982). Comparison standards and a number of models have been proposed (i.e., Spreng & Olshavsky, 1993; Cadotte et al., 1987; Westbrook & Reilly, 1983; Sirgy, 1984; Tse & Wilton, 1988).

Bitner (1990) argued that the customers evaluate the service at the service encounter level. Bitner points out that customer satisfaction depends primarily on the ability to manage and observe the period of time when a customer interacts directly

with the service providers, referred to here as the service encounter (Parasuraman et al., 1985). As previously mentioned, many studies regarding work place settings and the importance of providing good working conditions have been completed (Becker, 1990; Brill, 1984; Steele, 1973; Sundstrom, 1986). Only a handful have mentioned how employee satisfaction with facility services influences the employee's satisfaction with his/her work environment (i.e., Becker, 1990; Davis et al., 1985). When studying facility services, especially those provided by an in-house staff, one may look at it in terms of a non-profit relationship. In non-profit transactions, there is typically no money exchanged<sup>1</sup>, nor is the customer offered a choice of service providers. Negotiations of how the services are to be rendered often do not take place either. Customer satisfaction has seldom been studied in relation to non-profit organizations (Garland & Westbrook, 1989). The non-profit sector is lacking a real model of customer satisfaction formation. The above mentioned differences lead to a different formation of satisfaction for customers. The customer, because of his/her lack of control or the form of negotiation or choice, may not have a reason to evaluate those services. The customer may just accept the services as they are, not knowing that services may be improved upon (Day, 1977). Also, Garland and Westbrook (1989) speculate that there may not be one set of factors a customer uses to evaluate services in non-profit environments. That is, each evaluation is based on the individual customer's interpretation. For this reason, there is no real model of customer satisfaction formation in nonprofit settings. Another difference between profit and non-profit may be the relative importance of interpersonal and environmental dimensions. Customer satisfaction has been conceptualized to be multi-attribute in composition



(Parasuraman et al., 1985). Bateson, Eiglier, Langeard and Lovelock (1978) offered that the attributes of service customer satisfaction were comprised of the interaction between the customer, the environment and the service personnel. Garland and Westbrook (1989) furthered this by creating three factors representing those dimensions: the service received, the service personnel and the environment (physical and social). In Garland and Westbrook's 1989 study, they found that global satisfaction with the setting, a library in this case, was most strongly related to the service provider, followed by the social environments. The study does not explain the relationship, but the authors do offer that the reason may be the particular service given and the absence of monetary exchange. Garland and Westbrook's study did not analyze demographical data, which may be a consideration.

### **Summary**

Drawing from the literature review, the model shown in Figure 2 was created. The model illustrates the possible effects immediate work environment and facility service constructs can have on employee perceived satisfaction with the immediate workspace and the facility services provided within the work environment. The model goes on to depict the impact the level of employee satisfaction with the immediate workspace and facility services can have on employee perceived satisfaction with the overall work environment.

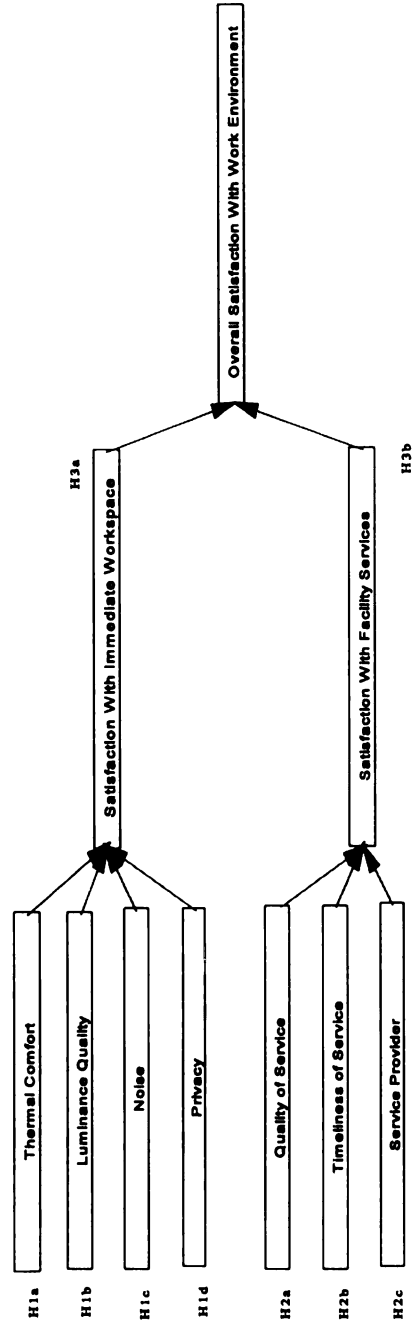
Research reports that the following constructs are good predictors of employee satisfaction with the immediate workspace and the overall work environment: Thermal Comfort (Ruck, 1989; Klitzman & Stellman, 1989), Luminance Quality (Katzev,

1992), Noise (Sundstrom, 1986; Sundstrom et al., 1994; Campbell, 1983), and Privacy (Duvall-Early & Benedict, 1992; Sundstrom, Herbert & Brown, 1982; Oldham, 1982; Sundstrom, 1986; Wineman, 1982).

Previous research also indicates that the following constructs are significantly related to customer satisfaction: Quality of Service, Timeliness of Service, Service Provider. The constructs used to predict employee satisfaction with facility services are based on research in the service quality field (Parasuraman et al., 1985, 1988, 1994; Garland & Westbrook, 1989; Bateson, Eiglier, Langeard & Lovelock, 1978).

The immediate workspace represents characteristics such as furniture, work surface, storage capabilities, and chair comfort. The literature reviewed indicates that employee satisfaction with the immediate workspace is significantly related to overall satisfaction with the work environment (Lunden, 1972; Locke, 1976; Sprecklemeyer, 1993).

The studies reviewed above signify that both satisfaction with an environment, and customer satisfaction are multi-attribute in composition, and subjective, or perception-based processes. The literature review also indicates that non-profit services cannot be measured using the same methods as for-profit services. This assumption is based on the characteristics of a non-profit relationship (i.e., lack of monetary exchange, lack of control, lack of negotiation). Based on the aforementioned characteristics, it would seem appropriate to measure satisfaction with non-profit services, such as facility services, in the same manner as one would measure an individual's satisfaction with an environmental setting.



**Figure 2.** A Model of Work Environment Satisfaction

## **CHAPTER II: STATEMENT OF THE PROBLEM**

### **Statement of the Problem**

The purpose of this study was to examine the relative contribution of satisfaction with facility services when compared to other proven environmental factors in explaining overall satisfaction with the work environment. The study attempted to identify any significant relationships between factors of the work environment and facility services.

A Post-Occupancy Evaluation (POE) of an office setting was designed for this study. It involved measuring employee satisfaction with the building environment and the services provided by an in-house facility service provider. The organization being studied is the corporate world headquarters of a medium-size financial institution located in a metropolitan area in the Mid-Atlantic region of the United States. The organization's headquarters and operations site is situated on a 26.5 acre tract of land in a technology park. The site consists of a six story building, built in two phases from 1975 to 1988, with 548,300 square feet of gross floor space (344,500 square feet of office space; 203,800 square feet of subsurface parking and mechanical areas), and a two level annex building with 33,990 square feet of gross floor space (23,000 square feet of office space), located approximately 400 yards from the headquarters and operations building.

The annex building was originally constructed in 1975 for business use. The building was purchased by the organization in 1992 due to space limitations in the main headquarters building. Renovations were completed by a contractor in 1993, to the specification of the organization. Minor alterations and finishing touches continued through the first month of user occupancy, July 1993.

### **Rationale**

If the study can explain how certain variables may influence user satisfaction more than others, then facility managers, property managers, and other facility service providers will be better able to prioritize or rank the attention placed on each of those variables. The study would also be useful in presenting evidence of the value of quality facility service operations within an organization. To the best of the author's knowledge, an analysis between these factors has not been completed. However, the literature supports the need for this relationship analysis to be included in future work environment studies.

### **Hypotheses**

Analysis of the results from the study explored the organizational issues stated in the following hypotheses. An explanation of the terms will follow in the operational definition section.

- H1a: Thermal Comfort has a significant effect on satisfaction with the immediate workspace.
- H1b: Luminance Quality has a significant effect on satisfaction with the immediate workspace.
- H1c: Noise has a significant effect on satisfaction with the immediate workspace.
- H1d: Privacy has a significant effect on satisfaction with the immediate workspace.
  
- H2a: Quality of Service has a significant effect on satisfaction with facility services.
- H2b: Timeliness of Service has a significant effect on satisfaction with facility services.
- H2c: The Service Provider has a significant effect on satisfaction with facility services.
  
- H3a: Satisfaction with the immediate workspace has a significant effect on overall satisfaction with the work environment.
- H3b: Satisfaction with facility services has a significant effect on overall satisfaction with the work environment.

## **Operational Definitions**

### **Overall Satisfaction With the Work Environment**

This refers to the degree to which employees are satisfied with the work environment. This was measured by a dependant variable, “*Overall, how satisfied are you with your building and office environment?*” This item was measured on a 5-point Likert scale. Scale anchors were *very satisfied* and *very dissatisfied*.

### **Satisfaction With the Immediate Workspace**

This refers to the degree to which the employee is satisfied with elements within the individual workspace, as well as how it may relate to the surrounding building environment. This was measured by using a twelve-item scale. Items include: (1) comfort of your chair, (2) adjustability of your chair, (3) work surface, (4) storage space, (5) adjustability of CRT/PC, (6) arrangement of furniture, (7) rearrange furniture, (8) workspace helps communication, (9) layout helps communication, (10) interior layout, (11) appearance/decor, (12) decorate or personalize.

Satisfaction with the immediate workspace was operationalized by an average of these twelve items. Items were measured on a 5-point Likert scale. Scale anchors were as follows: *very satisfied* and *very dissatisfied* (1,8,10,11,12), *never* and *seldom* (2,3,4,6,7), or *strongly agree* and *strongly disagree* (5,9).

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### Noise

This refers to the degree to which the employee is generally satisfied with the noise level within the building. This was measured by using a three-item scale. Items include: (1) noise level, (2) excessive noise, (3) noise from office machines.

Satisfaction with noise was operationalized by an average of these three items. Items were measured on a 5-point Likert scale. Scale anchors were as follows: *very satisfied* and *very dissatisfied* (1), or *never* and *seldom* (2,3).

### Privacy

This refers to the degree to which the employee feels their privacy needs are met within the building. This was measured by using a two-item scale. Items include: (1) crowded by other people, (2) exposure to others.

Satisfaction with privacy was operationalized by an average of these two items. Items were measured on a 5-point Likert scale. Scale anchors were as follows: *very satisfied* and *very dissatisfied* (2), or *never* and *seldom* (1).

### Satisfaction With Facility Services

This refers to the degree to which employees are satisfied with the facility services. Services are divided into five categories: mechanical, electrical, plumbing, maintenance, and facility operations/automated systems center. Typical services include replacement of lamps or light fixtures, repair and maintenance of restroom fixtures and accessories, door hardware, relocation or repair of furniture and

equipment, access control of door systems, and installation and repair of electrical outlets.

This was measured by using a six-item scale. Items include: (1) ease of doing business, (2) accommodation of unique requirements, (3) flexibility, (4) responsiveness, (5) effectiveness of communications, (6) overall satisfaction with services provided. Satisfaction with facility services was operationalized by an average of these six items. Items were measured on a 5-point Likert scale. Scale anchors were *very satisfied* and *very dissatisfied* for all six items.

#### Quality of Service

This refers to the degree to which the employee is satisfied with the quality of services provided. This was measured by using a four-item scale. Items include: (1) quality of cleaning, (2) quality of maintenance, (3) quality of alterations, (4) quality of repairs.

Satisfaction with the quality of service was operationalized by an average of these four items. Items were measured on a 5-point Likert scale. Scale anchors were *very satisfied* and *very dissatisfied* for all four items.

#### Timeliness of Service

This refers to the employees satisfaction with the time it took to receive services from the service provider. This was measured by using a four-item scale. Items

include: (1) timeliness of cleaning, (2) timeliness of maintenance, (3) timeliness of alterations, (4) timeliness of repairs.

Satisfaction with the timeliness of service was operationalized by an average of these four items. Items were measured on a 5-point Likert scale. Scale anchors were *very satisfied* and *very dissatisfied* for all four items.

### Service Provider

This refers to the degree to which the employee is satisfied with the facility service provider staff. This was measured by using a six- item scale. Items include: (1) technical competence, (2) knowledge of building systems, (3) availability, (4) appearance, (5) courtesy, (6) understanding of needs.

Satisfaction with the service provider was operationalized by an average of these six items. Items were measured on a 5-point Likert scale. Scale anchors were *very satisfied* and *very dissatisfied* for all six items.

### Limitations

The organizational culture may differ from traditional organizational units, and the results may reflect this. The study involved only one group within a large and diverse organization. The group studied may not be like others in this organization due to its independence. The independence may create higher expectations relating to building standards, therefore making it difficult to generalize about the organization as a whole.

The design intent of the interior space was to create an environment similar to the headquarters by using like finishes, fixtures, furnishings and layout styles. Some features could not be replicated. These include: no exterior windows in private and open office areas, natural light source from skylights, lower ceiling and systems furniture panel height, reduced cubicle size, post-Americans with Disabilities Act (ADA) construction, and automated restroom fixtures.

### **Assumptions**

The following assumptions were made about the sample population: (1) employees were not required to participate in the study, therefore all subjects have been motivated to complete the questionnaire thoughtfully and accurately; (2) despite the aforementioned generalization limitation of the sample studied within the organization, it is assumed that similar groups exist to which the findings may be applied; (3) it is also assumed that if the current study's sample has a high level of expectation and is satisfied with the work environment, then other groups with lower expectation levels would also favor the environment.

The following assumption was made regarding the theoretical framework: (1) individual satisfaction perceptions of non-profit services can be measured in the same manner as individual satisfaction with an environment.

## **CHAPTER III: METHODS**

### **Sample**

The study included one hundred, twenty-eight (128) employees, out of a possible one-hundred ninety-nine (199) employees. The study was limited to the employees within an organizational unit referred to as the Division. The Division was recently selected to relocate to an annex building on the headquarters site due to space limitations. This organizational unit was chosen to relocate due to its ability to operate independently from the organization. The Division is divided into four branches, including: Director and Staff, Services, Support, and Approval and Collections. Each branch has similar duties and responsibilities.

### **Measures**

A post-occupancy evaluation (POE) was designed to measure employee satisfaction with the building environment and the services provided by an in-house facility service provider. The POE consisted of employee questionnaires, and physical measures of light, noise level measures, and indoor air quality.

The assessment of a building by applying post-occupancy evaluation methods was adapted by environmental psychologists and has since become popular with architects and interior designers. By systematically collecting data from completed

designed settings, the overall effectiveness of current building designs may be noted and thus future spaces may be designed accordingly (Zimring, Wineman and Carpman 1988). The POE may be used to collect new data pertaining to the environment and the people working within it to support any action taken to improve that environment (Shibley and Schneekloth 1988). More specifically, the POE allows the evaluator to determine the facility's performance level by measuring data related to user satisfaction and needs (Park 1992).

### **Employee Questionnaire**

The employee questionnaire was modeled after the available literature regarding POE research (Bechtel, 1988; Cook & Campbell, 1979; Murtha, 1988; Preiser, 1989; Shibley & Schneekloth, 1988; Wener, 1988; Vischer, 1989; Zimring, Wineman & Carpman, 1988), including survey questions adapted from office environment studies (Brill, 1985; Carayon, 1993; O'Neill, 1993; Stokols, Smith & Prostor, 1975). The International Facility Management Association (I.F.M.A.) provided a questionnaire<sup>2</sup> (I.F.M.A., 1992), that focused primarily on the quality of customer service provided by facility managers and owners.

The questionnaire is divided into six (6) sections: Background Information; Office Environment; Building Environment; Building Equipment; Facility Services; Facility Management Staff; Facility Procedures. There were ninety-eight (98) questions included in the survey and all responses, except for those in the Background Information section, were based on a 5-point Likert type scale. A comments section

was provided for subjective responses. Open-ended responses were summarized by the investigator to be used as supporting data. The questionnaire constituted the primary data-gathering instrument for the present study.

### **Physical Measures**

Light level, noise level and indoor air quality tests were taken in the new facility. Light level readings were collected using an industrial/ commercial grade Sylvania light meter. Levels were measured in foot candles. Noise level readings were collected using an ANSI type S3A Sound level meter. Levels were measured in decibels.

Indoor air quality tests of the main headquarters building are conducted semi-annually. Management has a high regard for this type of testing and will include the Annex building in future tests. Testing is conducted by a contracted firm who specializes in indoor air quality. Issues studied include: air filtration, supply air, static air pressure, temperature and relative humidity, carbon dioxide and miscellaneous gasses.

### **Data Collection**

The survey data collection process utilized a seven-page self-report questionnaire that was distributed by the researcher in early February 1994. The survey was approved by The University Committee on Research Involving Human Subjects (UCRIHS IRB# 93-600). The questionnaires were distributed to all Division employees by the investigator. Instructions as well as a letter of introduction were

distributed to participating employees along with the questionnaire. Completed questionnaires were gathered by a Division supervisor and were then mailed to the researcher. Confidentiality was assured throughout the entire data collection process. Questionnaires were coded by employee telephone extension and identifying names were kept on a separate list. This information was not used to identify specific respondents. Participation was on a voluntary basis.

### **Data Analysis**

Questionnaire data were coded and entered into a database program. Range and logic checks were performed to correct data entry errors and detect any respondent inconsistencies. All the analyses were performed using the SPSS statistical analysis software.

To examine the possible effects of the demographical characteristics, t-tests for Equality of Means were used to contrast the mean scores of the various measures with the seven constructs, two intermediate variables and one dependent variable.

The seven constructs used for the analyses were created based on relevant literature. Construct reliabilities for each are based on Cronbach's Coefficient Alpha. A Pearson Correlation analysis was utilized to identify any relationships among the seven constructs, two intermediate variables and one dependent variable.

Multiple regression techniques were used to assess Employee Satisfaction With the Immediate Workspace, H1a-H1d, Employee Satisfaction With Facility Services, H2a-H2c, and Overall Satisfaction With the Work Environment, H3a-H3b. This was done by means of non-stepwise multiple regression equations.



## **CHAPTER IV: RESULTS AND DISCUSSION**

### **Sample**

The organization studied was a Division within the corporate world headquarters of a medium-size financial institution located in a metropolitan area in the Mid-Atlantic region of the United States. The study was in an office setting and involved measuring employee satisfaction with the building environment and the services provided by an in-house facility service provider.

Of the possible one-hundred ninety-nine employees within the Division, one-hundred twenty-eight employees completed and returned the questionnaire. This represented approximately 64% of the Division. The descriptive data for the sample is listed in Table 1.

A total of 85 females and 42 males participated in the study. Approximately 20% of those studied are employed at a supervisory level. The remainder are in support and administrative positions. Data from the questionnaires indicated that most employees are working on a full-time basis, following a fixed schedule. Employees reported an average length of service within the organization as 52.9 months, and at their present position 26.1 months.

**Table 1. Description of the Sample**

	<u>Response</u>	<u>Percentage</u>	
Gender	Male = 42	32.81%	
	Female = 85	66.41%	
	Unreported = 1	00.78%	
Position	Supervisor = 26	20.31%	
	Non-Supervisor = 102	79.69%	
Employee Status	Full-time = 122	95.31%	
	Part-time = 6	04.69%	
	Fixed Schedule = 122	95.31%	
	Changing Schedule = 6	04.69%	
Length of Service			
(in months)	<u>Minimum</u>	<u>Maximum</u>	<u>Average</u>
Organization	1 mo.	240 mo.	52.91 mo.
Position	1 mo.	95 mo.	26.07 mo.

### **Measures of the Environment**

A post-occupancy evaluation (POE) was designed to measure employee satisfaction. The POE consisted of physical measures of light and noise level, indoor air quality, and employee questionnaires surveying user perceptions of satisfaction.

#### **Light and Noise Level Measures**

Light and noise level measures indicated that the work environment being studied meets or exceeds established recommended levels.

#### **Indoor Air Quality Tests**

Indoor air quality tests were conducted. Inspections are comprised of visual examinations of HVAC equipment, instrumental measures and some sampling. Using

past results as baseline data, assessments of results are based on variations in air quality over time. A pre-commissioning of the Annex was given prior to occupancy. The first semi-annual test was completed three months after the building was occupied. Results generally confirm that air quality is satisfactory and within OSHA recommended standards.

### **Data and Tests**

#### **Employee Questionnaires**

Data from the employee questionnaires were statistically analyzed and the results follow. Results from the t-tests for Equality of Means analyses shown in Tables 2-4 exhibit very little difference in means perception in terms of gender and position. No significant differences were observed between males and females with respect to perceptions of the attributes of Satisfaction With the Immediate Workspace, Facility Services, and Overall Satisfaction With the Work Environment. There were no significant differences between managers and non-managers with respect to the variables. These results support other research regarding gender differences (Block & Stokes, 1989; Walden, Nelson & Smith, 1981). However it does not agree with previous research regarding position and workplace satisfaction. Previous research reported a significant difference between manager and non-manager ratings of perceived privacy and crowdedness (O'Neill, 1994; Sundstrom et al., 1982). In both those studies, managers gave significantly higher satisfaction ratings than non-managers. The lack of significant difference between job levels in the present study

may be indicative of the type of office allocated to managers. Only a small portion (18%) of the managers work out of a hard wall office with a door. The remaining managers were allocated tile-based workstations without a door. The workstations are larger than non-manager workstations, and include more storage and work surfaces. The managers workstations may not offer the same amount of visual and conversational privacy as hard wall offices appear to in the previous studies. O'Neill reported that job levels was a good predictor of satisfaction with the workspace. This too was not supported by the present study.

**Table 2. Mean Differences Between Measures For Gender and Position - Immediate Workspace**

	Gender					
	Male		Female			
Independent Measure	Mean	SD	Mean	SD	t-value	2-Tail Sig
Thermal Comfort	3.1284	0.696	3.0548	0.712	-0.56	0.579
Luminance Quality	3.7571	0.727	3.7088	0.742	-0.35	0.729
Noise	3.4643	0.697	3.5922	0.707	0.97	0.336
Privacy	3.2381	0.951	3.2471	0.861	0.05	0.959
	Position					
	Manager		Non-Manager			
Independent Measure	Mean	SD	Mean	SD	t-value	2-Tail Sig
Thermal Comfort	3.0783	0.764	3.0794	0.692	0.01	0.994
Luminance Quality	3.7630	0.808	3.7145	0.717	-0.28	0.779
Noise	3.611	0.715	3.5333	0.703	-0.50	0.617
Privacy	3.2778	1.129	3.2350	0.818	-0.18	0.855

**Table 3. Mean Differences Between Measures For Gender and Position - Facility Services**

	Gender					
	Male		Female			
Independent Measure	Mean	SD	Mean	SD	t-value	2-Tail Sig
Quality of Services	3.8175	0.807	3.7059	0.802	-0.73	0.465
Timeliness of Services	3.8274	0.764	3.6696	0.861	-1.05	0.298
Service Provider	3.9500	0.634	3.8781	0.694	-0.57	0.573
	Position					
	Manager		Non-Manager			
Independent Measure	Mean	SD	Mean	SD	t-value	2-Tail Sig
Quality of Services	3.6296	0.681	3.7733	0.833	0.93	0.359
Timeliness of Services	3.6111	0.748	3.7525	0.852	0.84	0.403
Service Provider	3.8395	0.621	3.9207	0.689	0.58	0.563

**Table 4. Mean Differences Between Measures For Gender and Position - Dependent Measures**

	Gender					
	Male		Female			
Dependent Measure	Mean	SD	Mean	SD	t-value	2-Tail Sig
Satisfaction with Immediate Workspace	3.6488	0.508	3.6018	0.528	-0.48	0.629
Satisfaction with Facility Services	3.7863	0.708	3.7771	0.834	-0.06	0.952
Overall Satisfaction with Work the Environment	3.3750	0.838	3.5250	0.871	0.91	0.364
	Position					
	Manager		Non-Manager			
Dependent Measure	Mean	SD	Mean	SD	t-value	2-Tail Sig
Satisfaction with Immediate Workspace	3.6209	0.545	3.6164	0.516	-0.04	0.970
Satisfaction with Facility Services	3.7963	0.727	3.7752	0.811	-0.13	0.899
Overall Satisfaction with the Work Environment	3.280	0.737	3.5265	0.885	1.42	0.162

Questionnaire items for each of the seven constructs were evaluated in terms of item-total and inter-item correlations. Each of the constructs included from two to twelve items, for a total of fifty-one items of the original ninety-eight items included in the questionnaire. Alpha values range from .47 to .98. An Alpha value of .60 or greater was used to determine if each construct was a reliable measure<sup>3</sup>. All but one construct met this criteria; the Noise construct produced a Coefficient Alpha of 0.47. Normally, this construct would have been discarded from further analyses. After taking into account the inter-item correlations of this construct, the small number of items, and supporting research, the investigator allowed the construct to remain in the study. Construct reliabilities as well as relevant statistics for each composite scale are displayed in Tables 5 - 6.

**Table 5. Construct Reliabilities - Immediate Workspace**

Construct	Corrected Item-Total Correlation	Mean	SD	Coefficient Alpha
<b>Thermal Comfort</b>				<b>0.8503</b>
temperature during summer	.5222	3.0636	1.0517	
temperature during winter	.5272	2.3000	1.0713	
humidity during summer	.5898	3.2364	0.9571	
humidity during winter	.6949	3.0455	1.0784	
too little air movement	.5003	2.4545	0.8635	
uncomfortable temperature	.7025	3.2455	1.0154	
uncomfortable humidity	.4905	3.1909	1.0091	
stuffy air	.4098	3.5182	0.9456	
unpleasant odor in air	.3268	3.0818	1.1263	
indoor air quality	.6633	3.0545	1.0302	
put on/remove clothing	.5154	2.8909	1.3227	
<b>Luminance Quality</b>				<b>0.6654</b>
level of lighting	.4957	3.6452	1.0530	
lighting too bright	.3635	4.2581	0.8823	
workspace too dark	.5397	4.0565	1.0305	
shadows in the workstation	.5309	3.2177	1.3529	
glare from the lighting	.2231	3.4435	1.1914	
<b>Noise</b>				<b>0.4684</b>
noise level	.5886	3.1440	1.0527	
excessive noise	.5432	3.8400	1.1805	
noise from office machines	.6328	3.9360	1.2098	
<b>Privacy</b>				<b>0.6231</b>
crowded by other people	.2810	3.5433	1.0914	
exposure to others	.5920	2.9213	1.5969	
<b>Satisfaction with Immediate Workspace</b>				<b>0.6811</b>
comfort of your chair	.3400	3.5812	0.9307	
adjust your chair	.4933	2.6667	1.1890	
work surface	.3678	4.0085	0.9514	
storage space	.3842	4.5128	0.6774	
adjust CRT/PC	.5440	4.4103	0.8321	
arrangement of furniture	.3185	3.4615	1.2425	
rearrange furniture	.3309	3.7607	1.0958	
workspace helps communicate	.3633	3.4786	1.0875	
layout helps communication	.2197	2.3419	1.6830	
interior layout	.4407	3.7350	0.9321	
appearance/decor	.3224	3.6410	1.2280	
decorate or personalize	.5646	3.9829	0.8807	

Note: Items were measured on a 5-point Likert scale.



**Table 6. Construct Reliabilities - Facility Services**

Construct	Corrected Item-Total Correlation	Mean	SD	Coefficient Alpha
Quality of Service				0.8914
cleaning	.4618	3.6911	1.0949	
maintenance	.7512	3.8374	0.8236	
repairs	.6794	3.7967	0.8392	
alterations	.7322	3.7623	0.9186	
Timeliness of Service				0.8509
maintenance	.8442	3.7787	0.8768	
repairs	.8562	3.7623	0.9963	
frequency of cleaning	.8562	3.7131	1.1095	
Service Provider				0.9260
technical competence	.8055	3.9286	0.7559	
knowledge of building systems	.7765	3.8036	0.8036	
availability	.8229	3.8393	0.7659	
appearance	.8099	4.0179	0.7939	
courtesy	.7832	4.0179	0.7709	
understanding needs	.7188	3.9196	0.7957	
Satisfaction with Facility Services				0.9774
ease of doing business	.9025	3.8318	0.7708	
accommodation	.9432	3.7477	0.8252	
flexibility	.9320	3.7850	0.8245	
responsiveness	.8876	3.7883	0.9249	
effective of communication	.9308	3.7756	0.8162	
satisfaction with facility service	.9654	3.780	0.788	

Note: Items were measured on a 5-point Likert scale.

Descriptive statistics and correlations for the seven constructs, two intermediate variables, and one dependent variable are shown in Table 7. All correlations were statistically significant. Particularly strong relationships exist between: (1) Quality of Service and Timeliness of Service ( $r = .8736$ ); (2) Service Provider and Satisfaction With Facility Services ( $r = .7920$ ). This finding supports past research in the service quality field. According to Parasuraman et al. (1985) Timeliness of Service is actually a dimension of Quality of Service, so it would seem plausible that the two constructs would be related. Regarding the Service Provider and Satisfaction With Facility Services, one of the three types of service quality is interactive quality (Parasuraman et al., 1985). Interactive quality is derived from the interaction between the service provider and customer (Lehtinen & Lehtinen, 1982). In Garland and Westbrook's (1989) study of a non-profit service setting, the factor most strongly related to global satisfaction was the service provider. The researchers accounted for this by highlighting the level of skill each participant had. In Garland and Westbrook's study the customer relied on the service provider to fulfill his/her needs. This may be generalized to this study, in that most service requests are technical in nature and require a trained person to accomplish. Again, customers rely on the service provider.

**Table 7.** Descriptive Statistics and Correlation Matrix

	Construct/Variable	Mean	SD	alpha	1	2	3	4	5	6	7	8	9	10
Independent	1 Thermal Comfort	3.0715	0.7076	0.8503	***									
	2 Luminance Quality	3.7250	0.7315	0.6654	.4409	***								
	3 Noise	3.5482	0.7009	0.4684	.5761	.6172	***							
	4 Privacy	3.2461	0.8851	0.6231	.5502	.4896	.6196	***						
	5 Quality of Service	3.7448	0.7997	0.8914	.4146	.3536	.3546	.3694	***					
	6 Timeliness of Service	3.7244	0.8273	0.8509	.5052	.3953	.3431	.3454	.8736	***				
	7 Service Provider	3.8822	0.7049	0.9260	.4769	.2976	.2601	.3582	.4769	.6293	***			
Dependent	8 Immediate Workspace	3.6190	0.5184	0.6811	.5093	.5199	.5704	.5374	.3802	.3377	.2816	***		
	9 Facility Services	3.7804	0.8851	0.9774	.4708	.3520	.3073	.4025	.5570	.5760	.7920	.4750	***	
	10 Work Environment	3.4750	0.8596	N/A	.6199	.4409	.4967	.4686	.5176	.5446	.5979	.5890	.4406	***

$p < .001$  for all relationships ; N = 128

To gain further insight into the relationships among the constructs and variables, multiple regression analyses were completed to test the relationships suggested in H1a-d, H2a-c, and H3a-b. Results from these analyses are presented in Tables 8-10. A  $p$  value  $\leq .05$  was used to determine whether the hypotheses were supported.

In Table 8, Satisfaction With the Immediate Workspace was used as the dependent variable, with Thermal Comfort, Luminance Quality, Noise, and Privacy being used as predictors. This analysis yielded a  $R^2$  of .43 indicating that these constructs accounted for 43 % of the variance in Satisfaction With the Immediate Workspace. Noise ( $p = .0262$ ), Luminance Quality ( $p = .0373$ ) and Privacy ( $p = .0202$ ) were found to be good predictors, supporting H1b, H1c, and H1d, with Privacy being the best predictor of Satisfaction With the Immediate Workspace. This supports previous research (Allen, 1982; Sundstrom, 1986; Sundstrom et al., 1994; Campbell, 1983; Duvall-Early & Benedict, 1992; Sundstrom et al., 1982; Oldham, 1982; Wineman, 1982). The results shown in Table 8 do not support Thermal Comfort ( $p = .0772$ ) as a good predictor. Therefore, H1a was not supported. In this data, Thermal Comfort did not significantly add to Satisfaction With the Immediate Workspace. This was based in part on the  $p$  values and the correlations shown in Table 7. Table 7 indicates that Thermal Comfort ( $r = .5093$ ) has a strong relationship with Satisfaction With the Immediate Workspace. Therefore all four constructs explain the variance in Satisfaction with the Immediate Workspace.

A second equation, predicting Satisfaction With Facility Services from Quality of Service, Timeliness of Service, and Service Provider, yielded a higher  $R^2$  of .63, indicating that these variables accounted for 63% of the variance in Satisfaction With Facility Services. Results are shown in Table 9. The results indicated that Service Provider ( $p = 0.001$ ) was the only acceptable predictor of Satisfaction With Facility Services, this supports H2c. This finding parallels the results of other service quality studies (Bitner, 1990; Garland & Westbrook, 1989; Parasuraman et al., 1984, 1985; Taylor & Cronin, 1994). Since the results do not support Quality of Service ( $p = 0.3840$ ) and Timeliness of Service ( $p = 0.8695$ ), neither H2a or H2b was supported. Looking at the correlation results shown in Table 7, indicates that Quality of Service ( $r = .5570$ ) and Timeliness of Service ( $r = .5760$ ) both have strong relationships with Satisfaction With Facility Services. High inter-item correlation indicates a possible multi-collinearity problem among the constructs. Therefore all three of the constructs explain the variance in satisfaction with facility services.

In the third equation, Overall Satisfaction With the Work Environment was the dependent variable, with Satisfaction With the Immediate Workspace and Satisfaction With Facility Services as predictors. This analysis yielded a  $R^2$  of .36, indicating that these variables accounted for 36% of the variance in Overall Satisfaction With the Work Environment. Results are shown in Table 10. The results indicate that Satisfaction With the Immediate Workspace ( $p = .0001$ ) is a good predictor of Overall Satisfaction With the Work Environment, thus supporting H3a. H3b was not supported. Table 7 indicates that Satisfaction With Facility Services ( $r = .5890$ ) has a

strong relationship with Overall Satisfaction With the Work Environment. Both constructs explain the variance in Overall Satisfaction With the Work Environment.

An explanation for the non-significant regression results of H3b may be attributable to the same multi-collinearity problem indicative of H2a and H2b.

**Table 8.** Factors Influencing Satisfaction With the Immediate Workspace

F = 22.83, Sig F = .00					
Independent Variable	B	t-value	Sig-t	Standardized Beta	R <sup>2</sup>
Thermal Comfort	.117356	1.782	0.0772	0.160194	.42608
Luminance Quality	.134864	2.105	0.0373	0.190318	
Noise	.167832	2.250	0.0262	0.226924	
Privacy	.126428	2.353	0.0202	0.215884	

**Table 9.** Factors Influencing Satisfaction With the Facility Services

F = 60.24, Sig F = .00					
Independent Variable	B	t-value	Sig-t	Standardized Beta	R <sup>2</sup>
Quality of Service	0.103638	0.874	0.3840	.118561	.63250
Timeliness of Service	-.019712	-.165	0.8695	.119684	
Service Provider	0.870061	9.026	0.0000	.096398	

**Table 10. Factors Influencing Satisfaction With the Overall Work Environment**

F = 28.43, Sig F = .00					
Independent Variable	B	t-value	Sig-t	Standardized Beta	R <sup>2</sup>
Satisfaction With the Immediate Workspace	0.562061	5.691	.0000	0.098756	0.36478
Satisfaction With Facility Services	0.246570	1.645	.1031	0.149877	



## **CHAPTER V: CONCLUSION AND RECOMMENDATIONS**

Environment-Behavior studies exist to ensure that the users of a given environment, whether it be an office setting or factory warehouse, are provided with a healthy, safe, and efficient place within which to function. Building users in this study worked in an office setting for a division within a medium-size financial institution. The division was originally located in the main headquarters building. Due to space limitations the division was relocated to an annex building in the Headquarters Complex. The purpose of this study was to examine the relative contribution of satisfaction with facility services when compared to other proven environmental factors in explaining overall satisfaction with the work environment. The study involved measuring employee satisfaction with the building environment and the services provided by an in-house facility service provider. A post-occupancy evaluation (POE) was designed to measure employee satisfaction. The POE consisted of physical measures of the environment and employee questionnaires.

A model was created for this study illustrating the possible impacts work environment and facility service constructs can have on overall satisfaction with the work environment. Results from analyses of data from the employee questionnaire confirm that satisfaction responses for Luminance Quality, Noise and Privacy are good predictors of Satisfaction With the Immediate Workspace. Results also show that Thermal Comfort, along with Luminance Quality, Noise and Privacy, contributes in

the explanation of variance in Satisfaction With the Immediate Workspace. This supports previous research in the Environment-Behavior field (Allen, 1982; Sundstrom, 1986; Sundstrom et al., 1994; Campbell, 1983; Duvall-Early & Benedict, 1992; Sundstrom et al., 1982; Oldham, 1982; Wineman, 1982; Ruck, 1989; Klitzman & Stellman, 1989).

Correlation analyses also indicated that facility service constructs, Quality of Service, Timeliness of Service and Service Provider, explained a considerable amount of the variance in Satisfaction With Facility Services (63%). Regression analyses, however did not support Quality of Service and Timeliness of Service as good predictors of Satisfaction With Facility Services. A high inter-item correlation was noted between the two constructs, indicating a possible multi-collinearity problem. In early analyses of the data, a fourth construct was eliminated from the grouping due to this same problem. This type of solution, reduction of the number of things analyzed, for multi-collinearity is widely used. From a managerial standpoint, it may not be the best option. It is possible that the items deleted are the only measure of a given work unit, therefore eliminating a manager's opportunity to measure its performance. In this study the items within the fourth construct were not entirely excluded from analysis, but were included in the Satisfaction With Facility Services construct. The continuing multi-collinearity problem indicates that further research of the instrument is warranted.

In the final analysis, the impact Satisfaction With the Immediate Workspace and Satisfaction With Facility Services have on Overall Satisfaction With the Work Environment was measured. The analysis yielded a  $R^2$  of .36, and indicated that

Satisfaction With the Immediate Workspace was a good predictor of Overall Satisfaction With the Work Environment. Although Satisfaction With Facility Services was not found to be a good predictor, it did help to explain the variance in Overall Satisfaction With the Work Environment due to a strong correlation between the two constructs.

What was particularly interesting about these results, were the strong relationships among all the constructs representing the immediate workspace and facility services. Considering the model used for analysis was an introductory attempt at connecting E-B factors with those generally used in marketing research, the study was successful.

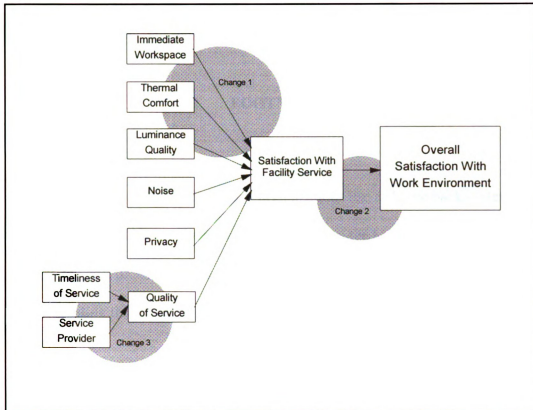
From a managerial standpoint the interrelationships between constructs poses a number of thought provoking questions. For instance,

1. Note the strong relationship ( $r = .5052$ ) between Thermal Comfort and Timeliness of Service. Do employees have a lower threshold for thermal comfort, than say privacy, and therefore are more aware of the response time for the service to be completed?
2. Satisfaction with the Service Provider and Overall Satisfaction With the Work Environment are also strongly related ( $r = .5979$ ). Does the service provider have more value than the quality and timeliness of a

service? Does this indicate to facility managers that they should increase the customer service skills of the service provider?

3. Of the four immediate workspace constructs, Thermal Comfort related the strongest with Satisfaction With Facility Services (  $r = .4708$  versus  $.3520$ ,  $.3023$ ,  $.4025$ ). Does this mean the facility manager of this particular building should focus more on thermal comfort?

In spite of the multi-colinearity problem, the linear analyses of the study (i.e., Pearson Correlations) did show that employee satisfaction with the facility services has an impact on overall satisfaction with the work environment. Although the results of this study are encouraging, it was a preliminary study. Further research is needed to gain a better understanding of the effects facility services have on employee satisfaction with the work environment. Future direction could include repeating a similar study, but utilizing the proposed model when analyzing the data. Another option is to redesign the model based on the results of this study. Considering the multi-colinearity problem, this may be the best solution. The following model illustrates the possible changes (see Figure 3).



**Figure 3.** An Alternative Model of Work Environment Satisfaction

### **Change (1)**

Include the Immediate Workspace as a construct relating to Satisfaction With Facility Services. This change is suggested to help alleviate multicollinearity problems. In the initial model, Thermal Comfort, Luminance Quality, Noise and Privacy were related directly to Immediate Workspace. The new model suggests that employee perception of satisfaction with the Immediate Workspace effects their Satisfaction With Facility Services.

### **Change (2)**

Change (1) dictates that Satisfaction With Facility Services affects Overall Satisfaction With Work Environment.

### **Change (3)**

This change is supported by the literature, which stated that Timeliness of Service and the Service Provider are dimensions of the Quality of Service (Parasuraman et al., 1985).

## FOOTNOTES

1. An exception to this occurs when organizations use a charge back system of accounting. This involves charging a monetary fee to individuals or departments for the cost of services and equipment. This form of accounting is useful in evaluating the actual costs of operating and maintaining an environment.
2. The questionnaire was developed based on the dimensions of SERVQUAL (Parasuraman, Zeithaml, & Berry, 1988). General Service Administration (GSA) focus groups were instrumental in putting together the survey, including pretesting activities.
3. Although the acceptable coefficient alpha for early stage research is .70 (Nunnally 1978), the investigator allowed .60 is the determinant for acceptance. Prior research supports the acceptance of those constructs.

## **BIBLIOGRAPHY**

## BIBLIOGRAPHY

- Allen, T.J. & Gerstberger, P.G. (1973). A field experiment to improve communication in a product engineering department: The nonterritorial office. Human Factors. 15, 487-498.
- Archea, J. (1977). The place of architectural factors in behavioral theories of privacy. Journal of Social Issues. 33(3), 116-137.
- Bateson, J., Eiglier, P., Langeard, E. & Lovelock, C.H. (1978). Testing a conceptual framework for consumer service marketing (Report No. 78-112). Cambridge, MA: MSI.
- Bechtel, R. (1988). Onward, upward and round about: to the future of the POE. Journal of Architectural Planning Research. 5, 339-357.
- Becker, F. (1990). The total workplace: Facilities management and the elastic organization. New York: Van Nostrand Reinhold.
- Bitner, M.J. (1990). Evaluating service encounters: The effects of physical surroundings and employee responses. Journal of Marketing. 54, 69-82.
- Block, L.K. & Stokes, G.S. (1989). Performance and satisfaction in private versus nonprivate work settings. Environment and Behavior. 21(3), 277-297.
- Brill, M. with Margulis, S., Konar, E., & BOSTI. Using office design to increase productivity. Buffalo, NY: Workplace Design and Productivity,, Vol. 1, 1984; Vol. 2, 1985.
- Cadotte, E.R., Woodruff, R.B., & Jenkins, R.L. (1987). Expectations and norms in models of consumer satisfaction. Journal of Marketing Research. 24, 305-314.
- Campbell, J.M. (1983). Ambient stressors. Environment and Behavior. 15, 366-380.
- Canter, D. (1972). Reactions to plan offices. Built Environment. 1, 465-467.
- Carman, J. (1990). Consumer perceptions of service quality: An assessment of the SERVQUAL dimensions. Journal of Retailing. 66, 33-55.



- Carayon, P. (1993). Job design and job stress in office workers. Ergonomics. 36(5), 463(15).
- Churchill, G.A. & Surprenant, C. (1982). An investigation into the determinants of consumer satisfaction. Journal of Marketing Research. 19, 491-504.
- Cotts, D.G. & Friday, S. (1994). Quality facility management: A marketing and customer service approach. New York: John Wiley & Sons, Inc.
- Cronin, J.J. & Taylor, S.A. (1994). SERVPERF versus SERVQUAL: Reconciling performance-based and perceptions-minus-expectations measurement of service quality. Journal of Marketing. 58, 125-131.
- Dainoff, M.J. & Dainoff, M.H. (1986). People and productivity: A manager's guide to ergonomics in the electronic office. Toronto: Holt, Rinehart and Winston of Canada, Ltd.
- Davis, F., Becker, F., Duffy, F., and Sims, W. (1985). (Executive Summary) ORBIT-2: organizations, buildings, and information technology. Norwalk, CT: The Harbinger.
- Day, R.L. (1977). Extending the concept of consumer satisfaction. In W.D. Perreault (Ed.), Advances in consumer research (Vol. IV.). Ann Arbor, MI: ACR.
- Duvall-Early, K. & Benedict, J.O. (1992). The relationship between privacy and different components of job satisfaction. Environment and Behavior. 24(5), 670-679.
- Dwyer, D.J. & Ganster, D.C. (1991). The effects of job demands and control on employee attendance and satisfaction. Journal of Organizational Behavior. 12, 595-608.
- Ferguson, G.S. & Weisman, G.D. (1986). Alternative approaches to the assessment of employee satisfaction with the office environment. In J.D. Wineman (Ed.), Behavioral issues in office design (pp. 85-108). New York: Van Nostrand Reinhold.
- Fried, Y. (1990). Workspace characteristics, behavioral interferences, and screening ability as joint predictors of employee reactions: An examination of the intensification approach. Journal of Organizational Behavior. 11, 267-280.
- Friday, S. (1993, November). Quality Management and Customer Service in the Facilities Business. Paper presented at the Facilities Management Educational Seminar and Exposition, St. Charles, IL.

- Furnham, A. & Walsh, J. (1991). Consequences of person-environment incongruence: Absenteeism, frustration, and stress. The Journal of Social Psychology. 131(2), 187-204.
- Garland, B.C. & Westbrook, R.A. (1989). An exploration of client satisfaction in a nonprofit context. Journal of the Academy of Marketing Science. 17(4), 297-303.
- Garvin, D.A. (1983). Quality on the line. Harvard Business Review. 61, 65-73.
- Gronroos, C. (1978). A service oriented approach to marketing of services. European Journal of Marketing. 12, 588-601.
- Gronroos, C. (1990). Service management and marketing. Lexington, MA: Lexington Books.
- Halaby, C.N. & Weakliem, D.L. (1989). Worker control and attachment to the firm. American Journal of Sociology. 95(3), 549-91.
- Harris, Louis and Associates (1978). The Steelcase national survey of office environments: Do they work?. Grand Rapids, MI: Steelcase, Inc.
- International Facility Management Association (IFMA) (1993). Facility Management Customer Satisfaction Survey. Houston: IFMA.
- Ives, R.S. & Ferdinands, R. (1974). Working in a landscaped office. Personal Practice Bulletin. 30, 126-141.
- Katz, R. & Greco, J. (1993). TQM: Adopting a customer-orientated philosophy. Non-Profit World. 11(2), 18-24.
- ✓ Katzev, R. (1992). The impact of energy efficient office lighting strategies on employee satisfaction and productivity. Environment and Behavior. 24(5), 759-775.
- Klitzman, S. & Stellman, J.M. (1989). The impact of the physical environment on the psychological well-being of office workers. Social Science Medicine. 29(6), 733-742.
- Lehtinen, U. & Lehtinen, J. (1982). "Service Quality: A Study of Quality Dimensions," Unpublished Working Paper, Helsinki: Service Management Institute, Finland OY.
- Leonard, F.S. & Sasser, W.E. (1982). The incline of quality. Harvard Business Review. 60, 163-171.

- Locke, E.A. (1970). Job satisfaction and job performance: A theoretical analysis. Organizational Behavior and Human Performance. 5, 484-500.
- Lunden, G. (1974). Environmental problems of office workers. Building International. 3, 24-29.
- Marans, R.W. & Spreckelmeyer, K.F. (1982). A conceptual model for evaluating work environments. Environment and Behavior. 14(3), 333-351.
- Marans, R.W. & Yan, X. (1989). Lighting quality and environmental satisfaction open and enclosed offices. The Journal of Architectural and Planning Research. 6(2), 288-301.
- Miller, J.A. (1977). Exploring satisfaction, modifying models, eliciting expectations, posing problems, and making meaningful measurements. In H.K. Hunt (Ed.), Conceptualization and measurement of consumer satisfaction and dissatisfaction (72-91). Cambridge, MA: Marketing Science Institute.
- Mowday, R.T., Porter, L.W. & Steers, R.M. (1982). Employee-organization linkages: the psychology of commitment, absenteeism, and turnover. New York: Academic Press.
- Murtha, D. (1988). Information resources for post-occupancy evaluation. Journal of Architectural and Planning Research. 5, 321-338.
- Nunnally, J.C. (1978). Psychometric theory (2nd. ed.). New York: McGraw-Hill.
- Oldham, G.R. (1988). Effects of changes in workspace partitions and spatial density on employee reactions: A quasi experiment. Journal of Applied Psychology. 75(2), 253-258.
- Oldham, G.R. & Brass, D.J. (1979). Employee reactions to an open-plan office: A naturally-occurring quasi-experiment. Administrative Science Quarterly. 24, 267-284.
- Oldham, G.R. & Rotchford, N.L. (1983). Relationships between office characteristics and employee reactions: A study of the physical environment. Administrative Science Quarterly. 28, 542-556.
- O'Neill, M. (1994). Workspace adjustability, storage and enclosure as predictors of employee reactions and performance. Environment and Behavior. (In Press).
- Parasuraman, A., Zeithaml, A., & Berry, L. (1985). A conceptual model of service quality and its implications for future research. Journal of Marketing. 40, 41-50.

- Parasuraman, A., Zeithaml, A., & Berry, L. (1988). SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality. Journal of Retailing. 64, 12-37.
- Parks, C. (1992). Pre- and Post-occupancy Evaluation: A Tool for Measuring Facility Performance. Unpublished manuscript, (The Environments Group).
- Ruck, N.C. (1989). Building Design and Human Performance. New York: Van Nostrand Reinhold.
- Shibley, R. & Schneekloth, L. (1988). Risking collaboration: Professional dilemmas in evaluating and design. Journal of Architectural and Planning. 5, 304-320.
- Sirgy, J. M. (1984). A social cognition model of consumer satisfaction/dissatisfaction. Psychology and Marketing. 1, 27-43.
- Spreckelmeyer, K. (1993). office relocation and environmental change: A case study. Environment and Behavior. 25(2), 181-204.
- Spreng, R. & Olshavsky, R. (1993). A desires congruency model of consumer satisfaction. Journal of the Academy of Marketing Science. 21(3), 169-177.
- Steele, F. (1973). Physical settings and organization development. Reading, MA: Addison-Wesley Publishing Co.
- Stokols, D., Smith, T.E., and Prostor, J.J. (1975). Partitioning and perceived crowding in a public space. American Behavioral Scientist. 18, 792-814.
- Sundstrom, E. (1982). Privacy in the office. Environment and Behavior. 14(3), 382-89.
- Sundstrom, E. (1986). Work places: The psychology of the physical environment in offices and factories. Cambridge, NY: Cambridge University Press.
- Sundstrom, E., Burt, R., & Kemp, D. (1980). Privacy at work: Architectural correlates of job satisfaction and job performance. Academy of Management Journal. 23(1), 101-117.
- Sundstrom, E., Town, J.P., Rice, R.W., Osborn, D.P., & Brill, M. (1994). Office noise, satisfaction and performance. Environment and Behavior. 26(2), 195-222.
- Takeuchi, H. & Quelch, J.A. (1983). Quality is more than making a good product. Harvard Business Review. 61, 139-145.
- Taylor, S.A. & Cronin, J., Jr. (1994). Modeling patient satisfaction and service quality. Journal of Health Care Marketing. 14(1), 34-44.

- Tse, D.K. & Wilton, P.C. (1988). Model of customer satisfaction formation: An extension. Marketing Research. 25, 204-212.
- Vischer, J. (1989). Environmental Quality in Offices. New York: Van Nostrand Reinhold.
- Walden, T., Nelson, P., & Smith, D. (1981). Crowding, privacy and coping. Environment and Behavior. 13(2), 205-224.
- Wener, R. (1988). Doing it right: Examples of successful application of environment-behavior research. Journal of Architectural Planning Research. 5, 284-303.
- Wineman, J.D. (1986). The importance of office design to organization effectiveness and productivity. In J.D. Wineman (Ed.), Behavioral issues in office design (pp. ix-xvi). New York: Van Nostrand Reinhold.
- Yi, Y. (1990). A critical review of consumer satisfaction. in Review of Marketing, 68-123.
- Zeisel, J. (1981). Inquiry by design. Cambridge: Cambridge University Press.
- Zeithaml, V. (1987). Defining and Relating Price, Perceived Quality and Perceived Value. Report #82-101, Cambridge, MA: Marketing Science Institute.
- Zalesny, M.D. & Farace, R.V. (1987). Traditional versus open offices: A comparison of sociotechnical, social relations, and symbolic meaning perspectives. Academy of Management Journal. 30(2), 240-259.
- Zimring, C., Wineman, J., & Carpman, J. (1988). The new demand-driven post-occupancy evaluation. Journal of Architectural Planning Research. 5, 273-283.

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