AN INVESTIGATION OF ENVIRONMENTAL PARADIGMS AND ORGANIZATIONAL CLASSIFICATIONS

THESIS

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THESIS

Presented to the Faculty of the Graduate School of Engineering

of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the

Requirements for the Degree of

Master of Science in Engineering and Environmental Management

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Abstract

The extent of environmental management in organizations is largely determined by what paradigms are espoused with respect to maintaining both natural resources and raw materials. Environmental management paradigms possibly stem from whether an organization is private or public, producing a product or providing a service. However, no established methods exist for comparing organizations with regard to environmental management approaches and perspectives. The purpose of this thesis is to determine whether particular organizational classifications are linked to specific environmental management paradigms.

This study incorporates several environmental management concepts to develop an analytical instrument for observing organizations. Environmental management paradigms provide a common spectrum of comparing organizations to one another. Environmental management systems provide a common basis on which to evaluate organizations. Environmental corporate responses identify environmental perspectives. The combination of paradigms, systems, and corporate responses results in the creation of a tool for analyzing organizations.

After analyzing ten of each type of organization, it is found that private with product organizations appear to have the highest overall degree of environmental management, followed by the private with service arena and finally the public with service sector. Theoretical reasons for the results include: financial benefits, production control, long-term planning, and managerial cohesion.

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Chapter I: Introduction

General Context of Thesis

Environmental management is a heated topic confronting the operations and processes of organizations due to governmental and competitive influences. For every organization, the government provides legal standards and the public observes social concern for environmental welfare; due to such pressures, some organizations go beyond compliance to innovation. All organizations practice environmental management, but there are apparent differences in the way private (for-profit with respect to this thesis) and public (governmental) arenas perceive and implement environmental programs.

Private organizations are able to justify their maintaining environmental standards, for they measure benefits on a monetary scale through decreased costs (waste handling and raw material treatment) and increased revenues (efficiency and competitiveness) (Bresnan, 1994). Such a scale heeds both governmental and public influences when determining the path that will maximize profit.

Conversely, public organizations have more difficulty when ascertaining an obvious rationale for complying with mandatory policies and procedures, for they cannot accurately measure the advantages of environmental action. Although public organizations are similar to their private counterparts in considering governmental and

public views, they cannot easily gauge their benefits on a numeric scale due to the inability to measure either goods or profit. Ultimately, however, whether the organization is private or public, environmental management has the capability to transcend economic significance and has the potential to become ingrained in a cultural awareness where ecological mandates become desired rather than forced.

Initially, due to both legislative and political initiatives, several organizations have enacted environmental management programs. As of recent years, environmental initiatives within organizations have come to be known as Environmental Management Systems (EMSs). In the English language, these systems surfaced in British, Canadian, European, Irish, and International standards. The degree to which organizations develop their EMSs varies due to organizational commitment concerning how much effort and resources should go to environmental practices.

By conceptualizing levels of environmental involvement, theorists have also joined the environmental arena, where there are the extremes of doing the bare minimum to enhancing the world's resources. Theoretical development has come in two types: paradigms and corporate responses. Paradigms seek to both define and label the possible levels an organization may achieve when viewing environmental management programs. According to Graham T. Allison, "a paradigm is a systematic statement of the basic assumptions, concepts, and propositions employed by a school of analysis" (1971). Corporate responses show the level at which various organizations operate, often stemming from their respective paradigms. Such paradigms and responses seek to capture the development of environmental management in current organizations.

By integrating organizational environmental management systems with corporate environmental responses, a mechanism is created whereby one may determine where organizations lie along environmental management paradigm continuums.

Background

In the 1960s, concern for the environment resulted in radical changes in environmental management. With issues stemming from land, sea, and air, various nations have banded together to develop effective environmental strategies. Beginning with governmental legislation and moving to corporations themselves, the practice of environmental management has permeated the business affairs of those who have an impact on the environment. For all organizations, an overwhelming societal consciousness has deemed it necessary to ensure that there is at least minimal care taken for corporate impacts on environmental surroundings.

Indeed, the private organization is able to employ economic creativity when initiating environmental practices. For instance, International Paper Company, one of the largest private land owners in the United States, promotes wildlife and recreation programs, offering camping and hunting facilities to both individuals and clubs (Stroup and Shaw, 1992). Employing foresters and wildlife biologists, the company utilizes techniques such as controlled burning and buffer zones to improve animal habitats. Because the company makes substantial revenue from recreational investments, it is willing to invest a substantial portion of funds in preserving, protecting, and enhancing its wilderness and wildlife resources (Stroup and Shaw, 1992). With governmental

support for environmental awareness and with public enthusiasm for aesthetic pleasure, the private organization (in this case one that produces goods) is able to receive benefits through commercial and monetary assets.

Whether organizations are private or public, they must adhere to established environmental standards. Although there are little to no monetary benefits for organizations within the public sector, such organizations are publicly expected to comply with regulatory standards nonetheless. In the arena of land conservation, for instance, Eve Endicott of the Lincoln Institute of Land Policy believes public organizations need allotted federal financial aid due to four primary reasons: increasing costs of land, emphasis on landscape-scale preservation, public transition from pragmatic (necessity) to programmatic (routine) protection, and renewed interest in planning (1993). All four reasons involve economic needs; not only is land becoming more expensive, but planning for aesthetic upkeep is customary. While the private organization potentially receives economic gains in raising standards for maintaining the environment, the public organization possibly suffers from being expected to comply in the same manner.

Another way of looking at an organization is whether or not it produces a product or a service. Environmental management seems to have a greater focus on production related activities due to raw material and natural resource considerations. On one end of the spectrum, some industries (such as oil companies) constantly risk severe environmental damage; on the other end, service-related organizations (such as retailers) do not have as direct an impact on the environment but can still enhance ecological

practices (Welford, 1996). However, both product and service organizations have environmental management paradigms. Environmental consideration can emphasize the overall impact of an organization on the environment by taking both suppliers and outputs into account; thus, all organizations, whether related to either a product or a service, are expected to follow similar environmental guidelines and regulations.

Purpose of Study

This investigation attempts to observe a hypothetical correlation between the type of an organization and the respective degree of environmental management. For this study, three classifications of organizations will be used: private with product, private with service, and public with service. The "private with product" category essentially encompasses for-profit organizations that produce a good. The "private with service" category includes for-profit organizations that have no material, palpable output. The "public with service" category consists of governmental organizations that serve the nation. There is no "public with product" category because governmental organizations do not generally produce physically tangible items. By utilizing the above three organizational classifications, this study will focus on the examination and the investigation of respective EMSs.

Differences in ecological perspectives between organizations that produce products and organizations that provide services are of key significance for this study. Product-oriented organizations market products that come from processed raw materials. Service-oriented organizations sell services that are often perishable and sometimes

intangible. Due to contrasts in production between products and services, environmental practices may vary as well. Ascertaining whether or not there is a difference in the environmental management perspectives between product-oriented organizations and service-oriented organizations is the primary focus of this thesis effort. From observing EMSs within each organization and organizational type, this study attempts to determine if different organizational classifications (private versus public and product versus service) correlate to certain environmental management paradigms.

Objectives

The goal of this thesis is to determine if there is a correlation between organizational classifications and environmental management paradigms. To accomplish the goal, there are five sequential objectives: compilation, synthesis, investigation, classification, and correlation. First, compilation involves obtaining a substantial number of environmental management paradigms, corporate environmental responses, and environmental management systems from a wide geographical array of theorists and planners. Synthesis entails amalgamating the selected environmental management systems, merging the compiled paradigms, and integrating the acquired corporate responses into one continuum of increasing levels of environmental management perspectives. Investigation includes finding various organizations for observation and study. Classification encompasses the placement of each organization within a category of the synthesized environmental management paradigm. Finally, correlation determines

if there is a notable relationship between organizational classifications and environmental management paradigms. From the five objectives, conclusions are drawn.

Scope

This study pertains to three areas: organizations, theory, and EMSs. The thesis observes and investigates only the aforementioned categories of private organizations (product and service) and public organizations (service). Furthermore, the thesis does not include every paradigm and corporate response ever created. Finally, the study observes EMSs only in the English language. Such boundaries for analysis exist to ensure a focus on thesis objectives towards accomplishing the overall purpose of determining if environmental management paradigms differ between organizational categories.

Limitations

There are certain boundaries, stemming from a qualitative approach that utilizes a subjective manner of categorizing organizations, in which this thesis is limited. First of all, the study encompasses only a limited number of organizations based on a convenience sample, thus producing two noteworthy (and possibly detrimental) aspects to the approach: (1) there are several types of organizations not covered and (2) there is no random selection of organizations. As stated previously, only three sectors will be observed: private organizations with a product, private organizations with a service, and public organizations with a service. Limiting the study to three specific sectors aids in focusing attention on specific categories rather than convoluting or amalgamating

organizational types. As for random selection, choosing which organizations should be used in this study is difficult for at least two reasons: (1) there is no universal listing of organizations based upon the three classifications used in this thesis and (2) there is no guarantee that every randomly selected organization produces an environmental report. Thus, the convenience sample is used for selecting organizations in this study.

A second limitation involves categorizing the selected organizations according to respective organizational paradigms. This part of the thesis is subjective in nature and depends on analyzing EMSs as shown in organizational environmental reports. At this juncture, matching statements from organizational reports to those found within environmental management paradigms is paramount to the thesis, thereby generating inherent human judgment (and subjectivity) when interpreting EMSs.

Another restriction is the extent of usage regarding organizational environmental reports. This study does not observe quantitative data; rather, it focuses on EMS agendas, to include environmental programs and developmental initiatives. Organizations do not follow a universal format when creating environmental reports. Therefore, each report differs as to the amount and the type of information provided. When analyzing different reports, attempting to use a standard approach of investigating environmental management results in a potential hindrance to this study.

A fourth limitation to this effort is that a theoretical approach inherently lacks proof by application. By attempting to validate environmental paradigms based upon matching similar statements (between organizational EMSs and the synthesized paradigm), speculation enters the framework of analysis. Furthermore, because

environmental management theory is in early stages of development, there is no one way to look at paradigms and corporate responses. The lack of universality in thought results in subjectivity when attempting to provide an acceptable framework for defining theory.

Thesis Overview

This study involves four stages: the application of organizational theory, the development of the analytical tool, the utilization of the analytical tool, and the conclusion of the study. The first arena is organizational theory and application, in which there is a generalized overview of organizational types and characteristics that pertain to this study. From this primary stage, the aim is to ascertain which organizational classifications will be investigated.

The development of the analytical tool involves three parts: environmental management paradigm synthesis, corporate environmental response synthesis, and environmental management system synthesis. The aim of synthesizing environmental management paradigms is to develop an appropriate continuum of paradigms for the thesis. The aim of synthesizing corporate environmental responses is to develop a tool from which one may compare aspects of organizational EMSs to respective paradigms. The aim of synthesizing environmental management systems is to create a common ground on which to base the analysis of environmental reports. In essence, this thesis effort aims to merge both the theory and the systems of environmental management, then to apply the results of the merger to organizational EMSs for the purpose of assigning a categorical paradigm to each organization.

The third step is the utilization of the analytical tool. Using the tool, this study will attempt to classify selected organizational EMSs (from the three aforementioned categories) into various levels of the synthesized environmental management paradigm. The aim of applying the tool, then, is to justifiably match each organization with a paradigm.

The conclusion of the study attempts to determine whether or not a correlation exists between organizational classifications and environmental management paradigms. From the conclusion, recommendations for future study are made.

Chapter II: Literature Review

Introduction

This thesis covers two general spectrums of thought: organizational theory and environmental management. Organizational theory provides a general perspective regarding various types of organizations to both identify and define, in a broad context, potential organizations to be studied in this thesis. In the area of environmental management, which shows how organizations take environmental considerations into account, there are two arenas of study: theory and systems. Environmental management theory is the study of determining the degree to which an organization implements environmental and ecological practices. Environmental management systems show the means by which an organization executes environmental programs. To further explain organizational theory, environmental management theory, and environmental management systems, the literature provides an overview of each.

Organizational Theory and Classifications

In its broadest context, organizations exist to arrange people in such a manner as to effectively accomplish tasks towards achieving specific goals. Theoretical observations may be made about organizations in two ways: societal context and production orientation. In a societal context, there are three types of organizations: private, nonprofit, and public (Nutt and Backoff, 1992). Private organizations exist for the pursuit of financial and economic gain. Nonprofit organizations exist for the public

good and receive financial support from various contributors; such organizations do not measure success on a monetary scale. Public organizations emerge with the purpose of consolidating efforts to meet societal demands placed on the government. Of the three organizational sectors, the public arena has the least amount of theoretical basis due to a lack of formal study, which began only within the last two decades (Rainey, 1991); however, it is perhaps the most influential regarding societal responsibility. On the other hand, the private arena receives much theoretical development due to the ease of determining a singular focus -- making a profit. In Latin, *public* means "of the people" and *private* means "set apart." For the purpose of this thesis, only private and public organizations will be observed.

In a production oriented context, there are two types of organizations: products and services. Products are tangible objects that may be created and that are either sold or used after production; conversely, services are either intangible or perishable (Murdick, Render, and Russell, 1990). Private organizations may develop either products (as seen in chemicals, automobiles, and forestry) or services (as seen in lodging, education, and recreation). On the other hand, public organizations tend to be more service oriented, evident in the duties of overseeing defense, energy, and labor. This thesis will observe private and public organizations that manufacture products and those that provide services.

Private organizations seek financial gain to economically aid shareholders. Economic gain comes from consumer fees and charges. Markets tend to be well-defined, thus aiding the organization in meeting demands (Nutt and Backoff, 1992). Private

organizations also have competition within similar markets, thus fueling the incentive to constantly improve organizational practices. The autonomy and the flexibility of private organizations tend to be limited only by legislation from the government and by management from within the organization (Nutt and Backoff, 1992). The influence of politics is indirect, and there is not much of a societal impact because those affected are those in the organization's market (Nutt and Backoff, 1992). Ownership often comes in the form of stockholders and stakeholders who make financial contributions and who share financial risks in the hopes of making profit. Private organizations often have clear goals because management is, for the most part, independent of direct external influences, such as society and special interest groups, when making decisions (Nutt and Backoff, 1992). In essence, private organizations are created by profit-seeking individuals to meet public desires.

Public organizations aim to meet civil needs by utilizing governmental initiatives. Such organizations have three general traits: they are created by law, they have the task of administering the law, and they receive financial support from the public in the form of taxes (Vasu, 1990). Because public organizations originate from law, they are normally part of the government and are thus held accountable by the body politic (Vasu, 1990). Essentially, the public sector has one primary goal -- public service. Because such service involves aspects that include social justice, issues of societal participation, equality of opportunity, civil rights, public education, mass transit, social security, welfare, housing, pollution, and crime (to name a few), the public sector has to find means of integrating all areas of society when determining what paths to take when

making decisions (Vasu, 1990). Thus, creating explicit goals is difficult. The uniqueness of public organizations lies in their inception and in their purpose, for they are created by the public to serve the public.

As stated, organizations may be either product or service oriented. Product oriented organizations tend to extract, combine, and transform raw materials or resources, producing an end product through a means of manufacturing (Murdick, Render, and Russell, 1990). Industries that develop electronic appliances and sporting goods focus on the creation and the selling of those products. Service oriented organizations tend to facilitate the usage of products for the purpose of enhancing lives through either time or place utility (Murdick, Render, and Russell, 1990). Retailers and house-cleaning services use products in providing services. Oftentimes, measuring the output of service organizations is a difficult task, making it more perplexing to assess the efficacy of procedural changes. Obviously, there are different means of producing products as compared to services; thus, the methods used in managing environmental practices could also differ.

With such a vast array of organizations, it is useful to categorize them into a general system. For the purpose of this thesis, the above organizational theory culminates in four classes: private with products, private with services, public with products, and public with services. Matching organizational classifications with environmental management paradigms accomplishes the goal of this thesis, which seeks to determine if paradigms differ between organizations.

Environmental Management Theory

Environmental management theory usually involves the practice of classifying organizations along a spectrum on environmental commitment. Due to the vast array of problems, from natural resource depletion to atmospheric degradation, environmental management has become a major concern of society-at-large. The creation of environmental management paradigms aids in developing a scale of commitment upon which organizations may be analyzed to determine respective concern for the environment. Accordingly, paradigms aid in keeping organizations accountable to public scrutiny by forming an atmosphere of perceptions based on varying degrees of environmental commitment. Environmental management corporate responses help to compare organizations with paradigms, showing what characteristics are evident within each organization in determining the organizational perspective towards environmental management. Accordingly, environmental management theory develops categories in which organizations may perceive themselves in determining where they stand environmentally in comparison to both competitors and peers.

Wever (1996) categorizes environmental management in the corporate arena along a continuum of ten stages, moving from an inward focus to an outward view to a global view. The first two stages occur in unprepared organizations: wastes/costs/non-compliance and compliance (reactive). In wastes/costs/non-compliance, organizations simply pay fines and take no environmental initiative. In compliance (reactive), organizations respond only when regulated by a governmental authority. The next two stages take place in aware/reactive organizations: compliance (proactive) and pollution

prevention. In compliance (proactive) organizations initiate environmental management without prompting from outside forces. In pollution prevention, organizations seek to ensure that controls are placed on all emissions considered environmentally detrimental by either government or society. The next two stages appear in proactive/anticipatory organizations: management system focus and product stewardship. Management system focus appears when upper echelons of organizational management commit to environmental excellence through all levels of the organization. Product stewardship is a combination of both life-cycle analysis and design for environment where organizations plan for long-term effects. The next two stages are in mainstreaming organizations: partnerships and environmental cost accounting. Partnerships occur when various organizations combine efforts in working together to develop better tools and to use environmentally friendly materials. Environmental cost accounting takes place when organizations substantiate the importance of environmental practices by setting aside a significant portion of funds to ensure environmental practices in all phases of production. The final two stages are evident in mature/highly integrative organizations: integrated management systems and design for sustainability. Integrated management systems are in organizations that have environmental oversight in all phases of production, making all levels of the organization accountable for environmental initiatives. Design for sustainability or (sustainable development) is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987). Wever's continuum

provides a general overview of the various stages of environmental management in order to provide a merging of thoughts both theoretical and corporate.

The ability to understand environmental management theory enables regulators to comprehend environmental influences and developments. Furthermore, organizations are able to compare themselves with peers in assessing their technologies and their initiatives. In the growing concern for the environment, theory becomes substantiated in application as programs develop from paradigms.

Paradigms. Environmental management paradigms are cognitive in nature, as they explore perspectives rather than processes. Such cognitive thought analyzes developments in scientific theory and societal change. In the case of environmental management, two kinds of paradigms have been proposed: continuums and classifications (Hass, 1996). The continuums of interest in this thesis are paradigms with increasing levels intensity concerning environmental management. Continuums evaluate organizational responses, attitudes, and postures regarding environmental issues and theoretical parameters (Hass, 1996). After evaluation, continuums rate organizations according to a scale of increasing stages of environmental management (Hass, 1996). Classifications, on the other hand, are paradigms that do not follow a certain order; rather, they categorize organizations in specific groups according to organizational perspectives on environmental management. There is no expected progression regarding the structure of classification, or categorical, models (Hass, 1996). Although movement along different categories is possible, one classification is not seen to be of a higher or better degree than another (Hass, 1996). Continuums and classifications have

overlapping environmental management characteristics that are identified but have different approaches to rating organizations.

Continuum #1 – Arnold (1997). At the Business, Environment, and Leadership Conference in 1997, Matt Arnold proposed the following paradigm in response to the following question: can sustainability work as a business strategy? Towards sustainability, Arnold uses the following four categories in ascending order: franchise, process, product, and sustainability.

Franchise. In this stage, enterprises have the goal of maintaining a social contract with respective governments by ensuring societal health. Its primary activity is treatment as required by regulation, and the only value for environmental management is that of ensuring organizations have the right to operate. This stage may be summarized in the term "responsible care."

Process. In this stage, the goal of organizations is to reduce waste, emissions, and discharge. Accordingly, the primary activity is pollution prevention, where organizations place controls on environmental practices deemed unhealthy by the government or society. The value of environmental management is seeking to increase corporate reputation and to live the motto "pollution prevention pays."

Product. In this stage, the goal of organizations is to minimize the environmental impact by initiating the primary activity of stewardship, or design for environment, where organizations realize they are only stewards, not masters of that which they use as supplies and produce as outputs. The value of environmental

management in this phase is customer loyalty, where organizations thrive on healthy societal reputations by showing concern for public welfare.

Sustainability. This phase of environmental management is seen when organizations have the goal of maximizing environmental, economic, and societal values by seeking to ensure that future generations enjoy the same amount of resources available in the present. The primary activities in this stage are utilizing reusable inputs, redesigning business systems, and regenerating raw materials. The value of environmental practices is the creation of new markets, where global awareness takes place.

Continuum #2 -- Colby (1991). Michael Colby proposes five basic paradigms for integrating environmental management and human development: frontier economics, environmental protection, resource management, eco-development, and deep ecology. In his categorization, he assumes human nature and environmental nature have differing imperatives, threats, and risks that lead to various conclusions, as seen in his paradigms.

Frontier Economics. Frontier economics views nature as having an infinite amount of resources. Such resources are for human exploitation, and environmental consumption results in pollution production and ecological degradation. The focus is on corporate progress and prosperity, seeking human benefit at all costs. Threats to frontier economics are hunger, poverty, disease, and natural disasters. In this stage, organizations look to capitalize on free goods and open access markets. Such a paradigm lacks an awareness of reliance on ecological balance.

Environmental Protection. This category sees environmental management as a series of tradeoffs, where ecology and economy complete against one another. There is still a humanistic element, but measures are made to ensure compliance with regulatory standards. The dominant threats to organizations are negative effects of pollution and endangered species. The focus of environmental management is on a defensive stance, whereby organizations focus on that which is legal, fulfilling minimum requirements while furthering economic growth. This view lacks any commitment to raising environmental awareness at all levels of organizations.

Resource Management. This paradigm views environmental management as sustainability, integrating human pursuits with environmental welfare. The threats in this category are resource degradation (which defies the purpose of sustainability), poverty, and population growth. Thus, the main theme is global efficiency as organizations seek to blend economy with ecology, knowing that there is an interdependence upon human survival and environmental management. The weakness of this perspective is that there is no consideration for uncertainty, such as how to ensure that every organization does its part in sustaining the environment.

Eco-Development. This view sees environmental management as a merging, or a partnership, between humanity and nature. It shifts towards an ecocentric view where the development of the earth is seen as the means by which humans may live; if there is no care for the world, humans will die. The threats in this arena are ecological uncertainty and global change, where nature itself causes damage to both humans and the environment. In this paradigm, the focus is on centering economy around ecology, as

organizations merge with nature in a codependency towards one another. The main flaw in this stage is the difficulty in developing a new consciousness within every organization, where cultures and climates change.

Deep Ecology. This paradigm looks at environmental management as earth-centered. It seeks to have human harmony with nature in the thought process that all life stems from the earth. Biocentric at its core, deep ecology seeks to reduce human growth to ensure ecological growth. Primary threats are the collapse of the ecosystem and unnatural disasters, where uncommon occurrences such as atmospheric destruction and meteor collision take place. The focus of this stage is a symbiosis between humans and nature, where there is equality of all things of the earth. The primary weakness in this stage lies in moral and ethical complications such as finding methods to reduce the population.

Continuum #3 – Gladwin, Kennelly, and Krause (1995). In this continuum of paradigms, Gladwin, Kennelly, and Krause seek to balance human-centered and earth-centered perspectives by focusing on sustainability. The areas of importance pertaining to sustainability as specified by the authors are the following: inclusiveness, connectivity, equity, prudence, and security. Inclusiveness is organizational embracing and combining of both environmental and human systems in considering population change, technological development, economic growth, and societal institutions. Connectivity is understanding that organizations cannot reach economic goals without also reaching social and environmental goals; organizations should view the world's problems as interrelated with one another. Equity is the fair distribution of resources and

rights between current and future generations. Prudence is taking caution (through precautions, preemptive safeguards, reversible actions, safety margins, and emergency preparedness) when managing the environment due to such dynamic risks as uncertainty and unpredictability of social and ecological systems. Security is ensuring sustainment for the future to include no net loss of natural resources as well as enduring health and welfare standards. By utilizing the spectrum of perspectives as seen in the following three categories, the authors seek to develop a framework of environmental paradigms from the viewpoint of the aforementioned five traits of sustainability (note that sustaincentrism and sustainability are not the same).

Technocentrism. Technocentrism views the earth as a dead machine with humans dominating over every facet. Nature can withstand anything humans do and technology does not have to take the world into account. Humans are free to exploit the world for self-gain and materialistic pursuits. Regarding inclusiveness, there is disassociation with humans and nature, for humans are superior. As for connectivity, this view sees economic and environmental pursuits as incompatible. There is no equity, for technocentrism is human-centered. As for prudence, this paradigm heeds no warning and does not prepare for the future of the earth's resources. Accordingly, in the area of security technocentrism does seek the welfare of future generations. In summary, technocentrism does very little for the environment, much less the sustainment of nature.

Sustaincentrism. Sustaincentrism sees the earth as a life support system and as a home for living creatures. Humans and nature are interdependent, one to

another, and humans are responsible for proper stewardship of ecology. There is to be precaution in technological advancements to ensure that there is no depletion of resources as a whole; thus, there is skepticism when developing new technologies. This paradigm seeks to conserve the environment and to maintain current levels of resources. Concerning inclusiveness, there is deeper attention given to the balance between human economy and natural ecology, thus correlating needs between humans and nature. In connectivity, there is an interrelationship between production and society, where organizations realize that what they do has a significant impact on others, including their markets. In the field of equity, sustaincentrism seeks to find a balance between ecology, economy, and society in preparing for long-term planning. Concerning prudence, there are precautions taken to ensure realistic boundaries when using and restoring natural resources and ecological inputs. Regarding security, there is a balance between social systems and ecological systems in establishing ways for humans and the earth to benefit from one another over time. In summary, sustaincentrism is too utopian for technocentrists and too passive for ecocentrists.

Ecocentrism. Ecocentrism sees the earth as the mother of life; thus, it is alive and sensitive to environmental damage. Humans are but a part of the overall intricacies of nature and technology is often to benefit humans at the cost of harming ecology. The population is too great for the environment to handle and humans should limit reproduction. Regarding inclusiveness, the human system is a sub-category of the ecological system. As for connectivity, ecocentrism falls far short of ensuring human welfare; it views the world as sustainable unto itself and humans as a potential

threat. In equity, the biosphere is of sole importance and all else, human or non-human, present or future, are of little consequence. In the arena of prudence, ecocentrism favors a return to a state where there is little technological advancement. In security, ecocentrism reduces the ability to sustain resources by its not specifying any means by which humans may put back what it removes in regard to nature. Because humans are no longer distinct in the ecocentric view, there is no true role for humans to play; ecocentrism provides no measures for future sustainability. Surely, this paradigm is in deep contrast as compared to technocentrism.

Classification #1 -- Meima (1994). At the 1994 Business and Strategy Conference, Ralph Meima discussed paradigms not as a way of increasing levels of thought on a continuum, but as a way of classifying types of motivations in various categories. The following categories (one added by Richard Welford) show Meima's unique view, where organizations may fall into one or more patterns of thought.

Anthropocentric Moral/Ethical Dilemma. In this category, organizations consider ethical and moral practices such as animal testing and societal impacts. There are such practices as eco-auditing, openness and disclosure, public information, and legal responsibility.

Circular Flow and Value Chain. This arena integrates such practices as life-cycle assessment, integrated chain management, and environmental management integration such as recapture, reuse, and recycling. There is a cyclical pattern to environmental management regarding what is removed and what is returned.

Aspect of Product Quality. In the pursuit of total quality, environmental management becomes linked with total quality management practices to ensure that there is environmental action taken at all levels of the organization and to ensure excellence in all organizational practices.

Balance Between Nature and Industry. In this classification, there is industrial ecology and symbiosis where organizations utilize practices that either do not harm nature or that actually use nature. Accordingly, there is also substitution of materials, pollution prevention, effective record-keeping, and zero emissions. Thus, in this stage, industry becomes part of the ecosystem.

Sustainable Development (Welford, 1996). Welford adds this category to Meima's paradigm to add another perspective: that of futurity. Rather than looking at current organizational practices, Welford hopes to show how sustainability can be an underlying theme of Meima's four categories.

Corporate Responses. Environmental corporate responses, otherwise known as corporate environmental management, take paradigms and institute them as practices for use within organizations. Concerning corporate responses, Julie Hass believes that placing concepts into similar groups increases a theoretical understanding of environmental management by allowing a basis on which to discuss organizations (1996). As with paradigms, corporate responses also are either continuum/progression or classification/categorical in nature. However, while paradigms take environmental management thought into consideration, corporate responses actually observe the implementation of environmental management practices. In corporate environmental

management, observers view organizational responses, attitudes, and postures towards environmental issues based upon similar characteristics. The following continuums and categorizations provide a brief look at how various individuals perceive corporate responses, thus providing an aid in understanding how organizations undergo classification later in this thesis.

Continuum #1 -- Beaumont, Pedersen, and Whitaker (1993). This framework explores various degrees of organizational reconfiguration induced by both societal and regulatory concerns when managing the environment. The authors utilize six categories: ignored, localized action, corporate action, business process action, supply chain action, and business scope action. *Ignored* means that organizations do not consider environmental matters. Organizations are able to remain operational without developing an environmental framework of operations. In *Localized Action*, individual managers and departments consider environmental matters to include compliance with legislation and measures to improve resource efficiency (such as energy). Regarding *Corporate Action*, environmental matters are deemed important by management and actions shift from focusing simply on short-term benefits. Concerning *Business Process Action*, basic business methodologies and practices are modified due to increasing environmental awareness. In *Supply Chain Action*, environmental matters and organizational action become intertwined to the point where suppliers also adhere to organizational standards. Finally, *Business Scope Action* utilizes environmental matters to expand organizational horizons beyond traditional boundaries in expanding markets and social awareness.

Continuum #2 – Dodge (Welford, 1995). In Welford's book Environmental Strategy and Sustainable Development, John Dodge creates a five-level corporate response (ROAST) based upon organizational performance. *Resistance* occurs when there is complete disregard to environmental values and rules. In this stage, organizations are neither responsive nor reactive to environmental initiatives. *Observe and Comply* takes place when the organization observes environmental laws but is hesitant to comply, thereby displaying a stubborn attitude. In this stage, actions are enforced by legal proceedings. *Accommodate* eventuates when the organization begins to adapt to change by showing early signs of proactive and responsive behaviors. In this stage, actions go beyond simply complying with legislation to the point of voluntary action. *Seize and Preempt* ensues when the organization seizes and preempts its operations with environmental consideration, whereby the organization becomes proactive in setting an environmentally conscious agenda. In this stage, organizations also become aware of stakeholder concerns pertaining to the environment; furthermore, signs of sustainable development become evident. *Transcend* arises when the values, beliefs, attitudes, and culture exhibit complete support for environmental initiatives. In this stage, there is sustainable development and organizations are sensitive to all of nature, greatly surpassing competitors.

Continuum #3 – Ford (1992). Richard Ford observes the extremes of corporate environmental management from non-existent to sole goal. Along this spectrum, there are four categories: inactive, reactive, proactive, and hyperactive. *Inactive (Ignore, Ostriches)* companies are those that choose to place blinders over their

eyes in disassociating environmental impacts from their businesses, thereby placing their heads in the sand as an ostrich. Such companies do not act illegally or immorally, but view environmental practices as a low priority. *Reactive (Respond, Chicken Lickens)* companies find that unexpected environmental pressures have the potential to cause severe damage on their operations; like Chicken Licken, they live in terror that the sky will fall until it is too late. These companies are non-strategic in their approach to the environment and react to problems as they come rather than preparing for the future. *Proactive (Anticipate, Green Hornets)* companies seek to anticipate future impacts, acting on what they perceive to be future trends in the environment. Such organizations choose to remain abreast of environmental changes and consider "green" issues as fundamental to their operations. *Hyperactive (Provoke, Robin Hoods)* companies exceed both government and customer requirements, creating their own standards that are unknown amongst peers. Such companies feel that extreme environmental activities will one day prevail in the midst of those who fall behind; profit is but a means to achieve a self-induced environmental morality.

Continuum #4 -- Greeno (1991). Greeno characterizes corporate postures along a three-stage framework: problem-solving, managing for compliance, and managing for assurance. In this perspective, Greeno produces a corporate response where one stage flows into the next one. In *Problem Solving*, the primary purpose is to define basic goals and directions while solving only immediate problems. The motive is to avoid excessive costs; the vulnerability is inability to respond to severe environmental changes. In *Managing for Compliance*, the primary purpose is to build environmental

systems in achieving goals, thereby coordinating compliance efforts in preventing drastic yet necessary changes. The motive is to use resources effectively in preparing for the future; the weakness is in compliance, which falls far short of sustainability. In *Managing for Assurance*, the primary purpose is to establish an ongoing management of both risks and opportunities; at this stage, environmental systems are in place. The primary motive is to protect both internal and external environments from harm; the risk is in funding environmental operations without immediate financial return.

Continuum #5 -- Hunt and Auster (1990). Hunt and Auster place the value of the environmental corporate response in three arenas: legally, publicly, and governmentally. Legally, environmental practices reduce liability. Publicly, environmental management provides favor with both media and customers. Governmentally, preparing for future standards allows companies to be ahead of their peers when foreseeing changes. Hunt and Auster utilize the following five-stage continuum: beginner, fire-fighter, concerned citizen, pragmatist, and proactivist. The *Beginner* has a program that does not reduce environmental risk in any way. It views environmental management as unnecessary, it commits minimal resources, and managers are not involved. The *Fire Fighter* has an environmental program that provides minimal protection. Environmental issues are encountered only when necessary, budgeting is provided only as problems occur, and there is minor involvement from managers. The *Concerned Citizen* has an environmental program that provides moderate protection. Environmental management is seen as worthwhile and organizations become aware of environmental procedures; resources are provided consistently (at a minimal level), and

managerial commitment is verbalized. The *Pragmatist* has an environmental program that provides comprehensive protection. Environmental management is an important function in daily operations and there is usually sufficient funding for environmental projects; management is aware and moderately involved. The *Proactivist* has an environmental program that provides maximum protection. At this stage, environmental management is a priority and funding has no limits; management is actively involved.

Continuum #6 – James (1992). James' continuum is focused on regulation. At the first level, organizations *Ignore Environmental Issues* and do not participate in or consider environmental initiatives. The next stage is *Impact Amelioration*, or minimizing as required by law, where organizations do only what is necessary in complying with regulatory and legislative standards. Third is *Corporate Responsibility*, or moving beyond legislation, in which organizations surpass expected requirements and begin to implement self-directed initiatives. Finally, there is *Green Design*, or gaining competitive advantage, where organizations involve themselves in long-term planning and implementation of environmental programs and processes while learning how to forecast upcoming trends in environmental management.

Continuum #7 – Ketola (1993). Ketola views corporate responses in a strategic manner in order to explain how companies respond to one another concerning corporate environmental management. The first stage is *Stable*, where organizations are occasionally defensive and take action when a competitor makes a significant move. The second stage is *Reactive*, where organizations are partially defensive and partially cooperative with one another. The next stage is *Anticipatory*, in which organizations are

cooperative and thus support one another when encountering major environmental initiatives. Fourth is *Entrepreneurial*, in which organizations are partially threatening and partially cooperative with one another, helping one another with the intention of gaining an advantage. Finally there is *Creative*, where organizations are threatening to others due to their own ingenuity in developing innovative environmental management programs.

Continuum #8 -- Newman (1993). John Newman, Senior Vice-President of Booz-Allen & Hamilton, manages the firm's global environmental consulting business. He views corporate responses in the following three categories: reactive, proactive, and innovative. A *Reactive* posture has a narrow view of risk management, focusing on compliance with regulations and nothing more. Reactive organizations view environmental issues as isolated concerns but not an integral element of business. A *Proactive* stance takes place when organizations find opportunities related to the environment. The organization benefits from practices such as recycling and "green" packaging. An *Innovative* attitude is evident when organizations have a comprehensive understanding of controlling potential risks. Innovative organizations capitalize on the benefits of risk management, as seen from market acceptance and strategic preparedness.

Continuum #9 -- Pietilainen (1991). Pietilainen groups organizational corporate responses according to "greenness." The initial approach is to emphasize environmentally beneficial attributes of products through *Communication*. However, a weakness is evident when manufacturers provide false advertising to gain profit. Second, organizations focus on improving *Manufacturing Processes*, avoiding burden to the

environment by developing more efficient production processes. The objective of a company focusing on manufacturing processes is to produce goods to serve traditional markets while realizing that the traditional attributes of the product determine the success of the product. Third, organizations seek to enhance *Environmental Protection*, producing equipment for minimizing environmental impacts; this includes keeping suppliers accountable to environmental practices. In this category, there is conservation of materials, there is efficient use of energy, and there is reduction of waste. The fourth group focuses on the *Entire Strategy and Product Mix*, where green ideology consumes planning both short-term and long-term. This stage requires comprehensive strategic vision and extensive research and development.

Continuum #10 -- Roome (1992). Roome views corporate responses as strategic options, where organizations start by reacting to legislation and society. The first strategy is *Non-Compliance*, which occurs due to financial constraints, managerial default, and limited planning. Second is *Compliance*, which focuses on reacting to legislative agendas, tackling one problem at a time. Next is *Compliance Plus*, where there is a proactive position regarding the environment and where organizations seek to integrate environmental management systems into the framework of business strategy. Fourth is *Commercial and Environmental Excellence*, where environmental management is viewed as effective and beneficial; environmental quality becomes inherent in the core corporate and managerial values. Finally, there is *Leading Edge*, in which organizations become innovative and develop leading edge technologies by placing environmental procedures in every facet of the operational framework.

Continuum #11 – Simpson (1991). Simpson develops a continuum of corporate responses based on social responsibility. At one end of the spectrum lie the *Why Mes*, who feel unfairly targeted in the industry; such organizations attract the attention of campaigning shareholders who have a great influence on corporate practices. In the middle, the *Smart Movers* exist; they follow current environmental trends and initiate specific (and sometimes innovative) environmental responses when opportunities arise. At the other end, *Enthusiasts* have a zealous response to environmental management, in which organizations envision a complete alignment of corporate practices around the realization of societal responsibility.

Continuum #12 – Topfer (1985). Topfer examines organizations based upon their attitudes towards environmental protection. *Resistant* organizations regard environmental practices as a limiting factor regarding business. Such companies seek to inhibit legislation while keeping the public from being concerned about the environment. *Passive* organizations ignore changes in societal opinion regarding environmental concerns. These companies do not react to changes because environmental management is not viewed as having any significant impact on the organization. *Reactive* organizations take some initiative when implementing environmental programs. However, such organizations tend to make a move only in defense of actions taken by competitors. *Innovative* organizations aim to benefit from new market opportunities derived from environmental protection demands. Such organizations take action based on self-motivation.

Continuum #13 -- Vandermerwe and Oliff (1990). Another strategic view of environmental management is provided by Vandermerwe and Oliff. At first, organizations focus on *Marketing*, where firms seek to develop markets. The focus at this stage is on advertising the environmental features of the product through public relations, advertising, sponsorships, and information campaigns. The next focus is on *Manufacturing*, where organizations focus on new techniques and processes that meet or exceed environmental expectations from society. The focus shifts from the public to internal operations, where production processes change (to include waste management and disposal) in order to accommodate environmental trends. The final stage is *Research and Development*, in which organizations produce technologies that drive "green" strategies. New products, innovative concepts, alternative production methods, state of the art technology, and modernistic processes promote such practices as raw material replacement and waste recovery.

Continuum #14 -- Welford (1994). Welford characterizes corporate responses to environmental challenges in four levels, especially pertaining to small-sized or medium-sized enterprises. *Ostriches* are those who do not recognize environmental challenges that face industry, thinking that environmental management is a passing phase and that competitors will do nothing. *Laggards* are those who recognize environmental challenges but feel incapable of doing anything; they lack information and think of environmental practices as an added burden in spite of realizing potential benefits. *Thinkers* are those who recognize environmental challenges and know that they will eventually have to take some action; they wait and see what others are doing before

taking action. *Doers* are those who derive and implement proactive environmental strategies, planning ahead to prepare for either necessary or anticipated changes in both processes and products.

Corporate environmental management includes not only continuums and progressions, but also classifications and categorizations. Corporate responses developed by Schot and Steger present various stages of environmental management according to classifications. Such classifications do not represent increasing levels of environmental awareness; instead, they seek to show how various organizations have different approaches. Rather than comparing organizations with one another, classifications objectively show characteristics of environmental management perspectives within organizations. Classifications aid in understanding how organizations implement environmental management and provide the rationale that organizations use when planning for environmental initiatives.

Classification #1 -- Schot (1992). In this classification scheme, Schot applies several corporate responses according to defending an organization against changes in surroundings through one of five strategic policies: dependent, defensive, offensive, innovative, and niche. The *Dependent* strategy is one with little policy concerning the reduction of pollution emission levels. There is an attempt to comply with legislation, but management has no commitment to environmental management. The *Defensive* strategy is one in which a company does its best to comply with governmental regulations. Solutions are found in technological sources external from the organization because environmental problems are viewed as external problems that

restrict organizational potential. The *Offensive* strategy takes place when an organization has to find its own solution. The organization develops its own policy to reduce emissions at rates that exceed governmental standards and alternatives for outputs are developed in case existing methods are not environmentally sound. The *Innovative* strategy is one where organizations seek to increase ecological concern through environmental commitment at all levels of the organization. Research and development and marketing seek to ensure that both clients and suppliers are involved in an environmentally conscious network. The *Niche* strategy is one in which organizations seek to find a place in the market where there an ecologically sound product already exists. In such organizations, there is little research and development due to existing technologies and environmental sensitivity of the product.

Classification #2 -- Steger (1993). Steger develops corporate responses centered on strategies in which there are two conditions: corporate potential for market opportunities stemming from environmental management and corporate risk when initiating environmental programs. The first classification is *Indifferent*, where environmental protection is of no strategic importance due to an insignificant increase in market opportunities and no environmental risk (evident in retailing). The second classification is *Defensive*, in which environmental technologies are initiated within the production of the output for the purpose of saving end-of-production costs; in this category, environmental risks are high and market opportunities are low (seen in the utility industry). In the *Offensive* strategy, organizations increase their market opportunities and have low risk when initiating environmental measures; accordingly,

there is the development of environmentally sound products due to increased profit (often seen in the food industry). The final strategy is *Innovative*, where organizations have a high increase in market opportunities and a high risk in environmental procedures when initiating ecologically sound programs; this takes place when there are major changes in the production process or when the entire output changes (seen in the chemical industry).

Environmental Management Systems

To effectively integrate environmental initiatives within organizations, EMSs are developed. EMSs may reveal organizational paradigms when responding to environmental mandates. According to the British Standards Institution, an EMS is "the organizational structure, responsibilities, practices, procedures, processes and resources for determining and implementing environmental policy" (1994). This definition is similar to other EMS documents such as CSA Z750, IS 310, and ISO 14001. In general, the EMS outlines organizational policy, plans or programs, implementation of plans, training of personnel, measurement and correction of environmental activities, documentation of environmental progress, and improvement of environmental activities.

The British Standards Institution, in British Standard 0, defines the following words: standardization, standard, and specification (1991). *Standardization* is establishing standards through formulation, issue, and implementation, while considering potential problems and constant application. A *Standard* is a document that provides rules, guidelines, or characteristics for organizational activities in order to achieve optimal results. A *Specification* is a set of requirements (to which organizations

conform) that are met by product, material, process, or system directives. In the context of the above definitions, EMSs provide systemic guidelines for organizations when implementing environmental initiatives.

For this thesis, every EMS document in the English language is covered. The purpose of covering all five documents is to synthesize them into a general tool for analyzing various EMSs. In this segment of the thesis, the following documents are covered, with subdivisions listed alongside applicable section numbers: BS 7750 (British), CSA Z750 (Canadian), EEC No 1836/93 (European), IS 310 (Irish), and ISO 14001 (International). Although all five documents have several elements of redundancy, it is beneficial to explain them in detail to gain an overall understanding of various EMS methodologies.

BS 7750: The British Standards Institution (1994). In 1990, the British Standards Institution (BSI) considered the involvement of a third party when assessing environmental performance. After consideration, BSI thought that environmental performance was more effective as a managerial issue within organizations. In general, the business community had an interest in environmental management correlating to already existing (and costly) quality programs. The result was BS 7750, the world's first environmental management system standard. The purpose of EMSs is to ensure conformance to environmental policy, objectives, and targets in the areas of activities, products, and services. In BS 7750, the portion dealing with environmental management systems is Section 4. The following shows the outline of the BS 7750 EMS:

4.1 Environmental Management Systems
4.2 Environmental Policy

4.3 Organization and Personnel
- 4.3.1 Responsibility, Authority, and Resources
- 4.3.2 Verification Resources and Personnel
- 4.3.3 Management Representative
- 4.3.4 Personnel, Communication, and Training
- 4.3.5 Contractors

4.4 Environmental Effects
- 4.4.1 Communications
- 4.4.2 Environmental Effects Evaluation and Register
- 4.4.3 Register of Legislative, Regulatory, and Other Policy Requirements

4.5 Environmental Objectives and Targets

4.6 Environmental Management Program

4.7 Environmental Management Manual and Documentation
- 4.7.1 Manual
- 4.7.2 Documentation

4.8 Operational Control
- 4.8.1 General
- 4.8.2 Control
- 4.8.3 Verification, Measurement, and Testing
- 4.8.4 Non-Compliance and Corrective Action

4.9 Environmental Management Records

4.10 Environmental Management Audits
- 4.10.1 General
- 4.10.2 Audit Program
- 4.10.3 Audit Protocols and Procedures

4.11 Environmental Management Reviews

CSA Z750: The Canadian Standards Association (1994). Rather than a specification, CSA Z750 is a guidance that provides advice instead of a set of requirements. In CSA Z750, the EMS system specifies the organizational structure, responsibilities, practices, procedures, processes, and resources for the implementation of environmental initiatives. According to CSA Z750, the four principles of environmental management are purpose, commitment, capability, and learning. The EMS is covered in Section 3 of the document, as shown in the following:

3.1 Elements of an Environmental Management System

3.2 Purpose

3.2.1 General
3.2.2 Environmental Policy
3.2.3 Risk Assessment
3.2.4 Environmental Objectives and Targets

3.3 Commitment
3.3.1 General
3.3.2 Environmental Values
3.3.3 Alignment and Integration
3.3.4 Accountability and Responsibility

3.4 Capability Processes
3.4.1 General
3.4.2 Resources -- Human, Physical, and Financial
3.4.3 Knowledge, Skills, and Training
3.4.4 Information Management and Procedures

3.5 Learning Processes
3.5.1 General
3.5.2 Measuring and Monitoring
3.5.3 Communication and Reporting
3.5.4 System Audits and Management Review
3.5.5 Continuous Improvement

EEC No 1836/93: The European Economic Community Regulation (EMAS: The Eco-Management and Audit Scheme) (Council of the European Communities, 1993). Rather than a standard, EMAS is a regulation. A regulation is general in application, binding in entirety, and applicable in member parties. EMAS has twelve member states in the European Community and provides common ground on which all nations can stand. The focus of EMAS is industrial companies. EMAS seeks to utilize audits to ensure necessary environmental initiatives and associated continual improvement. The environmental management scheme includes the following parts:

Annex I: Requirements Concerning Environmental Policies, Programs, and Management Systems

A. Environmental Policies, Objectives, and Programs
1. Establishment of Policy
2. Adoption and Review of Policy
3. Principles of Policy
4. Environmental Objectives

5. Environmental Program for the Site

B. Environmental Management Systems
   1. Environmental Policy, Objectives, and Programs
   2. Organization and Personnel
   3. Environmental Effects
   4. Operational Control
   5. Environmental Management Documentation Records
   6. Environmental Audits

C. Issues to be Covered

D. Good Management Practices

Annex II: Requirements Concerning Environmental Auditing
- A. Objectives
- B. Scope
- C. Organization and Resources
- D. Planning and Preparation for Site Audit
- E. Audit Activities
- F. Report Findings and Conclusions
- G. Audit Follow-Up
- H. Audit Frequency

Annex III: Requirements Concerning the Accreditation of Environmental Verifiers and the Function of the Verifier
- A. Requirements for the Accreditation of Environmental Verifiers
- B. The Function of Verifiers

Annex IV: Statements of Participation

Annex V: Information to be Provided to the Competent Bodies at the Time of Application for Registration or Submission of a Subsequent Validated Environmental Statement

IS 310: The National Standards Authority of Ireland (1994). The Irish EMS standard is applicable to all organizations and is similar to BS 7750. Its purpose is to complement the Irish series of quality management system standards and utilizes elements of EMAS. The EMS is covered in Section 4 of the document, which states that the main objectives of an EMS are to develop a policy, to implement a program according to policy, and to achieve associated objectives and targets pertaining to eliminating adverse environmental effects. The IS 310 EMS is summarized in the following outline:

4.0 Environmental Management System
4.1 Management Commitment
4.2 General Review
4.3 General Policy
    4.3.1 General
    4.3.2 Environmental Performance Objectives and Targets
    4.3.3 Environmental Policy Statement
4.4 Management Structure, Responsibilities, and Accountability
    4.4.1 Organizational Structure and Resources
    4.4.2 Senior Manager
    4.4.3 Awareness and Training
4.5 Environmental Management Program
4.6 Environmental Performance Measurement and Register
4.7 Environmental Management Documentation
    4.7.1 Environmental Management Manual
    4.7.2 Control of Documentation
4.8 Operational Control
4.9 Operational Performance Verification
4.10 Corrective Action
4.11 Environmental Management Records
4.12 Environmental Management System Audits
4.13 Environmental Management System Review
4.14 Environmental Reports

ISO 14001: The International Organization for Standardization (1996).

Other than electrical engineering and electronic engineering standards, all international standards are prepared by the International Organization for Standardization (ISO). ISO 14001 follows the Deming cycle of plan, do, check, and act. Planning shows what needs to be accomplished. Doing refers to implementing what is planned. Checking is evaluating what has been done. Acting is reviewing results of the evaluation to revise or to modify initial plans. ISO 14001 follows total quality management initiatives as outlined in ISO 9001, a standard for implementing quality initiatives within organizations. ISO 14001 defines an EMS as the aspects of an organization's overall structure that focus on the impact that products, services, and operations have on the

environment. Section 4 is the portion pertaining to EMS requirements; its elements are listed in the following outline:

- 4.1 General Requirements
- 4.2 Environmental Policy
- 4.3 Planning
  - 4.3.1 Environmental Aspects
  - 4.3.2 Legal and Other Requirements
  - 4.3.3 Objectives and Targets
  - 4.3.4 Environmental Management Programs
- 4.4 Implementation and Operation
  - 4.4.1 Structure and Responsibility
  - 4.4.2 Training, Awareness, and Competence
  - 4.4.3 Communication
  - 4.4.4 Environmental Management System Documentation
  - 4.4.5 Document Control
  - 4.4.6 Operational Control
  - 4.4.7 Emergency Preparedness and Response
- 4.5 Checking and Corrective Action
  - 4.5.1 Monitoring and Measurement
  - 4.5.2 Nonconformance and Corrective and Preventive Action
  - 4.5.3 Records
  - 4.5.4 Environmental Management System Audit
- 4.6 Management Review

Conclusion

By utilizing organizational classifications, environmental management theory, and environmental management systems, this study aims to understand differences regarding ecological practices between organizations. By synthesizing organizational types, one may derive classifications for observation. By synthesizing environmental management theory, one may derive an overall paradigm that satisfies the spectrum of ecological concerns in organizations. By synthesizing environmental management systems, one may derive an understanding of organizational practices with regard to

ecology. An amalgamation of the aforementioned three syntheses potentially allows for the development of a method of determining environmental management paradigms within organizations.

Chapter III: Methodology

Introduction/Overview

To determine whether there is a correlation between organizational classifications and environmental management paradigms, there needs to be a specific and defined process, the likes of which are undetermined in current academic thought. Thus, a new analytically objective method needs to be developed for this thesis, where the first step is to determine the type of an organization. The next step is to determine a set of reasonable paradigms to which organizations may be matched. For this thesis, the link between organizational types and environmental management theory are environmental management systems. Therefore, this study aims to understand environmental management perspectives (from annual reports) within different organizations, gathering information from various elements of EMSs and classifying them along a paradigm continuum of increasing environmental management progression. There is an inherent risk of inconsistency in that reports may not accurately present what the organization is actually accomplishing regarding environmental matters. Whether or not organizations have a formal EMS, they are evaluated within an EMS framework.

After determining where each element of an EMS belongs, there is a reasonable overall paradigm assigned to the respective organization. From categorizing representatives from each type of organization, there is a reasonable statistical analysis for correlating organizational classifications with environmental management paradigms. From the results of the statistical correlation, theoretical conclusions are obtained.

Synthesis of Organizational Classifications

For this thesis, the primary step is determining a set of organizational classifications that will allow for the study of various EMSs. As stated earlier, there are four general types of organizations: private with product, private with service, public with product, and public with service. Unfortunately, for the purpose of providing an adequate sample for statistical analysis, it is difficult to identify any public organizations that manufacture products. Almost every public organization provides a service, such as defense or energy. Even a privately funded, product manufacturing public organization as the United States Postal Service (that produces stamps) is referred to as a service. As a result, identifying organizations within the public with product sector is perplexing. Therefore, this study is limited to the following three categories.

Private with Product. This type of organization is primarily a privately owned organization. Funding may come from either private or public sources. In either case, such an organization focuses on a specific market that purchases its goods. Within similar markets, there is competition between these organizations. By a means of processing, these organizations extract, combine, and transform raw materials into an end product that is in turn sold for a profit (evident in automobiles, chemicals, and plastics).

Private with Service. Like the private with product organization, this type is primarily privately owned. Funding may come from either private or public sources. There is also a market, but the market purchases services instead of goods. There may or may not be competition within similar markets (in general, repair shops compete with

one another but utilities do not). These organizations make use of products to enhance or to maintain the lifestyle of society by offering an intangible and perishable service, such as education, electricity, or lodging.

Public with Service. For the purpose of this thesis, this type of organization is publicly owned and publicly funded. Originating from legislation, such organizations are accountable to society-at-large; they are created by the public to serve the public. Because the focus of public organizations is the betterment or the maintenance of society, they tend to concentrate efforts on services. By utilizing products, public organizations offer services such as the handling of commerce, agriculture, and labor. Such services are intangible and perishable, for the public does not actually purchase a commodity with its taxes. However, public organizations offer services that accommodate current and future lifestyles.

Organizational Selection

Ideally, this thesis would incorporate a random selection of organizations among the three organizational classifications; however, a random selection of organizations is not possible for several reasons. First, there is no complete listing of organizations that produce annual environmental reports. Second, there is no established system that categorizes organizations according to the aforementioned three categories from which a random selection may be obtained. Third, there is no guarantee that the observed organizations truly represent their respective target populations (organizational classifications), for this study utilizes annual environmental reports that are usually

produced voluntarily and not universally. Thus, this study makes use of a convenience sample wherein the selection of organizations is without systematic randomization (Devore, 1995). Nonetheless, this study aims to gather an impartial selection of organizations by obtaining reports that span a wide spectrum of disciplines. The following list identifies the organizations observed in this study.

Private with Product:
- Amoco Corporation
- Baxter International
- Bristol-Myers Squibb Company
- Eastman Kodak Company
- John Deere & Company
- Johnson & Johnson
- Monsanto Company
- PepsiCo
- Proctor & Gamble
- Rockwell International Corporation

Private with Service:
- BFI (Browning-Ferris Industries)
- Boston Edison Company
- Carolina Power & Light
- ComEd (Commonwealth Edison)
- Duke Power
- Entergy Corporation
- GMP (Green Mountain Power)
- SKB Environmental
- Texas Utilities Company
- United Power

Public with Service:
- Department of Agriculture
- Department of Commerce
- Department of Defense
- Department of Energy
- Department of Health and Human Services
- Department of Housing and Urban Development
- Department of the Interior
- Department of Labor
- Department of State
- Department of Transportation

Ten organizations for each classification are used to provide a statistical analysis. The number of organizations comes from the rule of thumb that a sample size greater than thirty represents a large sample (Devore, 1995). However, thirty organizations is a minute portion of all existing organizations, especially when considering differences within classifications. Thus, it is prudent to remain within a small sample size. There is not a sampling of thirty of each classification because organizations are statistically analyzed together; sampling thirty of each classification would violate having a small sample, which is true in this case.

Because there is no method of determining the total existing number of organizations in each of the three categories, there is no way to proportionately produce a representative sample (such as five percent of each classification). Of the three classifications, the private with product sector has the greatest number of organizations. Ten organizations represent a small fraction of the total number of private organizations that produce products. A smaller number of private companies provide services. Hence, within the private sector, ten organizations represent a greater percentage of service-oriented companies than of product-focused enterprises. The public with service sector is the smallest of the three classifications. Thus, there is a heavier representation of organizations for the public arena. Ultimately, a sample size of thirty remains within the "small sample" category and using an equal number of organizations to represent each classification allows for evenly weighted statistical representation. As a result, ten organizations within each classification are used for statistical analysis.

Synthesis of Environmental Management Paradigms

The second step in attempting to correlate environmental paradigms with organizational classifications is to determine a suitable paradigm. Paradigms sometimes originate from belief systems indigenous to societal cultures (Jennings and Zandbergen, 1995). Regarding environmental management, this would be evident in the societal and governmental concern regarding ecological care. Arnold's continuum (1997) portrays this line of paradigm development.

Paradigms also develop from a chronological process of instilling values, implementing practices, and constructing institutions (Jennings and Zandbergen, 1995). This is seen in the development of the Environmental Protection Agency: stemming from societal values, resulting in an institution, and impacting environmental management. Such a paradigm is evident in Colby's continuum (1991).

Finally, paradigms emerge from a deinstitutional (unstructured) approach, whereby environmental management stems from necessity in response to a series of events, such as depleted natural resources (Jennings and Zandbergen, 1995). This is evident in arising concerns regarding deforestation and global warming. The continuum of paradigms derived by Gladwin, Kennelly, and Krause (1995) shows the deinstitutional approach.

To provide an established theoretical foundation for analysis, this study synthesizes the three aforementioned paradigms, along with elements of Meima's classifications (1994), towards the development of a new continuum of paradigms. Working from already developed paradigms allows this study to consider current trends

in environmental management perspectives, from a wide range of viewpoints, with regard to various authors. Integrating all views, rather than focusing on any one author's position, allows this thesis to have a universal application along environmental management paradigm progressions. At one extreme, there is the unrealistic approach of doing nothing; legislature presents standards to which all organizations are accountable. At the other extreme, there is the approach of sacrificing profit to enhance the world's ecology. This is also unrealistic. However, extreme philosophies are pertinent to this thesis for the purpose of contrasting organizations along an all-encompassing progression of thought.

Creating a paradigm continuum relevant to this study provides the basis for analyzing organizations. Combining all paradigms into one continuum comes from taking all aforementioned paradigms into account. Colby's continuum (1991) and Meima's classifications (1994) contain five paradigms each with environmental perspectives ranging from economical emphasis to ecological focus. Arnold lists four paradigms spanning outlooks from corporate concern to sustainable development (1997). Gladwin, Kennelly, and Krause present three paradigms traversing attitudes from human superiority to ecological supremacy (1995). All environmental management perspectives lie in the range of five paradigms as presented by Colby (1991) and Meima (1994). Thus, elements of every environmental management continuum and classification may be combined into a single continuum of five paradigms, originating from the highest number of paradigms in any one of the aforementioned paradigm perspectives.

Synthesizing all environmental management paradigms, five comprehensive paradigms for classifying organizations may be derived for this thesis: Economical Pursuance, Methodological Consideration, Total Production, Environmental Sustainment, and Ecological Optimization. The following figure presents how existing paradigms span the progression from one categorical paradigm to the next with regard to the overall synthesized classification continuum. Each environmental management paradigm is not directly linked to one of the five comprehensive paradigms; rather, elements from each paradigm are placed where they are most applicable. Of course, Meima's environmental management classifications do not fit precisely into the continuum framework; thus, they are listed separately even though their elements are used in the development of the synthesis.

Source	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Continuum/Progression					
Arnold (1997)	Franchise	Process	Product	Sustainability	
Colby (1991)	Frontier Economics	Environmental Protection	Resource Management	Eco-Development	Deep Ecology
Gladwin, Kennelly, and Krause (1995)	Technocentrism	Sustaincentrism	Ecocentrism		

Classification					
Meima (1994)	Anthropocentric Moral/Ethical Dilemma	Circular Flow and Value Chain	Aspect of Product Quality	Balance Between Nature and Industry	Sustainable Development (Welford, 1996)

Figure 1. Environmental Management Paradigm Synthesis

Economical Pursuance. Economical pursuance is the pursuit of maximizing profit, doing the bare minimum to ensure regulatory compliance. At this stage, organizations do nothing if they are able to do so with impunity. Having no concern for the environment, technology is only for enhancing production means (Gladwin, Kennelly, and Krause, 1995). Reasonable care is the primary focus (Arnold, 1997). The only reason for environmental compliance is to have the right to operate (Arnold, 1997). Organizations operate with the assumption that there is an infinite amount of resources available for human consumption (Colby, 1991). Humans may use the environment for the purpose of financial gain.

Methodological Consideration. At this stage, the concern shifts to developing organizational practices and processes. Accordingly, the focus is on waste, emissions, and discharge (Arnold, 1997). Pollution prevention, which focuses on end-of-process control technology (usually regarding the contamination of air and water), is the key focus. The purpose of environmental management is to enhance organizational reputation (Arnold, 1997). The organization practices eco-auditing, allows public access to records, and enforces legal responsibility (Meima, 1994). Ecology and economy compete against one another (Colby, 1991). There is no environmental commitment at all levels of the organization.

Total Production. At this paradigm, organizations consider the impacts of suppliers and of outputs. Focusing on the entire operational process, organizations develop life-cycle assessments that consider both environmental impacts of suppliers and lasting effects of outputs (Meima, 1994). The main arena is stewardship, wherein

organizations realize they are accountable to, not masters of, the environment (Arnold, 1997). The catch phrase is design for environment, where there is concern for public welfare (Arnold, 1997). There is a desire to integrate ecology, economy, and society, and organizations realize there is an interdependence between human survival and environmental management (Colby, 1991). Consequently, environmental practices are evident at all levels of the organization.

Environmental Sustainment. The organization seeks to ensure that future generations enjoy the same amount of natural resources and lifestyles available in the present. Accordingly, there is a cyclical environmental pattern regarding what is used and what is returned (Meima, 1994). Primary activities constitute utilizing reusable inputs, redesigning business systems, and regenerating raw materials (Arnold, 1997). The key intent is sustainable development (Welford, 1996). The purpose is to create new markets, where global awareness is evident (Arnold, 1997). There is a partnership of care taken between organizations and nature (Colby, 1991). The organization centers economic resources around ecological concerns.

Ecological Optimization. The organization takes a strategic risk by sacrificing a portion of short-term profits for long-term benefits. The organization returns more than it removes from the environment (Gladwin, Kennelly, and Krause, 1995). Nature is used in developing production processes, and the organization becomes part of the ecosystem (Gladwin, Kennelly, and Krause, 1995). The earth becomes the focus and there is an equality of all things (Colby, 1991). The organization reduces, rather than modifies, all environmentally damaging practices and products. The primary concept is deep ecology,

where the organization believes it can survive only by the prospering of nature (Colby, 1991). There is a symbiosis between the organization and the environment.

Synthesis of Environmental Management Systems

The third step in constructing a method for analyzing environmental management paradigms in organizations is amalgamating existing EMSs into one EMS with common attributes. EMSs provide an overview of various aspects of the overall management system, usually in a chronological manner, ultimately allowing for a method of comparing organizational statements along similar environmental management elements. To reiterate, the five EMSs appropriate to this study include BS 7750, CSA Z750, EMAS, IS 310, and ISO 14001.

The development of systems for environmental management is an ongoing process. The first official use of the term "environmental management system" took place in EMAS in 1993. Pertaining only to companies that perform industrial activities, EMAS presents the EMS as part of an organization's overall environmental management structure (Council of the European Communities, 1993). In 1994, BSI 7750 took EMSs to a higher level by integrating all of the EMS components found in EMAS and by introducing an environmental management standard, relevant to every organization, that encompassed all activities and operations (British Standards Institution, 1994). IS 310 and CSA Z750 also originated in 1994. IS 310 correlates similarly to BS 7750 and is applicable to all organizations (National Standards Authority of Ireland, 1994). CSA Z750 differs from the others in that it provides guidance rather than specifications for

EMSs (Canadian Standards Association, 1994). In 1996, EMAS, BSI 7750, IS 310, and CSA Z750 were withdrawn with the advent and the approval of ISO 14000 and ISO 14001 (International Organization for Standardization, 1996). In essence, ISO 14001 has become a convergence point for all EMSs presented in this thesis.

ISO 14001 has five main elements: environmental policy; planning; implementation and operation; checking and corrective action; and management review (International Organization for Standardization, 1996). Therefore, using a synthesis of EMSs within the ISO 14001 framework, five elements may be derived: Examination and Policy, Preparation and Planning, Implementation and Operation, Monitoring and Correction, and Review and Enhancement. The following figure shows how each of the five EMSs in the English language correlates and pertains to each of the five EMS elements used for this thesis.

Environmental Management System	BS 7750 4.0, 4.1	CSA Z750 3.0, 3.1	EMAS Annex I	IS 310 4.0	ISO 14001 4.0, 4.1
Examination and Policy	4.2	3.2 (3.2.1, 3.2.2), 3.3 (3.3.1, 3.3.2)	A1, A2, A3, C, D	4.1, 4.2, 4.3 (4.3.1, 4.3.3), 4.14	4.2
Preparation and Planning	4.4 (4.4.1, 4.4.2, 4.4.3), 4.5, 4.6	3.2 (3.2.3, 3.2.4), 3.3 (3.3.3, 3.3.4)	A4, A5, B3	4.3 (4.3.2)	4.3 (4.3.1, 4.3.2, 4.3.3, 4.3.4)
Implementation and Operation	4.3 (4.3.1, 4.3.2, 4.3.3, 4.3.4, 4.3.5), 4.7 (4.7.1, 4.7.2)	3.4 (3.4.1, 3.4.2, 3.4.3, 3.4.4)	B2, B5, Annex IV	4.4 (4.4.1, 4.4.2, 4.4.3), 4.5, 4.6, 4.7 (4.7.1, 4.7.2)	4.4 (4.4.1, 4.4.2, 4.4.3, 4.4.4, 4.4.5, 4.4.6, 4.4.7)
Monitoring and Correction	4.8 (4.8.1, 4.8.2, 4.8.3, 4.8.4), 4.9, 4.10 (4.10.1, 4.10.2, 4.10.3)	3.5 (3.5.1, 3.5.2, 3.5.3, 3.5.4)	B4, B6, Annex II (A, B, C, D, E, F, G, H)	4.8, 4.9, 4.10, 4.11, 4.12	4.5 (4.5.1, 4.5.2, 4.5.3, 4.5.4)
Review and Enhancement	4.11	3.5 (3.5.4, 3.5.5)	B1, Annex III (A, B), Annex V	4.13, 4.14	4.6

Figure 2. Environmental Management System Synthesis

Examination and Policy. The organization compiles information to prepare a statement of environmental intentions and principles. This statement provides a framework for developing objectives and targets. Examination is the stage of environmental management when the organization considers reports on current environmental practices, examines organizational influences on the environment, and summarizes the history of previous environmental incidents. The organization also gathers applicable legislation and regulations while considering available technology.

Policy is the portion of environmental management when the organization considers the impact of its processes on the environment. It accounts for legislative compliance, addressing such practices as pollution prevention and continual improvement. The degree to which the organization uses technological innovations is mentioned. Policy should be relevant to every facet of the organization and should be available to the public.

Preparation and Planning. The organization makes its environmental commitment known at all levels of the organization and sets objectives (overall environmental goals) and targets (detailed performance requirements). Preparation comes in the form of documentation to notify the organization of changes. Such preparation seeks to ensure that all personnel know the purpose for environmental management by presenting respective mandates pertaining to each individual. Employees become aware of various elements of the EMS and how they interact. The organization identifies specific benefits of environmental management and addresses potential consequences of improper practices (non-compliance to EMS).

Planning defines the scope of environmental considerations and intentions. It establishes objectives and targets with regard to governmental legislation and organizational regulations. There may be specified time periods for achieving objectives and targets. There is consideration for the amount of resources to devote to environmental initiatives. Planning outlines the entire environmental management program and designates responsibility at each level of the organization.

Implementation and Operation. The organization ensures personnel are ready to execute environmental management, integrating EMS procedures within organizational practices. Implementation is the development of a training program respective to each working area. There are individuals appointed for accountability of the EMS, and such individuals have available resources for addressing environmental concerns. Employees have environmental guides or manuals pertaining to common practices and accessible supervision for unclear procedures.

Operation clarifies procedures at each department and level of the organization. The organization explains the incorporated framework of taskings between departments. There is also consideration for management system processes in relation to influences external to the organization. The organization outlines response procedures and preparedness testing in order to prepare for environmental accidents and emergencies.

Monitoring and Correction. The organization measures activities that have an influence on the environment and takes prescribed action to regain compliance to EMS standards (governmental legislation and organizational regulations) during episodes of non-conformance. Monitoring employs procedures for measuring activities with a

potentially significant environmental impact. There is consideration for periodic evaluation of compliance with legislation, regulations, objectives, and targets. There is also a means for ensuring the upkeep and upgrading of monitoring equipment in the pursuit of available or innovative technology.

Correction ensures there is a method of both investigating and handling episodes of non-conformance. The organization secures responsibility and accountability for violations of compliance. The organization has a means of determining corrective action when needed. Procedures and programs for periodic EMS audits are outlined. There are ways of ensuring environmental records are effectively used instead of merely discarded.

Review and Enhancement. The organization evaluates the EMS at specified time intervals and improves the EMS accordingly. Review involves having a program for examining and inspecting the existing EMS. There are modifications to policy with regard to continual improvement; objectives and targets are modified accordingly. There are ways of investigating the need for current or innovative technology. When considering the EMS, there is an opportunity for feedback from all organizational levels.

Enhancement stresses the importance of continual improvement. The organization attempts to project changes in political, legal, economical, technological, ecological, demographic, and cultural arenas. From evaluating the current EMS in light of forecasting trends in the environment, the organization outlines changes stemming from necessity, innovation, or both. The organization designates a certain amount of resources for improving environmental practices and develops a means of enhancing processes for the betterment of ecology.

Analytical Procedure

The final step in devising a method for matching organizations with paradigms is synthesizing environmental management paradigms and EMSs. By observing each element of an organization's EMS along the spectrum of paradigms, there may be an overall paradigm assessed to the organization. The correlating factor linking EMSs with ecological paradigms is corporate responses, or corporate environmental management.

Regarding an organization's EMS, environmental management corporate responses disclose organizational paradigms with respect to the five EMS elements used in this thesis. Moving along the synthesized continuum of paradigms, each author's system of corporate responses (both continuums and classifications) pertain primarily to specific EMS elements, as seen in the following list:

Examination and Policy: Greeno (1991); James (1992); Ketola (1993); Schot (1992)
Preparation and Planning: Beaumont, Pedersen, and Whitaker (1993); Topfer (1985); Roome (1992); Steger (1993)
Implementation and Operation: Dodge (1995); Pietilainen (1991); Vandermerwe and Oliff (1990)
Monitoring and Correction: Hunt and Auster (1990); Newman (1993)
Review and Enhancement: Ford (1992); Simpson (1991); Welford (1994)

Although each author's perspective relates to particular EMS elements, perspectives are not limited to one element. The following figure presents how, with respect to EMS elements, corporate responses merge into progressions of thought similar to paradigms; the figure shows a representation of independent continuums and classifications with respect to authors' perspectives, not an overall relation of responses to one another.

Source	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Continuum/Progression					
Beaumont, Pedersen, and Whitaker (1993)	Ignored	Localized Action	Corporate Action	Business Process Action	Supply Chain Action / Business Scope Action
Dodge (1995)	Resistance	Observe and Comply	Accommodate	Seize and Preempt	Transcend
Ford (1992)	Inactive (Ignore, Ostriches)	Reactive (Respond, Chicken Lickens)	Proactive (Anticipate, Green Hornets)	Hyperactive (Provoke, Robin Hoods)	
Greeno (1991)	Problem Solving	Managing for Compliance	Managing for Assurance		
Hunt and Auster (1990)	Beginner	Fire Fighter	Concerned Citizen	Pragmatist	Proactivist
James (1992)	Ignore Environmental Issues	Impact Amelioration	Corporate Responsibility	Green Design	
Ketola (1993)	Stable	Reactive	Anticipatory	Entrepreneurial	Creative
Newman (1993)	Reactive	Proactive	Innovative		
Pietilainen (1991)	Communication	Manufacturing Processes	Environmental Protection	Entire Strategy and Product Mix	
Roome (1992)	Non-Compliance	Compliance	Compliance Plus	Commercial and Environmental Excellence	Leading Edge
Simpson (1991)	Why Mes	Smart Movers	Enthusiasts		
Topfer (1985)	Resistant	Passive	Reactive	Innovative	
Vandermerwe and Oliff (1990)	Marketing	Manufacturing	Research and Development		
Welford (1994)	Ostriches	Laggards	Thinkers	Doers	
Classification					
Schot (1992)	Dependent	Defensive	Offensive	Innovative	Niche
Steger (1993)	Indifferent	Defensive	Offensive	Innovative	

Figure 3. Environmental Management Corporate Response Synthesis

The corporate responses do not fully correspond to either the synthesized paradigm continuum or to one another; furthermore, classifications do not fit into a continuum framework because environmental management focuses more on strategy than on perspectives. As a whole, however, corporate responses may be adjusted to fit the synthesized paradigm continuum. Corporate responses take various elements of environmental management into account along a progression of ecological concerns, thereby enabling this study to link EMS elements with respective paradigms. After evaluating paradigms with each EMS element for a particular organization, an overall paradigm may be assigned to that organization.

The next stage is the development of an analytical instrument that uses corporate responses to couple an organization's EMS elements with environmental management paradigms. Developing and using classification systems based on similarities between organizations provides a framework for which evaluation may be made. It could be argued that environmental management paradigms are meant only to understand the "greening" process. However, it appears that organizations are utilizing such classifications to determine where they appear on the spectrum of ecological awareness, thereby encouraging the development of corporate responses. Classification models enable an organization to be accountable to certain levels of environmental involvement and to keep track of what initiatives are evident among peers. Classifying organizations allows for a standard of measure for understanding environmental involvement. The following figure presents the instrument by which organizations are classified.

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Examination and Policy	- Reasonable care - Solve immediate problems - Take defensive action when competition takes initiative - Environmental issues are isolated concerns not integral to business	- Pollution prevention - Coordinate compliance efforts in preventing drastic yet necessary changes - Initiate program similar to either competition or peers	- Design for environment - Self-directed initiatives that go beyond current regulations and legislation - Work with peers to develop overall system of environmental awareness	- Sustainable development - Establish ongoing management of both risks and opportunities - Protect internal and external environments from harm - Move beyond peers	- Deep ecology - Set the standard for environmental initiatives in respective field of production - Protect external environment no matter the consequence - Disregard the competition
Preparation and Planning	- Compliance with legislation - Improve resource efficiency - Avoid excessive costs - Environmental initiatives based on managerial default and limited planning	- Focus is beyond short-term - Production processes modified for environmental concerns - Integrate environmental management into business strategy	- Suppliers and outputs adhere to organizational standards - Use resources to prepare for future - Environmental management is effective and beneficial - Environment part of core values	- Processes return what is removed - Forecast trends for long-term planning - Development of leading edge technologies by placing ecological procedures at all process levels	- Processes return more than what is used - Consideration of long-term effect on environment instead of organization - Reduce production to promote ecological growth
Implementation and Operation	- Disregard to environmental values - No reaction to environmental initiatives - Minimum amount of compliance - Communicate concern without taking immediate action	- Voluntary action beyond legislation - Signs of proactive and responsive behavior - Avoid burden on environment by advocating more efficient production processes	- Environmentally conscious and proactive agenda evident in all operations - Production of equipment to conserve environment by minimizing use of raw materials	- Stakeholder concerns realized - Integrate environmentally sound practices in all phases of production process to ensure cyclical usage of natural resources and raw materials	- Values, beliefs, attitudes, culture focus on ecology - New products and alternative production methods focus on reducing the current level of environmental impacts
Monitoring and Correction	- Measurements taken for minimal protection - Environmental issues considered when necessary - Budgeting provided as problems occur - Minimal involvement from management	- Monitoring only for internal processes - Awareness of environmental practices at all levels - Consistent but minimal funding - Management vocalizes concern	- Consideration of comprehensive production processes (inputs and outputs) - Environmental concerns of daily importance - Sufficient funding for environmental projects - Managerial action	- Environmental considerations maximized - Funding is sufficient for environmental sustainability - Environment is of primary concern - Management actively involved	- Ecological concerns are internalized - Funding provided without limit - Environment is more important than organization - Management centers actions on environment
Review and Enhancement	- Disassociation of environment and business - Ecology and economy counter one another - Environmental management is viewed as passing phase - Environment is not worth effort	- Systematically react to problems - No preparation for future - Improvement only when evident opportunities arise - Societal welfare not considered - Ecology is an added burden	- Anticipation of future impacts - Seek new market opportunities derived from environmental protection demands - Observe what others are doing before developing initiatives	- Set the pace for contemporaries with respect to environmental initiatives - Develop research and development program in securing continual improvement - Responsibility for society is focus	- Sacrifice funds for betterment of environment - Ecology becomes center of organization - Organization is willing to change outputs in the pursuit of enhancing the environment

Figure 4. Environmental Management Analysis Instrument

According to where respective EMS elements fit along the continuum of five paradigms, this study aims to validate the overall classification of various organizations with respect to the synthesized paradigms. This is accomplished by utilizing the above analytical instrument to match environmental statements of organizations with positions on the grid. After each EMS element is given a paradigm, the organization itself is matched with a paradigm. For example, one organization may have the following results:

Examination and Policy: Total Production
Preparation and Planning: Total Production
Implementation and Operation: Methodological Consideration
Monitoring and Correction: Economical Pursuance
Review and Enhancement: Methodological Consideration

The overall paradigm would be Methodological Consideration due to all five elements, as a whole, converging on that particular paradigm. When organizational EMS elements are consistently focused along one paradigm, it is considered to have that paradigm. When EMS elements for an organization span several paradigms, an overall average is provided, as seen in the previous example. For this thesis, each organization is assigned to a particular overall paradigm.

After matching organizations with paradigms, this thesis conducts a statistical chi-squared analysis to test homogeneity when comparing various groups. Five comparisons are made: private (products and services) versus public (services), products (private) versus services (private and public), private with product versus private with service, private with product versus public with service, and private with service versus public with service. The chi-squared analysis provides a basis for determining if there is

a difference between groups. After obtaining statistical data and deriving appropriate information, histograms are shown to determine what paradigms various organizational classifications tend to adopt. From the analysis, conclusions and recommendations are derived.

Conclusion

By synthesizing environmental management paradigms and EMSs, an analytical tool has been developed for matching organizations with paradigms. The use of corporate responses allows for various elements of EMSs to be viewed along spectrums of thought that reveal how an organization views environmental management. Indeed, corporate responses are a reflection of paradigms, evident in how organizations act on environmental perspectives.

The use of environmental management systems allows for a baseline upon which organizations may be compared along similar elements. Furthermore, the degree to which organizations implement EMSs reveals how an organization responds to environmental pressures and how the organization perceives ecological concerns. From matching each of thirty organizational EMSs (ten private with product, ten private with service, and ten public with service) with respective paradigms, reasonable conclusions may be drawn as to whether there is a correlation between organizational classifications and environmental management paradigms.

Chapter IV: Findings and Analysis

Overview

This study compiles environmental management information from a wide range of organizations. By matching environmental management statements of various organizations with statements from the analysis instrument used for this thesis, paradigms are assigned to each organization. From determining paradigms for each organization and arranging organizations in predetermined classifications, there is a statistical analysis of homogeneity to observe whether or not there is a difference between organizational types with respect to environmental management paradigms. Histograms show what paradigms each organizational category tends to have.

Organizational Information

For this study, thirty organizations are represented. Utilizing a convenience sample in selecting organizations, there are ten private with product, ten private with service, and ten public with service. The ten private with product organizations span a wide range of corporate activity including the following areas: chemical industries, natural resource extraction, hygiene goods, and electronic technology. The ten private with service organizations tend to be limited to utility companies and environmental services. The ten public with service organizations represent ten of fourteen offices in the Cabinet of the President of the United States. For the most part, environmental information is extracted from either environmental reports or corporate annual reports.

Private with Product: Organizational Results

The private with product organizational category is represented by many organizations who choose to make environmental management reports accessible to the public. For the most part, environmental management reports have emerged as commonplace in the private with product arena within the last five years. Some organizations have found environmental management to be detrimental to gaining profit while other organizations have found environmental management as a means of increasing revenue. Some organizations have found environmental management as a hindrance to production while other organizations have found environmental management to be innately linked to organizational existence. For this thesis effort, the following ten corporations represent the private with product category:

1) Amoco Corporation
2) Baxter International
3) Bristol-Myers Squibb Company
4) Eastman Kodak Company
5) John Deere & Company
6) Johnson & Johnson
7) Monsanto Company
8) PepsiCo
9) Proctor & Gamble
10) Rockwell International Corporation

All organizations from the above list produce annual environmental reports that present various practices including management systems and pollution statistics. Information for the determination of respective paradigms is gathered from examining environmental statements of organizational reports and by matching the statements to the paradigms developed for this thesis.

Amoco Corporation (1996). Amoco Corporation is a company that focuses on chemicals and petroleum. It seeks superior financial return and long-term growth and are committed to employees, communities, and the environment. Amoco has three primary sectors: exploration and production, petroleum products, and chemicals.

Examination and Policy. Amoco pledges protection of the environment as well as the health and safety of employees. As a worldwide integrated petroleum and chemical company, it recognizes the continuing challenge of fulfilling the pledge while accomplishing corporate goals. It seeks long-term success, with an evident partnership between economy and ecology as it plans for the future. The individual responsible for environmental initiatives is the vice president of environment, health, and safety, who reports to the senior vice president of shared services.

Preparation and Planning. Objectives are a commitment to leadership by operating and growing the business in compliance with legal requirements and organizational standards (which may be more stringent than legislature). Amoco promotes pollution prevention and environmental conservation.

Implementation and Operation. Amoco ensures that environmental information is disseminated at all levels. Education and training are provided for both employees and customers. There is anticipation, evaluation, and management of risks by maintaining crisis management programs that emphasize both prevention of incidents and emergency preparedness. There are also response and recovery plans in case of unanticipated disasters.

Monitoring and Correction. Monitoring is used for the purpose of continuous improvement. Amoco seeks to comply not only with legislation but also with internal standards. The company seeks to compare favorably with peers.

Review and Enhancement. Amoco seeks to earn the public trust by being open about policies, programs, and performance that advocate sound laws and regulations. The company seeks to project future trends and to prepare in advance for environmental concerns.

Overall Rating. Amoco is best characterized as a *Total Production* organization due to its moving from pollution prevention and current legislation to stricter standards. It seeks to integrate environmental initiatives at all levels of the organization. Although it seeks to minimize the impact on the environment, it is not yet at sustainable development.

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Examination and Policy			◆		
Preparation and Planning			◆		
Implementation and Operation		◆			
Monitoring and Correction		◆			
Review and Enhancement			◆		
OVERALL RATING			◆		

Figure 5. Amoco Corporation Paradigm

Baxter International (1997). Baxter International is a global company that produces medical products. It is a leader in technology related to the blood and the circulatory systems. Baxter leads the market in four areas: biotechnology (transfusion medicine); cardiovascular medicine (late-stage cardiovascular disease); renal (kidney disease); and intravenous systems and medical products (medication delivery and product distribution).

Examination and Policy. Baxter's policy is to be a global leader in environmental management with a commitment to sustainable development. The organization seeks to move beyond its peers regarding environmental practices. Baxter has found a partnership with economy and ecology, accruing over one-hundred million dollars in savings over the past seven years due to environmental practices.

Preparation and Planning. Ecological procedures are placed at all levels of the organization. Raw materials, production processes, disposal costs, and packaging are accounted for in planning. Baxter seeks major reductions in packaging, energy consumption, air toxics emissions, and waste generation by the year 2005.

Implementation and Operation. Every employee is held to compliance with environmental policy. There is a cyclical pattern of natural resource usage. Stakeholder concerns are taken into account, encouraging Baxter to have a margin of safety called a "green belt" that moves far beyond compliance.

Monitoring and Correction. Suppliers and contractors are held accountable to similar standards. Baxter offers to work with others in its total production

line to ensure all adhere to standard levels of environmental imperatives. Baxter continually monitors air emissions and waste disposal.

Review and Enhancement. Baxter seeks continual improvement by raising performance measurements to new levels. Baxter seeks to develop new technology for ensuring that future generations have the same amount of resources available today.

Overall Rating. Baxter receives the *Environmental Sustainment* rating due to its movement towards the desire to have no significant impact on the environment. The company has shown vast improvement in air emissions and waste disposal, showing that it may one day accomplish the goal of having no adverse impact on the environment. Corporate values show a respect for, but do not center on, environmental initiatives.

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Examination and Policy				◆	
Preparation and Planning			◆		
Implementation and Operation				◆	
Monitoring and Correction			◆		
Review and Enhancement				◆	
OVERALL RATING				◆	

Figure 6. Baxter International Paradigm

Bristol-Myers Squibb Company (1997). Bristol-Myers Squibb is a worldwide health and personal care company. Its primary businesses include pharmaceuticals, consumer products, nutritionals, and medical devices. It is a leader in the field of therapy for cardiovascular, metabolic, and infectious diseases; central nervous system and dermatologic disorders; and cancer. It is also a leader in consumer medicines, orthopedic devices, ostomy care, wound management, nutritional supplements, infant formulas, hair products, and skin care.

Examination and Policy. Bristol-Myers Squibb seeks to conduct business in an environmentally sustaining manner, considering the complex and interconnected relationship of the ecosystem. The company is committed to compliance, pollution prevention, and public communication in establishing a foundation on which to pursue sustainability.

Preparation and Planning. Division presidents are responsible for advocating environmental policy, allocating resources, and supporting environmental programs. Product life cycle reviews are conducted for all major product lines. For sustainable development, there is a focus on resource use, greenhouse gases, biodiversity (medicine from natural resources), land use, transportation, and corporate acquisitions. The company lacks a specified means of ensuring complete resource sustainability.

Implementation and Operation. At all levels, management is responsible for ensuring ecological awareness of processes and employees. Stakeholder concerns are brought to the forefront. Internally, there is communication between employees through the use of functional and cross-functional committees.

Monitoring and Correction. Negative impacts are considered at each stage of product life cycles and consider manufacturing, packaging, distribution, use, and ultimate disposal. The company considers environmental functions consistently and has set methods for responding to emergencies.

Review and Enhancement. The company focuses on the long-term impacts of its products from production to disposal. It encourages research and development for enhanced environmental management technologies. Externally, there is communication with investors, suppliers, customers, consumers, environmental interest groups, governmental leaders, the media, and international organizations. Accordingly, there is an inherent responsibility for society.

Overall Rating. The company receives a rating of *Environmental Sustainment* due to its pursuit of having no adverse impact on the environment. As seen in biodiversity, the company uses natural resources as its goods, thereby reducing the use of technology that harms the environment.

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Examination and Policy				◆	
Preparation and Planning			◆		
Implementation and Operation				◆	
Monitoring and Correction			◆		
Review and Enhancement				◆	
OVERALL RATING				◆	

Figure 7. Bristol-Myers Squibb Company Paradigm

Eastman Kodak Company (1996). Eastman Kodak (Kodak) seeks to be the world's leading imaging company. The company manufactures film for all uses, including still photography and motion pictures.

Examination and Policy. Policy is driven by customer, employee, and shareholder satisfaction. Kodak desires to be a world leader in establishing environmental quality as an imperative. Environmental practices are integrated into business operations. Kodak concentrates on design for environment through life cycle planning that develops technology for reducing environmental impacts.

Preparation and Planning. Kodak has nine guiding principles that focus on the following: research support, plant operation, management planning, product/process modification, customer information, public policy, performance measurement, community concerns, and external involvement. Suppliers in the procurement process are also held accountable to environmental standards.

Implementation and Operation. Products are developed to be more reusable and recyclable. Because stakeholder environmental concerns are of key importance, Kodak aims to minimize chemical and material waste. Kodak implements product stewardship when initiating environmental practices by seeking the reuse of its goods.

Monitoring and Correction. Kodak measures reduction in sourced materials and energy consumption. The company measures performance at all major sites three times annually and all other sites periodically to ensure compliance with governmental and organizational standards.

Review and Enhancement. There is concern shown for the environmental soundness of products in that customer use of products is both clean and efficient. There is also concern for communities in which Kodak operates, evident in improved handling of hazardous substances. Enhancement comes in the form of re-manufacturing, disassembly, and ergonomic improvements. There is a partnership between economic and environmental concerns, for Kodak realizes it can save money while reducing emissions. Furthermore, Kodak funds extensive research for developing environmentally sound products. This is evident in the development of new chemicals and packaging to emphasize an integration between ecology and business.

Overall Rating. Eastman Kodak receives a *Total Production* classification, for it implements design for environment in such a way that suppliers and product life are considered. However, it does not assure sustainable development due to the company's not maintaining existing levels of natural resources in the environment.

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Examination and Policy			◆		
Preparation and Planning			◆		
Implementation and Operation				◆	
Monitoring and Correction			◆		
Review and Enhancement			◆		
OVERALL RATING			◆		

Figure 8. Eastman Kodak Company Paradigm

John Deere & Company (1996). John Deere & Company (Deere) is at the forefront of both agricultural and industrial manufacturing. It manufactures machinery and hardware for farming and for land use management.

Examination and Policy. The policy of Deere is to ensure a clean and healthful environment by safeguarding and sustaining the environment. Deere designs products and conducts operations to eliminate environmental risks to customers, employees, neighbors, and communities.

Preparation and Planning. In accordance with policy, Deere establishes programs that comply with legislation and regulations. The company develops air, water, and waste management programs. Accordingly, it focuses on technologies, operating procedures, and treatment alternatives that reduce or eliminate waste generation. Deere develops technology by utilizing recyclable shipping containers and by developing new chemicals for agriculture. Environmental impacts of products are considered as crucial to organizational plans.

Implementation and Operation. There are management systems in place for the following: product stewardship, awareness and training, regulatory tracking, chemical management resources, line responsibility, risk assessment, risk management, and pollution prevention. Roles and responsibilities are disseminated.

Monitoring and Correction. Deere incorporates a five-year strategic plan that provides key measurements to achieve organizational environmental objectives. The plan also seeks to prevent both pollution and accidents. Audits are used to ensure Deere remains ahead of its competition. However, there is no monitoring of suppliers.

Review and Enhancement. Deere utilizes many leading edge technologies that the company develops on its own. To improve environmental management, Deere incorporates global positioning satellites to ensure that the chemical impact generated in various agricultural areas remains minimal; satellites determine the amount of chemicals needed in any given area. Deere also develops engines to provide more power with minimal pollution. There are also new technologies to use pesticides only on weeds, thus minimizing environmental impacts. Deere also uses a mostly biodegradable hydraulic and transmission fluid. Furthermore, most of its packaging is now biodegradable.

Overall Rating. Deere receives a classification of *Total Production*. It is moving towards environmental sustainment, but it has yet to keep suppliers of inputs accountable to similar standards. Nonetheless, developed technologies, risk management, and environmental awareness are evident throughout all levels of the organization.

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Examination and Policy				◆	
Preparation and Planning			◆		
Implementation and Operation			◆		
Monitoring and Correction		◆			
Review and Enhancement				◆	
OVERALL RATING			◆		

Figure 9. John Deere & Company Paradigm

Johnson & Johnson (1997). Johnson & Johnson is a leader in health care products. The company markets products for bodily wounds (bandages), hygiene (fluorine rinses), and physical enhancement (contact lenses).

Examination and Policy. The company claims responsibility to the world community. It realizes the importance of maintaining the property it uses and the protection of the environment. Johnson & Johnson also seeks to protect natural resources. The Vice Chairman is responsible for the environmental management program. The company views environmental responsibility in light of sustainable development. Thus, environmental management is both dynamic and ever-expanding.

Preparation and Planning. Johnson & Johnson seeks to make the environment an integral part of business strategy. Its key objectives include: prevent or reduce all worldwide environmental impacts; develop or adapt the most innovative or the latest proven procedures; train management in technical and communication competencies of environmental crises; respond continuously and contribute proactively to environmental developments; maintain policies that meet or exceed legislation; contribute to the balance of nature; educate all personnel; build relationships with society; and demonstrate continual improvement.

Implementation and Operation. The company seeks to educate management, employees, stockholders, customers, suppliers, and communities in fostering a worldwide environmental ethic. Environmental awareness is at the core of operations, for Johnson & Johnson claims to seek the welfare of humanity and to ensure that future generations have the ability to be healthy (thus sustaining the company).

Environmental training is conducted on a regular basis. Emergency incident prevention is encouraged through site teams that specialize in crisis management.

Monitoring and Correction. The company focuses on worldwide pollution prevention. Each year, every operating location is classified based on audits. The classification then determines the frequency of environmental assurance reviews. There is ongoing improvement concerning toxic chemical releases, waste, and energy.

Review and Enhancement. A new term used is "proactive prevention," where there is long-range planning of environmental consciousness in all strategic planning. Proactive prevention is the core focus of "ECO 20/20," a developing program with the purpose of ensuring the company is at the leading edge of ecological concerns.

Overall Rating. Johnson & Johnson focuses on *Sustainable Development*. This is evident in the wide-ranging environmental initiatives stemming from packaging to the disposal of products. There is new technology for ensuring the latest technologies and chemicals are utilized in manufacturing processes.

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Examination and Policy				◆	
Preparation and Planning				◆	
Implementation and Operation			◆		
Monitoring and Correction		◆			
Review and Enhancement				◆	
OVERALL RATING				◆	

Figure 10. Johnson & Johnson Paradigm

Monsanto Company (1996). The Monsanto Company provides products for end-use markets. Its products include the following: sweeteners, agriculture products, crop protection products, fibers, food enhancers, phosphates, animal health products, pharmaceuticals, and various specialty chemicals.

Examination and Policy. The core of Monsanto is sustainability. The company seeks to ensure sustainable agriculture. Sustainable development is evident in Monsanto's practices of air, land, water, food, and resource management. Monsanto goes far beyond legislation and peers in its pursuit of excellence. Monsanto has come to see economical and ecological concerns as complementing one another.

Preparation and Planning. Monsanto seeks to move beyond legislature towards state-of-the-art programs in safety, regulatory management, environmental management, and quality assurance. Monsanto pledges to reduce all toxic and hazardous releases and emissions towards a goal of zero effect. Monsanto seeks to pose no undue risk, to ensure groundwater safety, to involve the community with operations, and to benefit nature. The company claims its top priority is not generating any waste.

Implementation and Operation. Monsanto focuses on product stewardship, whereby the company looks beyond the manufacturing of products to product impacts on the world. Operations and products utilize new methodologies that are at the leading edge of worldwide technologies. Ecology is at the center of processes.

Monitoring and Correction. There are regular audits conducted at each site by local personnel. There is also a comprehensive corporate audit of each plant every three to five years. Management is actively involved and funding is adequate for

sustainability. Non-conformance to standards is intolerable on a corporate level because the environment is of primary importance.

Review and Enhancement. Monsanto is willing to sacrifice funds in pursuit of meeting stringent organizational goals. Its products offer environmental, social, and economic benefits to include: reductions in soil erosion, energy use, emission of greenhouse gases, insecticide use, herbicide use, and raw materials use. Monsanto desires to include local communities in production processes. Agriculturally, Monsanto has found ways to genetically improve crops such as soybeans, corn, potatoes, and cotton. Chemically, the company has found ways to use former waste in pharmaceuticals, cosmetics, adhesives, and coatings.

Overall Rating. Monsanto Company may be classified as *Environmental Sustainment*. Monsanto is a pioneer of sustainable technologies. Sustainability is a goal for the present, but environmental concern is fast becoming the core of Monsanto's corporate enterprise. The company is willing to make financial sacrifices for ecology.

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Examination and Policy				◆	
Preparation and Planning				◆	
Implementation and Operation					◆
Monitoring and Correction				◆	
Review and Enhancement				◆	
OVERALL RATING				◆	

Figure 11. Monsanto Company Paradigm

PepsiCo (1995). PepsiCo is a consumer products company. PepsiCo's three major businesses are beverages, snack foods, and restaurants. The company includes the divisions of Pepsi-Cola, Frito-Lay, Pizza Hut, Taco Bell, and Kentucky Fried Chicken.

Examination and Policy. The company claims that it does not have the major environmental problems of heavy industry. Instead, its primary environmental challenge is the packaging that facilitates products. PepsiCo seeks to be an environmentally responsible corporate citizen and to comply with all applicable laws and regulations. The company believes the environment is an important part of good corporate citizenship.

Preparation and Planning. Packaging is viewed as important to public health because it is a critical component of the distribution system that includes consumers and commercial establishments. The company seeks to minimize environmental impacts by being socially responsible, scientifically based, and economically sound. PepsiCo encourages conservation, recycling, and energy use programs that promote clean air and water while reducing waste.

Implementation and Operation. PepsiCo supports programs that educate, train, and motivate employees to be environmentally responsible. PepsiCo believes that employees should assume responsibility as environmental stewards. The company promotes but does not actually implement all-encompassing training programs.

Monitoring and Correction. With regard to corporate business there is monitoring of solid waste, air quality, water quality, water use, management of materials, and shipment of goods. There is corrective action for continual improvement, but the

company seeks to adhere to external standards rather than developing its own cutting edge regulations; thus, environmental action is not made known in all facets of the organization. Still, there is action taken to ensure suppliers adhere to similar standards of recycling and reusing packaging products.

Review and Enhancement. PepsiCo focuses on the following areas when considering improvement: energy use, recycling, hazardous chemical use, land preservation, packaging source reduction, and waste prevention. However, there is only minimal planning when considering long-term ramifications of products.

Overall Rating. PepsiCo receives the *Methodological Consideration* classification due to its environmental perspective focused on the company. There is a small degree to which the company considers external influences, but for the most part it focuses on innovative product packaging. Food processes consider environmental impacts on a very limited basis. However, by voluntarily recycling and reusing packaging, the company moves beyond standards set by legislature.

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Examination and Policy		◆			
Preparation and Planning		◆			
Implementation and Operation		◆			
Monitoring and Correction	◆				
Review and Enhancement		◆			
OVERALL RATING		◆			

Figure 12. PepsiCo Paradigm

Proctor & Gamble (1996). Proctor & Gamble (P&G) produces a wide range of household products. Its products include laundry detergents, dishwashing liquids, diapers, and paper towels. It is an industry leader in domestic products.

Examination and Policy. P&G's policy commits to operating in an environmentally responsible manner. The company's emphasis is on continual improvement of environmental performance regarding products, packages, and processes. P&G seeks to unite people around the world in a commitment to environmental responsibility.

Preparation and Planning. The company focuses on products, packaging, and manufacturing. Its policy is to ensure environmental safety regarding operations and to reduce or prevent environmental impacts of manufacturing processes. P&G seeks to meet or to exceed all environmental laws and regulations. It seeks to ensure that employees are accountable to daily environmental practices. Environmental initiatives are evident at all levels of the organization.

Implementation and Operation. P&G's program of implementing environmental programs ensures employees are trained regarding their responsibilities pertaining to the environment. There is an environmental management group that is comprised of the following departments: professional and regulatory services; environmental science department; and product supply environmental department. The focus of employee involvement is environmental stewardship at all production phases.

Monitoring and Correction. P&G continuously assesses environmental technology and programs, monitoring environmentally impacting practices to ensure

goals are met. Corrective action is made to comply with long-term goals such as economic savings through environmental practices. There are also one-year goals pertaining to reducing waste, ingredient testing, and innovative packaging. Impacts to the environment are noted every day. P&G works with suppliers to ensure compliance.

Review and Enhancement. P&G's philosophy has three parts: globalization, the big picture, and working with others. Globalization is implementing environmental management at all levels of the organization in all regions of the world. The big picture is long-term planning, where cumulative effects of products are considered. In order to ensure that it heeds trends in science, industrial relations, and public policy, P&G works closely with other companies.

Overall Rating. Proctor & Gamble receives a *Total Production* rating due to its focus on developing manufacturing processes at all levels. Rather than spearheading innovative changes, P&G works with others to ensure it is utilizing current practices. Its five-year and one-year programs set the stage for improvement.

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Examination and Policy			◆		
Preparation and Planning			◆		
Implementation and Operation				◆	
Monitoring and Correction			◆		
Review and Enhancement			◆		
OVERALL RATING			◆		

Figure 13. Proctor & Gamble Paradigm

Rockwell International Corporation (1995). Rockwell International Corporation (Rockwell) is an electronics company focused on being the best in the world. It recently divested its aerospace and defense divisions to The Boeing Company. The company now focuses on four disciplines: automation; avionics and communications; semiconductor systems; and automotive components.

Examination and Policy. Rockwell is committed to being a leader in responsible and sound environmental management. The company seeks to couple environmental goals with economic health while ensuring compliance to both legislative standards and pollution prevention goals. Rockwell's environmental aim is to ensure customer welfare by applying resourceful science and technology in the field of recycling, bioremediation, and energy use.

Preparation and Planning. The company has four goals. The first goal is to reduce, minimize, or eliminate the generation of waste and of hazardous materials. The second goal is to prevent adverse impacts of operations on the environment. The third goal is to make environmental concerns and natural resource conservation priorities for new corporate initiatives. The fourth goal is to recognize and to respond to community concerns regarding environmental impacts. Resource conservation is an integral part of business.

Implementation and Operation. The company seeks to involve all employees in the implementation of environmental initiatives. Rockwell works with communities, stakeholders, and customers to meet ever-increasing demands. There is no cyclical usage of natural resources but there is a minimal use of raw materials.

Monitoring and Correction. There is monitoring of air emissions, chemical reporting, ozone-depleting substances, hazardous waste, energy use, and fuel consumption. However, Rockwell tends to focus on internal processes. Therefore, it does not work with suppliers or develop a product life-cycle analysis.

Review and Enhancement. Rockwell develops environmental technologies that are used worldwide. Such technologies include solar energy systems and solid waste management methods. The company seeks to set the pace for environmental innovation with regard to leading edge research and development. Because of the customer focus, there is also an inherent concern for societal welfare.

Overall Rating. Rockwell International Corporation receives a *Total Production* classification due to its forward-looking but internal focus. The company's focus is on environmental stewardship, which is most evident in their automotive components division.

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Examination and Policy		◆			
Preparation and Planning			◆		
Implementation and Operation			◆		
Monitoring and Correction		◆			
Review and Enhancement				◆	
OVERALL RATING			◆		

Figure 14. Rockwell International Corporation Paradigm

Private with Service: Organizational Results

This study does not observe a wide range of private with service companies due to the lack of services that report on environmental management. In general, the following organizational types do not produce formal environmental reports: amusement parks, child care facilities, dry cleaners, hospitals, hotels, libraries, recreational locations, retailers, and schools. Organizations who are expected to report on the environment often do not make reports publicly accessible; such organizations include: airlines, automotive repair companies, engineering design services, engineering testing services, and vehicle rental companies. Due to the limited variety of private with service organizations that create environmental management reports, this thesis is limited to a small portion of the entire service sector: eight utility companies and two environmental services organizations. The following list shows the observed organizations:

1) BFI (Browning-Ferris Industries)
2) Boston Edison Company
3) Carolina Power & Light
4) ComEd (Commonwealth Edison)
5) Duke Power
6) Entergy Corporation
7) GMP (Green Mountain Power)
8) SKB Environmental
9) Texas Utilities Company
10) United Power

From the above list ComEd, Duke Power, Entergy Corporation, and Texas Utilities Company produce annual environmental reports. For the other organizations, environmental information is gathered from organizational material such as overviews and publicly released documents.

BFI (1997). Browning-Ferris Industries (BFI) develops waste collection, transportation, processing, disposal, and related services to both public and private customers. BFI owns some of and operates over one-hundred landfills in the United States. The organization focuses on recycling, solid waste, medical waste, and building disposal.

Examination and Policy. BFI has the policy of conducting environmental services safely and responsibly with respect for the role of government in protecting the public interest. The standard is based on governmental legislation rather than on corporate initiatives.

Preparation and Planning. Environmental management is part of the organization's business strategy due to the nature of the company. Unlike publicly owned landfills, private counterparts must have millions of dollars available in cases of emergencies or accidents. Private landfills are also responsible for paying for landfill closings and for decades of monitoring. Processes are accountable to corporate standards, and the organization seeks to use land efficiently by minimizing areas used for landfills.

Implementation and Operation. Employee training is crucial due to the environmental nature of the organization. Employee compensation is based on procedural and legislative compliance. Although there is an environmentally sound agenda, there is no use of technology to minimize or to eliminate the use of natural resources. Still, BFI seeks to minimize the burden on the environment by using half of its land for disposal and the rest for buffer zones of landscaping and wildlife.

Monitoring and Correction. BFI goes beyond regulations set by environmental agencies and interest groups by maintaining internal testing capabilities that monitor waste brought to landfills. There are both routine and surprise inspections. However, monitoring is only for internal practices, and there are few public initiatives taken to ensure that customers use landfills for environmentally sound purposes.

Review and Enhancement. BFI is working on leading edge recycling efforts but does not consider the reason for recycling -- customer waste. Because of limited community budgets, local governments are turning to private sector landfill experts in spite of most landfills being publicly owned. Thus, the environment is fundamental to the organization because it drives opportunities for making profit.

Overall Rating. BFI has a *Methodological Consideration* paradigm due to its inability to involve customers and suppliers in both preservation and protection of the environment. No sustainable development is evident because landfills use land rather than making land suitable for use and there are no evident initiatives to reuse waste.

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Examination and Policy		◆			
Preparation and Planning			◆		
Implementation and Operation		◆			
Monitoring and Correction		◆			
Review and Enhancement			◆		
OVERALL RATING		◆			

Figure 15. BFI Paradigm

Boston Edison Company (1995). Boston Edison is a power utility corporation owned by investors. The company serves the eastern region of Massachusetts. There is testing and evaluation of visionary initiatives regarding energy when focusing on system reliability, customer service, and cost savings.

Examination and Policy. Boston Edison sees environmental protection as a fundamental corporate responsibility. Thus, the company seeks to protect, preserve, and improve the environment. The organization has an overall operating goal of anticipating standards and achieving compliance sooner than required. The energy generating system is the cleanest in Massachusetts.

Preparation and Planning. Such initiatives in the fields of emission reduction, energy efficiency, recycling, and water conservation are key aspects of planning. The Environmental Management Control System places responsibility of environmental compliance on managers and employees. The focus is on utilizing new technologies and initiatives that lead to benefiting the environment. The focus is on outputs while there is little consideration for resources and inputs.

Implementation and Operation. The company involves the public sector for environmentally sensitive programs that are focused on community needs. Energy efficiency is the focus of environmental controls. There is an Environmental Protection Manual given to all levels of the organization to guide document control and training. There is also a Central Environmental Committee to ensure managers are in compliance. There is little regard given to prior environmental impacts regarding the use of raw materials. Rather than being environmentally proactive, the focus is on compliance.

Monitoring and Correction. There is monitoring of internal practices and a daily concern for compliance. The focus of corrective action is on pollution prevention, solving problems once they occur. Monitoring is accomplished at the end of processes, so inputs are not considered.

Review and Enhancement. The organization works with the public before implementing new methods and procedures. Boston Edison Company attempts to foresee new legislation and to develop technology for process efficiency. There is a concern for the welfare of local communities in which it operates.

Overall Rating. Boston Edison Company has a *Methodological Consideration* paradigm. Pollution prevention is the catch phrase in the organization, for the company seeks to lower emission rates. It realizes that it is responsible for waste management but does not focus on reducing the use of raw materials. It uses natural resources to satisfy customers rather than improving ecology. Compliance is a daily concern but proactive environmental initiatives are not common.

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Examination and Policy			◆		
Preparation and Planning		◆			
Implementation and Operation		◆			
Monitoring and Correction		◆			
Review and Enhancement			◆		
OVERALL RATING		◆			

Figure 16. Boston Edison Company Paradigm

Carolina Power & Light (1997). Carolina Power & Light (CP&L) generates, transmits, and distributes electric power to customers in North Carolina and South Carolina. The company has sixteen generating plants and utilizes the following energy mediums: coal, nuclear, hydro, oil, gas, and propane.

Examination and Policy. The company policy is to conduct all aspects of business in an environmentally conscious manner. CP&L states that environmental factors will be an integral part of planning, design, construction, and operational decisions. The organization understands environmental stewardship of natural resources in designing systems around the environment. There is participation with other business and industry organizations when developing effective and reasonable environmental regulations.

Preparation and Planning. Compliance with laws and regulations is the primary focus of the environmental program. There is a desire to prevent damage to the environment. There is also a desire to work with public and private forces in both protecting and enhancing natural resources.

Implementation and Operation. Employees are held accountable to company policy. CP&L works to ensure proper handling, treatment, and disposal of waste while attempting to control waste generation and to encourage recycling. Efficient processes are the focus of the organization.

Monitoring and Correction. Measurement of activities is on both inputs and outputs. Source reduction methods such as product substitution, minimal use of chemicals, and process modifications are implemented to correct deficiencies with

respect to environmental sensitivity. Correction is primarily for compliance with legislation. There are exercises to ensure timely emergency preparedness. There is support provided for technologies that mitigate environmental impacts, evident in a ninety percent reduction in waste generation in a five year period.

Review and Enhancement. Development of environmental initiatives comes through research and development of new methods to develop markets for wastes. There is care taken outside of the organization as well; such initiatives include: recreation, rare plant protection, environmental agency support, and ecological education. The company also sponsors state park volunteer programs.

Overall Rating. Carolina Power & Light has a *Total Production* paradigm due to its involvement at all levels of production as well as outside of the organization. It works with both peers and communities in establishing programs that encourage environmental stewardship and protection.

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Examination and Policy			◆		
Preparation and Planning		◆			
Implementation and Operation		◆			
Monitoring and Correction			◆		
Review and Enhancement			◆		
OVERALL RATING			◆		

Figure 17. Carolina Power & Light Paradigm

ComEd (1996). Commonwealth Edison (ComEd) is primarily concerned with the production, purchase, transmission, distribution, and sale of electricity to both wholesale and retail customers. Including Chicago, the company serves one-fifth of the state area of Illinois.

Examination and Policy. ComEd is committed to protecting the environment due to its position as an electric energy supplier. Based on what customers desire, the company respects the environment. Pollution prevention is the focus of the organization, and efforts are based on legislative and regulatory compliance. Company policy is to operate facilities in a manner that protects both the public health and the local environment while utilizing available technology.

Preparation and Planning. ComEd cooperates with governmental and local authorities to ensure a strong compliance record. Preserving the environment is stated to be a core value. The following are various aspects of environmental planning: environmental stewardship, pollution prevention, life cycle management, and compliance. Compliance is stated to be the focus, but there is planning for future initiatives that stem to designing processes for environmental soundness.

Implementation and Operation. There is a voluntary Environmental Stewardship program to promote individual action by employees and respective families. Implementation of environmental management is based on compliance with air, water, and land effects after energy production. The company studies outputs but not inputs.

Monitoring and Correction. Compliance is measured by self-examination which reviews adherence to legislation, regulations, organizational policies,

and internal procedures. ComEd promptly notifies appropriate agencies during cases of non-compliance and admits responsibility. There are procedures in place to remove contaminants to designated levels and to restore affected areas as well as to take responsibility for past impacts on the environment. Corrective action is focused on maintaining standards instead of continual improvement.

Review and Enhancement. ComEd utilizes available technology rather than developing new methodologies from within the organization. There are initiatives taken in order to plant prairies, preserve habitats, save endangered species, and encourage efficient energy use. ComEd works outside of its own organization to direct environmentally conscious programs.

Overall Rating. Commonwealth Edison has a *Methodological Consideration* paradigm. It appears to be satisfied with compliance rather than initiating self-directed environmental programs. The organization develops more environmental initiatives external to the organization than it does to its own operations.

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Examination and Policy		◆			
Preparation and Planning			◆		
Implementation and Operation		◆			
Monitoring and Correction		◆			
Review and Enhancement			◆		
OVERALL RATING		◆			

Figure 18. ComEd Paradigm

Duke Power (1995). Duke Power is a leading provider of energy in the southeastern United States. Nuclear, coal, and hydroelectric methods are the primary means used to generate power. Duke Power serves both North Carolina and South Carolina. The organization works nationally and internationally to provide engineering, communications, and merchandising services as well.

Examination and Policy. The company has a policy of ensuring ample resources for future generations, stopping waste before it starts. All aspects of the procurement process (buying, using, and disposing) are considered when taking environmental action. Pollution prevention is perceived as normal practice, and life-cycle analysis is accomplished for all operations.

Preparation and Planning. Duke Energy's corporate policy is manifested in seven environmental leadership principles: core value, waste reduction, energy efficiency, quality of life, environmental compliance, effective communications, and continuous improvement. Organizational influences start form within and impact wildlife and ecological arenas. Duke Power sets pre-qualification criteria in its procurement contracts.

Implementation and Operation. The company's planning focuses on individual responsibility. The organization partners with environmental resource agencies and citizen groups in initiating environmental programs such as recycling and reuse of materials. There is involvement at all levels, for Duke Power organizes representatives to take part in local governments, resource agencies, and interest groups. Stakeholders directly influence organizational initiatives.

Monitoring and Correction. Measurement of activities is accomplished to ensure that environmental practices improve in the following areas: reduction of waste at the source; reduction of pollution production; and eliminate emergencies and accidents. The environment is a major concern and suppliers are held accountable to organizational standards.

Review and Enhancement. The organization seeks to operate with less waste and less cost towards less environmental impact. It supports environmental research and pilot projects. Continuous improvement is based on Total Quality Environmental Management. The organization plans ahead to determine future environmental impacts of processes. There are also new technologies developed such as renewable energy, new kinds of concrete, and transportation alternatives.

Overall Rating. Duke Power has an *Environmental Sustainment* paradigm, evidenced in its passion for environmental leadership. It understands the need for high standards regarding the use of and the impacts on water, air, and resources.

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Examination and Policy				◆	
Preparation and Planning			◆		
Implementation and Operation				◆	
Monitoring and Correction			◆		
Review and Enhancement				◆	
OVERALL RATING				◆	

Figure 19. Duke Power Paradigm

Entergy Corporation (1997). Entergy Corporation is a major energy company with global power production and distribution operations. It supplies power for Arkansas, Louisiana, Mississippi, and Texas. It also provides energy internationally in England, Australia, and Argentina. The company provides power marketing services and sells electricity wholesale. It offers other services to include: energy management, security monitoring, and telecommunications.

Examination and Policy. Environmental stewardship is the mainstay of the company. The focus of policy, then, is to take responsibility for environmental impacts. The primary concern is with complying with environmental laws and regulations. Pollution prevention is the organizational focus, and energy efficiency is the primary means of reducing environmental impacts.

Preparation and Planning. Production processes are modified to lessen the amounts of pollution. Waste prevention of fossil fuels and nuclear power are key aspects when developing environmental programs. Source reduction, elimination, substitution, and recycling efforts are considered. There is little planning done for future impacts to the environment.

Implementation and Operation. The organization seeks to instill an environmental consciousness in its employees by encouraging them to take voluntary action for ecological initiatives. There are mobile emergency response trailers staffed at all times by environmental professionals to lower impacts of hazardous waste spills. Pollution prevention is a fundamental practice but source reduction is undefined. Clean electricity generation is seen in uses of natural gas, low-sulfur coal, and nuclear energy.

Monitoring and Correction. Financial grants are given to interest groups, town governments, and private organizations for ensuring societal cooperation at all levels. Environmental initiatives are based on impacts, goals, and benefits for both the organization and the community. Public initiatives that better wildlife habitats, forestry, and wetlands show consideration for natural resources and land impacts.

Review and Enhancement. Improvement focuses on complying with regulatory standards. Concerning energy production, action is directed towards efficiency in production, delivery, and electricity use. Concern for the external environment is evident in biodiversity, where the ecosystem provides sources for pharmaceuticals, crops, fibers, and petroleum substitutes.

Overall Rating. Entergy Corporation has a *Methodological Consideration* paradigm. It focuses on new research and development processes for the environment and has a community outlook. It does not have a program to minimize raw material and natural resource use in its energy generating processes.

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Examination and Policy		◆			
Preparation and Planning		◆			
Implementation and Operation		◆			
Monitoring and Correction			◆		
Review and Enhancement			◆		
OVERALL RATING		◆			

Figure 20. Entergy Corporation Paradigm

GMP (1997). Green Mountain Power (GMP) provides energy to Vermont. It is owned by investors. Currently, it is promoting a new structure for the electric industry that seeks to promote the retail sale of electricity while utilizing a traditional approach for transmission and distribution of electricity.

Examination and Policy. Environmental policy states that leading environmental technologies will eventually account for early losses in profit. Initiatives are based on environmental concerns. Working with distribution companies, GMP hopes to prepare for future environmental impacts by developing leading edge energy production methods.

Preparation and Planning. While maintaining compliance with federal requirements, GMP hopes to plan environmental initiatives around new technologies that utilize resources in preparing for the future. GMP's marketing approach seeks to combine economy and ecology. GMP assumes that customers will be willing to pay more for environmentally conscious generation of energy. There is consideration for decreasing raw material use when generating new methods.

Implementation and Operation. The organization expects processes rather than personnel to be responsible for environmental initiatives. Distribution companies would commercialize new technology to provide funding for continued research. Efficient processes lessen the impact on the environment.

Monitoring and Correction. Monitoring is for internal processes and impacts on the external environment are not defined. Pollution prevention is important, but source reduction is not crucial.

Review and Enhancement. GMP looks for renewable energy sources that conserve and preserve natural resources, utilizing wind technologies to sustain the environment. The company plans to improve current procedures through the use of modern, ultra-clean technologies (such as fuel cells) and renewable generation into the marketplace. Continual improvement is crucial to implementing such initiatives. GMP believes that customers will support new methods that set the standard for the industry.

Overall Rating. Green Mountain Power receives a *Total Production* classification. It utilizes contemporary methods that are on the leading edge of technology and that have a primary concern for long-term economic gain. Rather than sacrificing organizational profit, the societal market will be financing initiatives. The primary risk comes in the form of public support for new initiatives. Thus, it seeks to make customers sensitive to the environment. The organization is filled with new ideas and concepts for revolutionizing the energy industry but methods are not integrated into operational perspectives.

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Examination and Policy			◆		
Preparation and Planning			◆		
Implementation and Operation		◆			
Monitoring and Correction		◆			
Review and Enhancement				◆	
OVERALL RATING			◆		

Figure 21. GMP Paradigm

SKB Environmental (1997). SKB Environmental is the largest yard waste processing firm in Minnesota. The company specializes in construction, demolition, composting, and yard waste management. Innovative methods in the area of industrial waste disposal make the company a leader in landfill technologies.

Examination and Policy. The organization has a policy of moving beyond compliance by utilizing state-of-the-art waste management services. Its policy is to be a pioneer in cutting edge methods to ensure it is at the forefront of waste management. It utilizes the latest commercial technology available, seeking to ensure waste minimization. SKB Environmental plans for ongoing risks of hazardous materials (such as asbestos) and creates opportunities for reusing waste (such as road construction). It seeks to aid in limiting the use of natural resources by recycling and reusing waste.

Preparation and Planning. Planning for the environment takes place in two divisions. The first is construction and demolition waste management where there is recycling, waste transfer, and land disposal. The second is composting and yard waste management where there are product screening, reuse of waste, and compost marketing. With reuse and recycling, there is preparation for the future. However, it does not involve its customers in environmental awareness.

Implementation and Operation. Operations focus on adhering to organizational standards. SKB Environmental requires the latest technology in its daily functions to ensure it remains beyond compliance. By utilizing efficient processes, the company recycles recoverable concrete, brisk, block, cardboard, iron, and wood. The organization seeks is conscious of environmental impacts in all processes.

Monitoring and Correction. The organization utilizes the latest technology to separate and to measure waste. The separation of waste allows for reuse; compost may become fertilizer and shingles may become road-base. There is constant monitoring of inputs, processes, and outputs as well as managerial involvement in recommending procedures for continual improvement. There has never been a case of non-compliance to legislature. Organizational regulations are often much more stringent than public standards.

Review and Enhancement. SKB Environmental conducts research to anticipate future uses for waste, whether marketing yard compost or reusing raw materials. As a service, it finds new market opportunities for recycled waste.

Overall Rating. SKB Environmental receives a *Total Production* classification due to its ability to minimize and to reuse waste. The methods by which it recycles and markets waste allay customer impacts on the environment by reusing materials that were once thought of as worthless.

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Examination and Policy				◆	
Preparation and Planning		◆			
Implementation and Operation			◆		
Monitoring and Correction			◆		
Review and Enhancement			◆		
OVERALL RATING			◆		

Figure 22. SKB Environmental Paradigm

Texas Utilities Company (1997). Texas Utilities Company (TU) is an energy services system owned by investors. The company has international business operations in the following: electric utilities and gas services; natural gas transmission, processing, and storage; lignite coal mining; and telecommunications.

Examination and Policy. From examining the past, TU initiated programs that state and federal agencies used as models for environmental protection. TU's commitment states that the organization is to be a responsible caretaker of air, land, and water. The organization implements ecological awareness based on environmental design, whereby it takes environmental impacts (such as greenhouse gases) into account before implementation of energy programs.

Preparation and Planning. Planning takes place for land reclamation, recycling, water, and air. The restoration of used land, the reuse of raw materials, and consideration of emissions all take place when determining new ways of producing energy. While experimenting with renewable sources of energy, the company focuses on creating energy efficient and environmentally responsible technologies.

Implementation and Operation. There are programs in place that influence communities in which the company operates. TU works to expand customer access to the latest energy technologies and associated applications. In its processes, the organization applies renewable energy technologies that include solar powered security lighting, solar waste pumping, solar shingles for construction, and wind turbines for agricultural use. There is environmental concern in all phases of production from raw material extraction to outputs.

Monitoring and Correction. The organization monitors both processes and outputs. It focuses on restoring damaged land. The use of water to cool power plants is closely monitored. Potential air emissions are minimized to prevent pollution.

Review and Enhancement. With regard to sustainable energy, the company is spearheading solar and wind power for utilities. There are programs in place that influence regions in which the company operates. The main program, Energy Park, has the purpose of working with customers, manufacturers, other utilities, educators, and regulatory officials for the purpose of testing, demonstrating, and applying new and emerging technologies. Energy Park seeks to develop renewable and advanced methods of potential energy resource options for future needs and for the environment. TU's technologies benefit not only the organization but also the surrounding communities.

Overall Rating. Texas Utilities Company has a *Total Production* paradigm based on its taking environmental considerations into account before taking action. Concern for renewable energy sources exhibits stewardship of resources.

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Examination and Policy			◆		
Preparation and Planning			◆		
Implementation and Operation			◆		
Monitoring and Correction		◆			
Review and Enhancement			◆		
OVERALL RATING			◆		

Figure 23. Texas Utilities Company Paradigm

United Power (1995). United Power serves electricity to Colorado's front range. The service area includes communities, agriculture, industry, mountains, and plains. It is involved with businesses that include: manufacturers, mining companies, food production, greenhouses, farms, ranches, speedways, and broadcasting. Rather than being owned by a traditional private entity such as investors, the organization is a unique cooperative where there are profit making dividends for several civic and service organizations.

Examination and Policy. In defining policy, the organization uses the term "environmentally responsible development." The focus of such development is on customers who use energy rather than on internal processes. Although there is oversight and record keeping of internal mechanisms, proactive initiatives have little to do with production processes.

Preparation and Planning. Planning in United Power is different from conventional utility companies in that it is owned by a cooperative of stakeholders who operate other businesses. Ecological concerns within the organization are based on legislative constraints; there is no evident environmental management program in place. Resource efficiency for the benefit of stakeholders is the key focus when developing objectives.

Implementation and Operation. The public is involved with corporate initiatives. United Power seeks to involve the community in voluntary action rather than focusing on internal processes. There is environmental awareness evident throughout the organization but no defined program for managing environmental initiatives.

Monitoring and Correction. There is monitoring of energy usage; measurements are taken at the end of, rather than before or during, processes. Management shows concern for the environment by offering financial incentives to major energy users who utilize efficient technologies such as improved heating and cooling mechanisms. Thus, corrective action is the responsibility of customers rather than of the company.

Review and Enhancement. Improvements combine public awareness and corporate responsibility. Energy management specialists work with industrial, commercial, and residential customers when developing programs for enhancing business. The company forecasts future trends through integrated resource planning (use of raw materials) and demand-side management (meet future needs and requirements).

Overall Rating. United Power operates with a *Methodological Consideration* paradigm. Rather than focusing on internal solutions and improvements, it expects customers to respond to financial incentives for environmental awareness.

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Examination and Policy		◆			
Preparation and Planning	◆				
Implementation and Operation		◆			
Monitoring and Correction		◆			
Review and Enhancement			◆		
OVERALL RATING		◆			

Figure 24. United Power Paradigm

Public with Service: Organizational Results

In the Federal Government of the United States, the Environmental Protection Agency (EPA) oversees and works with various public administrations to ensure the development of environmental management programs. Environmental information and statistics are compiled by the Council on Environmental Quality (CEQ), which reports the state of the nation's environment to the President. Various administrations in the President's Cabinet work closely with the CEQ to develop new initiatives.

The purpose of the Cabinet is to inform the President about any subject related to the duties of the respective offices. The Cabinet functions to both update and advise the President at any time regarding the status of the nation. It is composed of fourteen departments, ten of which are used for the purpose of this study. The Departments of Education, Justice, Treasury, and Veterans Affairs are not studied. The following is a list of the ten observed organizations:

1) Department of Agriculture
2) Department of Commerce
3) Department of Defense
4) Department of Energy
5) Department of Health and Human Services
6) Department of Housing and Urban Development
7) Department of the Interior
8) Department of Labor
9) Department of State
10) Department of Transportation

Not every organization creates annual environmental reports. As a result, environmental information is gathered from overall annual reports. The Department of State and the Department of Transportation are the only two organizations from the preceding list that produce separate environmental reports.

Department of Agriculture (1994). The Department of Agriculture has two purposes: improvement of farm income and development of market expansion. It works to cure poverty, hunger, and malnutrition. It also seeks to enhance the environment, maintaining current production capacities while helping landowners to protect natural resources. Key resources for natural growth are rural development, conservation, and credit programs. The Department is responsible for effects of food on public health.

Examination and Policy. Farm economy and environmental policy are viewed as compatible. The Department establishes private and public partnerships for the environmental issues of recreation, wildlife, and research. Private organizations are a major source of funding for Department initiatives. The forestry division focuses on sustainable development, but other departments do not. Ecosystems set the stage for operational management and oversight.

Preparation and Planning. Responsibility for environmental initiatives rests with the Agricultural Council on Environmental Quality, which is charged with coordinating organizational policies and programs. Department concerns include pesticides, endangered species, energy biomass, and water quality. The organization's Forest Service and Soil Conservation Service (now known as the Natural Resources Conservation Service) are responsible for seventy-five percent of the nation's land.

Implementation and Operation. The Department focuses on educating both employees and citizens regarding land conservation and resource management. Daily operations are regarded as environmentally sound, for there is a deep focus on natural resource conservation starting with minimizing the use of raw materials.

However, there is no extensive emergency response plan. Although the organization responds to contingency situations, expediency is not always a key concern and environmental action in response to accidents may take several months.

Monitoring and Correction. The Department has the responsibility of both monitoring and measuring the activities of others. Inspected areas include crops, water, and forestry. The organization constantly finds new ways to correct problems stemming from land and water, developing new methods to ensure ecological well-being.

Review and Enhancement. The Department and the EPA have an organizational structure that fosters cooperation in developing research, technology, and new materials regarding chemical usage. There is focus on land conservation and limited resource use. Long-term planning is implemented with regard to sustaining land use.

Overall Rating. The Department of Agriculture receives a *Total Production* rating due to its core environmental initiatives. The organization's nature is to oversee agricultural means, including constant environmental stewardship of land.

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Examination and Policy			◆		
Preparation and Planning			◆		
Implementation and Operation		◆			
Monitoring and Correction			◆		
Review and Enhancement			◆		
OVERALL RATING			◆		

Figure 25. Department of Agriculture Paradigm

Department of Commerce (1995). The Department of Commerce seeks to develop international trade, growth, and technological advancement. It seeks to increase the nation's competitiveness in the world economy. The Department provides research and support for scientific, engineering, and technological development. Organizational focus is on economic development and international economic relations.

Examination and Policy. The Department works to improve national understanding pertaining to the benefits of the natural environment and oceanic resources. Its two regions of influence that impact the environment are air and water. The organization's division that oversees environmental initiatives is the National Oceanic and Atmospheric Administration (NOAA), which has two missions: predicting environmental changes and conserving coastal resources. It seeks to ensure sustainable economic opportunities. It manages risks and opportunities of environmental changes for the purpose of public, not necessarily environmental, health.

Preparation and Planning. The NOAA has three goals pertaining to the environment: build sustainable fisheries, recover protected species, and sustain healthy coasts. It also has the objective of forecasting changes in climate. The Office of Sustainable Government and Intergovernmental Affairs helps the NOAA to develop fishery programs with foci on habitat restoration and fishing capacity. However, there is no such program for ensuring sustainability of coastal and marine regions.

Implementation and Operation. The Department implements environmental initiatives primarily in the NOAA but not elsewhere. There are limited environmental programs with the purpose of sustaining economy but not ecology.

Monitoring and Correction. There is much monitoring of trends in weather but minimal measuring of environmental conditions. Environmental measurements are taken only in response to public concerns. There are sustainable concerns, but limited corrective action, when monitoring natural resources.

Review and Enhancement. The NOAA is constantly developing new technologies for understanding the environment. There is cooperation with private organizations in developing new technologies for meteorology but not for environmental initiatives. The Department responds to problems as they occur. The only forecasting accomplished is with regard to technology for understanding the weather.

Overall Rating. The Department of Commerce receives a *Methodological Consideration.* The organization continues to mention the word sustainability in its operations but does not practice it in reality. Furthermore, the organization does not yet fully realize environmental impacts in all organizational facets, for the NOAA can tend to work independently of other agencies.

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Examination and Policy			◆		
Preparation and Planning		◆			
Implementation and Operation		◆			
Monitoring and Correction	◆				
Review and Enhancement		◆			
OVERALL RATING		◆			

Figure 26. Department of Commerce Paradigm

Department of Defense (1997). The Department of Defense focuses on national security. It is responsible for providing military services needed for deterring war and for protecting the country. The Department exercises authority, direction, and control over the Army, Navy, Marine Corps, and Air Force to ensure national interests are kept intact in spite of international conflicts.

Examination and Policy. Environmental security is regarded as strong environmental, safety, and occupational health. The Department seeks to prevent pollution and to restore contaminated properties. Pollution prevention is at the core of environmental efforts because the organization views it as reducing overall compliance and restoration costs.

Preparation and Planning. The Department focuses on complying with legislation and regulations. It now partners with suppliers in the acquisition process, other militaries, and other interest groups when seeking to implement environmental programs. The organization plans its environmental initiatives around current standards and does not plan for future trends.

Implementation and Operation. There are programs in place to keep suppliers accountable to environmental standards. However, there are limited practices to ensure that military operations conserve the environment. Compliance is the goal of the organization, for cleaning hazardous waste at various sites has proved to be costly. Environmental concerns are given minimal treatment, and there is little focus on natural resource conservation. Emergency procedures are in place, but there are a limited amount of measurements taken concerning new technologies.

Monitoring and Correction. Almost eighty percent of the Department's hazardous waste comes from weapons systems production. Although there is the desire to reduce hazardous waste, there are no programs to integrate environmental philosophies with operational practices when utilizing weapons. Correction focuses on past mistakes rather than on current trends.

Review and Enhancement. The Department seeks to develop new technologies for improving the environment in which it operates. Pollution prevention is the focus of the organization; thus, it encourages technology for reducing impacts on the environment. Technologies focus on cleaning hazardous waste after generation.

Overall Rating. The Department of Defense has an *Economical Pursuance* paradigm due to its reactive posture. It desires to be at the leading edge of military peers around the world but takes little initiative when considering sustainability or environmental concerns. The organization has almost been forced into ecological conservation due to its past record of environmental damage.

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Examination and Policy		◆			
Preparation and Planning	◆				
Implementation and Operation	◆				
Monitoring and Correction	◆				
Review and Enhancement		◆			
OVERALL RATING	◆				

Figure 27. Department of Defense Paradigm

Department of Energy (1995). The Department of Energy devotes its time to the development of a comprehensive and balanced energy plan through coordinating and administrating energy functions of the Federal Government. The organization is responsible for long-term, high risk research and development of energy technology. Its duties include the oversight of energy conservation, power systems marketing, energy regulation, and nuclear weapons.

Examination and Policy. Although the Department has a pollution prevention strategy to reduce waste and to minimize environmental impact, it seeks to implement sustainable development procedures in conjunction with other nations for a global impact. There are public policy imperatives for understanding and for reducing risks associated with toxic chemicals and hazardous waste.

Preparation and Planning. Globally, the Department focuses on ozone depletion, climate change, biodiversity, and hazardous waste. Nationally, the organization devotes eighty-five percent of its environmental budget to compliance with legislation. Its policy is evident in five areas: daily environmental considerations, understanding of risks, land use reduction, environmental technology, and cleaner production processes. Ecological concerns are part of the Department's core values.

Implementation and Operation. The organization utilizes a "best in class" approach where there is improvement in productivity without reduction of environmental programs. Efficiency is the primary focus of organizational operations. Privatization and reengineering produce economic savings and environmental benefits, but there is no proactive agenda at all levels of the Department.

Monitoring and Correction. There is constant measuring of internal processes and appropriate corrective action when needed. The Department is cleaning up nuclear and chemical wastes at over one-hundred sites around the United States, but has only begun integrating limited accountability with suppliers.

Review and Enhancement. Developments focus on the following: treatment and disposal of waste; retrieval and processing of tank wastes; remediation of contaminated soils and groundwater; stabilization of landfills; and decontamination or decommissioning of facilities. Obviously, technologies are not focused on future trends but on past impacts. Societal welfare is considered, but there is no environmental advancement beyond compliance.

Overall Rating. The Department of Energy has a *Methodological Consideration* paradigm due to its focus on minimizing impacts from efficient internal processes rather than focusing on environmental conservation. Although there are leading technologies developed, the organization does not focus on future concerns.

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Examination and Policy			◆		
Preparation and Planning			◆		
Implementation and Operation		◆			
Monitoring and Correction		◆			
Review and Enhancement		◆			
OVERALL RATING		◆			

Figure 28. Department of Energy Paradigm

Department of Health and Human Services (1995). The Department of Health and Human Services is focused on the enhancement of individual people. The Department impacts the lives of more humans than any other agency. It calls itself an organization where people serve people, for it develops programs for human welfare.

Examination and Policy. Focusing on public health, the Department experiments with various chemicals for societal welfare. However, there is no established environmental management system in place to definitively oversee proper disposal of chemicals and proper environmental stewardship. The environment is viewed as an entity separate to operations.

Preparation and Planning. The Department focuses on biomedical research, substance abuse, public health care, drug approval processes, and community health centers. Environmental considerations are evident in compliance, particularly with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980. The Act requires each Federal organization to conduct Superfund audits of payments, obligations, reimbursements, and other uses of Superfund moneys. However, planning is limited and environmental impacts of medicine are not considered.

Implementation and Operation. There are no training programs in place to educate personnel on every day environmental issues. Compliance is minimal and there is no integration between processes and environmental concerns.

Monitoring and Correction. Environmental monitoring is not accomplished consistently and corrective action is initiated only when legislative standards require it. Funds are provided only for very limited environmental concerns.

Review and Enhancement. Improvements focus on human health. Chemicals are widely used in medicine, but environmental initiatives are not promoted, just expected, of suppliers. Technology focuses on medical programs and there seems to be disregard for environmental practices.

Overall Rating. The Department of Health and Human Services has an *Economical Pursuance* paradigm due to its not implementing environmental management in operational processes. The organization implements almost no environmental initiatives, responding by providing funds when needed and not keeping suppliers accountable to ecologically sound standards.

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Examination and Policy	◆				
Preparation and Planning	◆				
Implementation and Operation	◆				
Monitoring and Correction	◆				
Review and Enhancement	◆				
OVERALL RATING	◆				

Figure 29. Department of Health and Human Services Paradigm

Department of Housing and Urban Development (1995). The Department of Housing and Urban Development focuses on national housing needs, fair housing opportunities, and development of national communities. Its primary functions are directed toward funding and realty.

Examination and Policy. There is no defined environmental policy in place regarding housing programs. The organization is just beginning to realize environmental protection concerns due to its responsibility of redeveloping various neighborhoods and communities. Economic concerns still overshadow environmental impacts, for the primary mission of the organization is to provide housing for as many individuals as possible. However, in the responsibility of redesigning underdeveloped communities for societal welfare, environmental concerns are finally surfacing.

Preparation and Planning. The Office of Policy Development and Research is tasked with the Department's environmental considerations. However, environmental management is not defined outside of complying with legislation.

Implementation and Operation. A major concern in the organization is land use. Redevelopment means reusing the land in distressed housing areas. However, redevelopment often takes place where previous uses of land have resulted in hazardous environmental conditions. Thus, environmental concerns end up being reactive as the organization responds to needs as they arise. Planning for the future becomes overshadowed by providing solutions for the past.

Monitoring and Correction. Monitoring is limited only to regions where there is redevelopment. Substantial cleaning initiatives are often needed, but the

Department has no set procedures for managing environmental initiatives. There is little preparation for unconventional incidents due to difficulty in determining what communities to evaluate and what damage has been done.

Review and Enhancement. The organization is learning how to systematically react to problems, but there is still no preparation for future environmental trends. Societal welfare is of concern but is evident more so in housing than in ecology. Because environmental concerns are fairly recent, the development of environmental initiatives is just beginning.

Overall Rating. The organization receives an *Economical Pursuance* paradigm due to its focus on economical methods to provide housing rather than to consider the environment. However, the organization is beginning to plan for future environmental programs to aid in redeveloping communities.

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Examination and Policy	◆				
Preparation and Planning	◆				
Implementation and Operation	◆				
Monitoring and Correction	◆				
Review and Enhancement		◆			
OVERALL RATING	◆				

Figure 30. Department of Housing and Urban Development Paradigm

Department of the Interior (1995). The Department of the Interior is the nation's principle conservation agency; thus, it has responsibility for most nationally owned public lands and natural resources. Its primary areas of responsibility are land use, water resources, biological diversity, environmental preservation, and outdoor recreation. The Department has the responsibility for American Indian communities.

Examination and Policy. The Department encourages environmental stewardship and citizen participation. Its mission has the following environmental mandates: management, preservation, and operation of public lands; development and use of resources in an environmentally sound manner; and scientific research and investigations for conservation. The organization seeks to ensure sustainable development for both current and future generations.

Preparation and Planning. The organization has two primary environmental categories: natural resources and science. Agencies for the management of natural resources are as follows: National Park Service, Fish and Wildlife Service, Bureau of Land Management, Bureau of Reclamation, Office of Surface Mining, and Minerals Management Service. The agencies for science are comprised of the following: U.S. Geological Survey, National Biological Service, and U.S. Bureau of Mines. Each agency is accountable for its respective field of responsibility. The organization develops technologies for ecological trends and plans for future impacts.

Implementation and Operation. The organization is committed to the health, diversity, and productivity of public lands. Environmental programs are initiated at a national level to manage mineral, timber, grazing, and water resources. All phases of

production focus on ensuring current levels of the ecological system, whereby the needs of the public are met.

Monitoring and Correction. The science agencies are responsible for measuring impacts of natural disasters, ecological hazards, natural resources, and raw materials. The ecosystem is viewed as a whole rather than in parts. Intrinsically, management centers all actions and improvements on ecology because the organization and the environment are crucial to one another's existence.

Review and Enhancement. Research and development are centered on continually improving the environment. The department inherently takes responsibility for society. The organization develops technology for long-term resource management.

Overall Rating. The Department of the Interior receives the *Environmental Sustainment* paradigm due to its centralized focus on ensuring the conservation and the sustainment of both land and natural resources. Environmental management and development lie at the core of the organization's mission.

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Examination and Policy				◆	
Preparation and Planning				◆	
Implementation and Operation				◆	
Monitoring and Correction					◆
Review and Enhancement				◆	
OVERALL RATING				◆	

Figure 31. Department of the Interior Paradigm

Department of Labor (1993). The Department of Labor fosters, promotes, and develops the welfare of wage earners. It seeks to improve working conditions and to advance opportunities for employment. The Department promotes workers' pension, job finding, and occupational training. Its overall goal is to provide opportunities for profitable employment.

Examination and Policy. There is no specified environmental management system or program established in the Department. There are environmental considerations when enhancing working conditions, but there are no defined procedural standards that take ecological considerations into account.

Preparation and Planning. The two agencies most adept to handling environmental considerations are the Occupational Safety and Health Administration (OSHA) and the Mine Safety and Health Administration (MSHA). OSHA and MSHA aim to develop safe and healthful working conditions by promulgating improved workplace standards through stringent inspection. However, OSHA and MSHA are unable to directly handle environmental cases. The Department has no environmental initiatives other than those stipulated by legislative requirements; legislation impacts the Department only on an administrative level.

Implementation and Operation. There are no environmental procedures to train personnel regarding environmental management. Environmental problems are viewed as the responsibility of inspected organizations, not of the Department.

Monitoring and Correction. OSHA and MSHA enforce health and safety standards by inspecting occupational areas. They consult, train, educate, and

inform both employers and employees regarding voluntary compliance for the protection of personnel. However, the inspected organizations are expected to institute corrective action, for neither OSHA nor MSHA are capable of managing environmental problems.

Review and Enhancement. Management has minimal involvement concerning widespread environmental procedures. There is no association between operations and the environment.

Overall Rating. The Department of Labor receives an *Economical Pursuance* paradigm. Environmental programs are not disseminated throughout the organization. Ecological concerns are concentrated primarily in OSHA and MSHA practices rather than within the Department, so all division managers are not apt to handling environmental concerns. Economy and wages are major concerns, and environmental management is not viewed as having lasting significance.

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Examination and Policy	◆				
Preparation and Planning	◆				
Implementation and Operation	◆				
Monitoring and Correction	◆				
Review and Enhancement	◆				
OVERALL RATING	◆				

Figure 32. Department of Labor Paradigm

Department of State (1997). The Department of State advises the President in foreign policy matters with the intent of long-term national security and welfare. The Department analyzes overseas interests, recommends future action, and implements established policy. It works with and represents the public, the Federal Government, and foreign governments.

Examination and Policy. The examination of environmental management has three considerations: damage to the global environment, political influences on the environment, and human responsibility for the environment. The organization's policy is environmental diplomacy, whereby environmental considerations are taken into account for every foreign matter. Continual improvement for the purpose of sustaining future generations is of primary concern.

Preparation and Planning. There are five priorities for the Department when implementing environmental diplomacy: climate change, toxic chemicals, species extinction, deforestation, and marine degradation. Regional environmental "hubs" are in place to work on regional environmental problems and to raise the profile of environmental concerns. Long-term planning is crucial in all facets of decision making.

Implementation and Operation. The Department is in the process of developing environmental management at all levels of the organization. Embassies and bureaus around the world are developing regional environmental policies to advance larger national interests. Regional objectives are stabilizing regions with scarce resources, enabling nations to work cooperatively, and strengthening relationships through joint efforts. However, plans are not yet fully executed in daily operations.

Monitoring and Correction. There is monitoring for water resources, air quality, energy resources, land use, urban growth, and industrial development. The focus of current action is backward looking in trying to correct past impacts on the environment. The direction is forward in ensuring that all managers implement programs that support the ecosystem. The Department provides adequate funding for new environmental initiatives in order to undo the negative impacts of past human practices.

Review and Enhancement. Review of environmental problems has resulted in phasing out substances that damage the ozone layer and banning radioactive waste in oceans. The Department takes responsibility for the well-being of society and develops programs that encourage other nations towards environmental stewardship.

Overall Rating. The Department of State has a *Total Production* paradigm due to its proactive environmental stance. The Department is leaning towards sustainability but still has to resolve past problems. It concentrates on environmental conservation and protection in thought but has to solve previous dilemmas in reality.

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Examination and Policy				◆	
Preparation and Planning				◆	
Implementation and Operation		◆			
Monitoring and Correction			◆		
Review and Enhancement				◆	
OVERALL RATING			◆		

Figure 33. Department of State Paradigm

Department of Transportation (1995). The Department of Transportation establishes overall transportation policy. It has responsibility for the following: highway, mass transits, railroads, aviation, and traveling safety. As such, the organization also has national concerns of land planning, energy conservation, scarce resource utilization, and technological change.

Examination and Policy. The Department creates several policies that ultimately pursue the goal of sustainability. Therefore, the organization seeks to protect the environment, ensuring the availability of adequate resources for the indefinite future. The Department still is unsure of the potential when coupling sustainable development with transportation methodologies, for adequate technology is not available. Furthermore, the organization grapples with development versus ecological optimization. Still, there are standards for environmental awareness regarding transportation industries.

Preparation and Planning. Transportation-related environmental impacts include the following: air pollution, noise, water pollution, solid waste, land use, and species habitats. There are two objectives to remedy ecological concerns: harmonize transportation means with the environment and provide leadership to ensure environmentally friendly solutions to daily activities. Environmental management is beneficial, but resources are not utilized to prepare for the future.

Implementation and Operation. Environmental training is provided at all levels, but many concerns are not confronted due to adequate means and technologies.

Monitoring and Correction. Environmental concerns are of primary importance in daily operations. There is constant monitoring of several areas including:

air quality, congestion mitigation, global climate, and aircraft impacts. In spite of excellent and comprehensive monitoring, corrective action is difficult due to the uncontrollable nature of increased emissions regarding external forces such as private industries and independent buyers. Although funds are adequate, technology is not.

Review and Enhancement. In anticipation of future trends, the Department oversees the development of environmentally improved products. Such products are for deterring various kinds of pollution: air, water, and noise. The organization seeks to develop technology to mitigate environmental concerns, working with various private industries to develop new transportation methods.

Overall Rating. The Department of Transportation receives a *Total Production* classification due to its forecasting environmental trends such as environmental stewardship and future impacts. Because adequate technology is not available, the organization is not able to implement sustainability in its operations. However, the organization has an advanced paradigm that does as much as possible.

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Examination and Policy			◆		
Preparation and Planning		◆			
Implementation and Operation		◆			
Monitoring and Correction			◆		
Review and Enhancement			◆		
OVERALL RATING			◆		

Figure 34. Department of Transportation Paradigm

Statistical Categorizations

From the organizational classifications, statistical analyses may be accomplished to determine if there is a difference in paradigms according to organizational categories. Using histograms, this study seeks to observe paradigm trends as compared between organizational types.

Organizational Synopsis. After matching organizations with paradigms, the next step is to compile the information for statistical analysis. Respective paradigms from the analyzed organizations may be summarized as seen in the following three tables, grouped according to organizational classifications.

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Amoco Corporation			◆		
Baxter International				◆	
Bristol-Myers Squibb Company				◆	
Eastman Kodak Company			◆		
John Deere & Company			◆		
Johnson & Johnson				◆	
Monsanto Company				◆	
PepsiCo		◆			
Proctor & Gamble			◆		
Rockwell International Corporation			◆		

Figure 35. Private with Product Paradigm Summary

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
BFI		◆			
Boston Edison Company		◆			
Carolina Power & Light			◆		
ComEd		◆			
Duke Power				◆	
Entergy Corporation		◆			
GMP			◆		
SKB Environmental			◆		
Texas Utilities Company			◆		
United Power		◆			

Figure 36. Private with Service Paradigm Summary

Environmental Management System	Economical Pursuance	Methodological Consideration	Total Production	Environmental Sustainment	Ecological Optimization
Department of Agriculture			◆		
Department of Commerce		◆			
Department of Defense	◆				
Department of Energy		◆			
Department of Health and Human Services	◆				
Department of Housing and Urban Development	◆				
Department of the Interior				◆	
Department of Labor	◆				
Department of State			◆		
Department of Transportation			◆		

Figure 37. Public with Service Paradigm Summary

Chi-Squared Analyses and Histograms. The chi-squared test procedure is useful for analyzing two-dimensional tables of discrete data (in this case environmental management paradigms and organizational classifications). The chi-squared test determines whether the paradigms and classifications are independent (hypothesis of independence) and whether relative frequency distributions for respective classifications and paradigms are the same (hypothesis of homogeneity). In this thesis, the chi-squared test is used to determine whether or not there is a correlation between classifications and paradigms and to what degree different classifications have similar paradigms.

The chi-squared analysis involves three values: the observed value, the expected value, and the chi-squared value. The observed value is the original value obtained from data (the number of organizations that have a certain paradigm according to respective classifications). The expected value is the value one may anticipate when considering this study's hypothesis. The chi-squared result is the contribution that both observed and expected values make on the overall chi-squared result.

In the chi-squared analysis for this thesis, the P-Value determines the amount of confidence that may be placed in stating whether or not there is a difference between organizations when considering environmental paradigms. For the purposes of this thesis, the following ratings show the amount of confidence that will be associated with each P-Value.

$0.00 \leq P < 0.05$	Significance
$0.05 \leq P < 0.10$	Suspect Significance
$0.10 \leq P$	Insufficient Evidence

The significance level represents correlations in which one may conclude that differences exist between organizations when observing environmental management paradigms. The suspect significance level denotes correlations where there is reason to surmise that there are differences between organizations with respect to paradigms. The insufficient evidence level expresses correlations that do not have ample justification for determining if a difference exists between organizations with regard to paradigms. After performing chi-squared analyses and obtaining respective P-Values, histograms are presented to show paradigm tendencies according to organizational types. The following abbreviations are used for both chi-squared tables and histograms.

Organizational Classifications
- Group 1: Private with Product
- Group 2: Private with Service
- Group 3: Public with Service

Environmental Management Paradigms
- EP: Economical Pursuance
- MC: Methodological Consideration
- TP: Total Production
- ES: Environmental Sustainment
- EO: Ecological Optimization

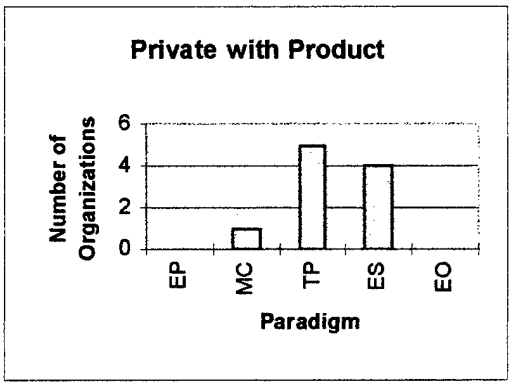
There are six chi-squared analyses performed for the purposes of this thesis: private with product versus private with service versus public with service; private (products and services) versus public with service; product (private) versus service (private and public); private with product versus private with service; private with product versus public with service; and private with service versus public with service. The analyses are utilized to draw conclusions concerning two organizational comparisons: private versus public and product versus service.

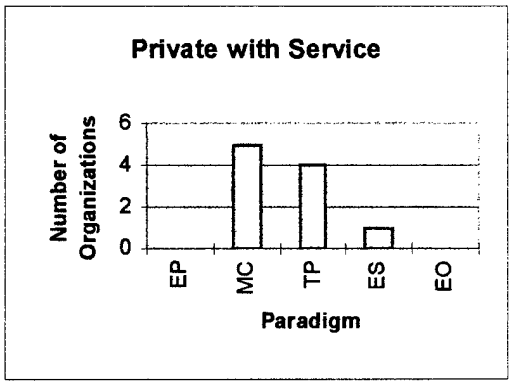
TABLE 1
CHI-SQUARED ANALYSIS OF PRIVATE WITH PRODUCT VERSUS PRIVATE WITH SERVICE VERSUS PUBLIC WITH SERVICE

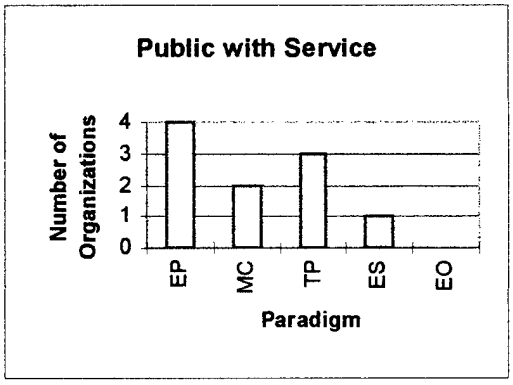
	Chi-Squared Analysis	EP	MC	TP	ES	EO
Group 1	Observed	0	1	5	4	0
	Expected	1.33	2.67	4.00	2.00	0.00
	Chi-Squared Result	1.33	1.04	0.25	2.00	0.00
Group 2	Observed	0	5	4	1	0
	Expected	1.33	2.67	4.00	2.00	0.00
	Chi-Squared Result	1.33	2.04	0.00	0.50	0.00
Group 3	Observed	4	2	3	1	0
	Expected	1.33	2.67	4.00	2.00	0.00
	Chi-Squared Result	5.33	0.17	0.25	0.50	0.00

Overall Chi-Squared Result: 14.75 P-Value: 0.0223 Degrees of Freedom: 6

TABLE 2
HISTOGRAM OF PRIVATE WITH PRODUCT VERSUS PRIVATE WITH SERVICE VERSUS PUBLIC WITH SERVICE







From the results of comparing organizational classifications (private with product, private with service, and public with service), it may be determined with statistical significance that each group is different with respect to paradigms. The private with product sector moves to the right in the direction of *Environmental Sustainment*. The private with service arena moves to the left in the direction of *Methodological Consideration*. The public with service domain moves to the left in the direction of *Economical Pursuance*. Thus, when analyzing all three classifications, there tends to be differences between organizational categories with respect to environmental management paradigms.

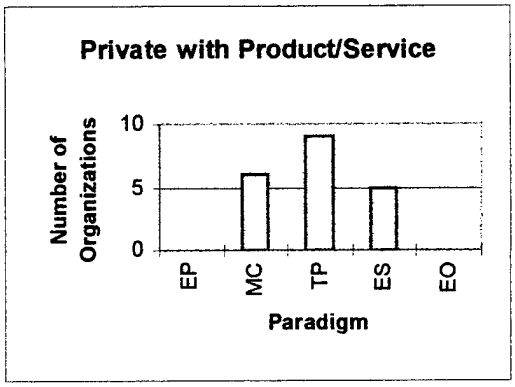
Observing all three organizational classifications at once is not sufficient for the purposes of this study because of the inability to distinguish organizational types. The intent of this thesis is to determine whether or not there is a difference with regard to paradigms in two contexts: private versus public and product versus service. Private versus public differences may be observed in three chi-squared analyses: private (products and services) versus public with service; private with product versus public with service; and private with service versus public with service. Products versus services may be seen in three chi-squared analyses: product (private) versus service (private and public); private with product versus private with service; and private with product versus public with service. The following chi-squared analyses and corresponding histograms show the results of comparisons between the aforementioned groupings of organizational classifications.

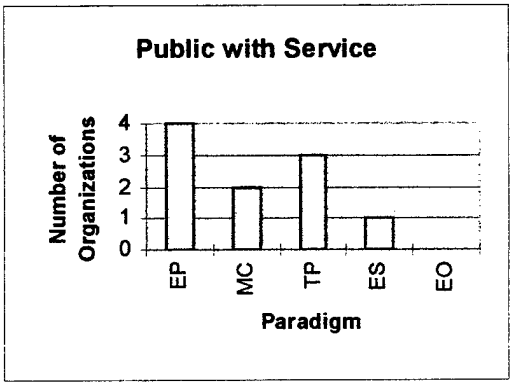
TABLE 3
CHI-SQUARED ANALYSIS OF PRIVATE WITH PRODUCT/SERVICE VERSUS PUBLIC WITH SERVICE

	Chi-Squared Analysis	EP	MC	TP	ES	EO
Group 1/2	Observed	0	6	9	5	0
	Expected	2.67	5.33	8.00	4.00	0.00
	Chi-Squared Result	2.67	0.08	0.13	0.25	0.00
Group 3	Observed	4	2	3	1	0
	Expected	1.33	2.67	4.00	2.00	0.00
	Chi-Squared Result	5.33	0.17	0.25	0.50	0.00

Overall Chi-Squared Result: 9.38 P-Value: 0.0247 Degrees of Freedom: 3

TABLE 4
HISTOGRAM OF PRIVATE WITH PRODUCT/SERVICE VERSUS PUBLIC WITH SERVICE





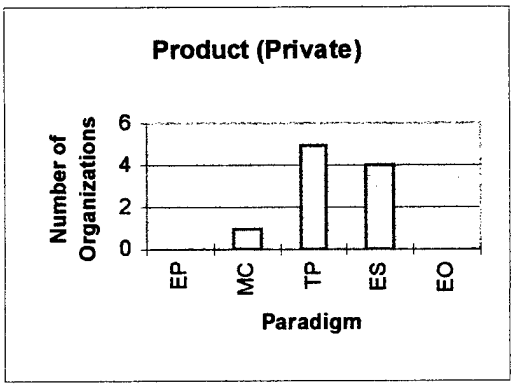
From the above results, it may be stated that there is a significant difference between the private sector and the public with service organizations regarding environmental management paradigms. As a whole, the private sector tends to move towards the *Total Production* paradigm while the public with service arena moves towards *Economical Pursuance*. It appears that the private sector has more environmental management initiatives than the public with service sector.

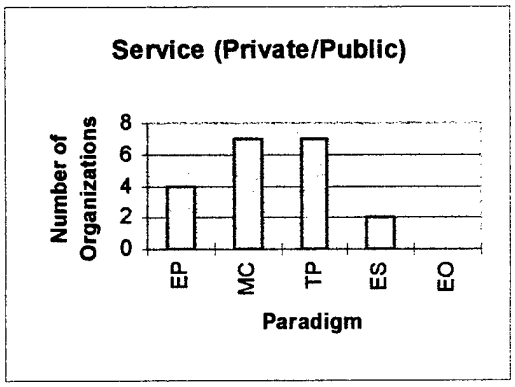
TABLE 5
CHI-SQUARED ANALYSIS OF PRODUCT (PRIVATE) VERSUS SERVICE (PRIVATE/PUBLIC)

	Chi-Squared Analysis	EP	MC	TP	ES	EO
Group 1	Observed	0	1	5	4	0
	Expected	1.33	2.67	4.00	2.00	0.00
	Chi-Squared Result	1.33	1.04	0.25	2.00	0.00
Group 2/3	Observed	4	2	3	1	0
	Expected	2.67	5.33	8.00	4.00	0.00
	Chi-Squared Result	0.67	0.52	0.13	1.00	0.00

Overall Chi-Squared Result: 6.94 P-Value: 0.0739 Degrees of Freedom: 3

TABLE 6
HISTOGRAM OF PRODUCT(PRIVATE) VERSUS SERVICE (PRIVATE/PUBLIC)





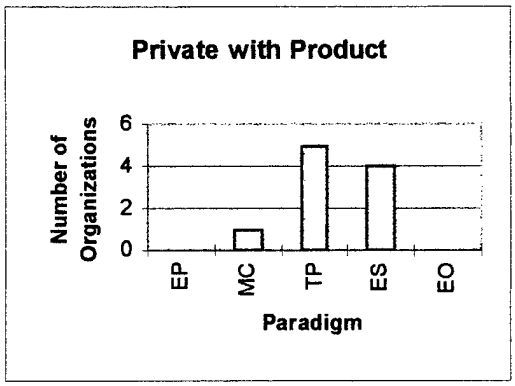
From the above results, it may be stated with suspect significance that there is a difference in paradigms between the product (private) sector and the service (private and public) organizations. The product (private) sector tends to move towards *Environmental Sustainment*. As a whole, the service arena moves towards the *Methodological Consideration* paradigm. It appears that the product (private) sector has a higher degree of environmental management than the service (private and public) sector.

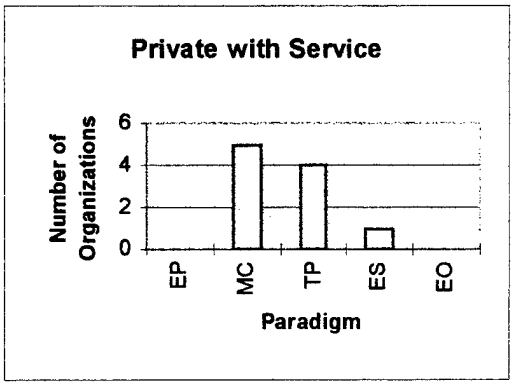
TABLE 7
CHI-SQUARED ANALYSIS OF PRIVATE WITH PRODUCT VERSUS PRIVATE WITH SERVICE

	Chi-Squared Analysis	EP	MC	TP	ES	EO
Group 1	Observed	0	1	5	4	0
	Expected	0.00	3.00	4.50	2.50	0.00
	Chi-Squared Result	0.00	1.33	0.06	0.90	0.00
Group 2	Observed	0	5	4	1	0
	Expected	0.00	3.00	4.50	2.50	0.00
	Chi-Squared Result	0.00	1.33	0.06	0.90	0.00

Overall Chi-Squared Result: 4.58 P-Value: 0.1014 Degrees of Freedom: 2

TABLE 8
HISTOGRAM OF PRIVATE WITH PRODUCT VERSUS PRIVATE WITH SERVICE





From the above results, it may be concluded that there is insufficient evidence when comparing the paradigms of private with product organizations with those of private with service companies. Although the private with product sector appears to have a more involved paradigm than the private with service sector, there is a tendency for both arenas to focus on *Total Production.* There is no clear determination whether or not producing a product or a service in the private sector influences ecological pursuits.

TABLE 9

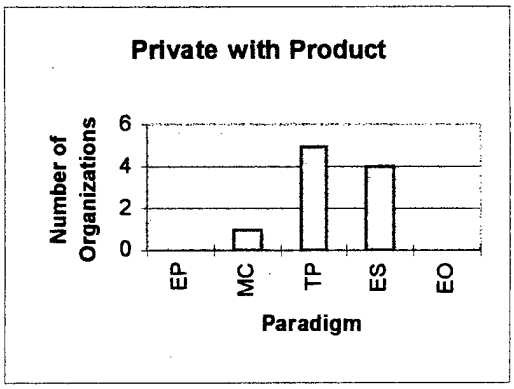
CHI-SQUARED ANALYSIS OF PRIVATE WITH PRODUCT VERSUS PUBLIC WITH SERVICE

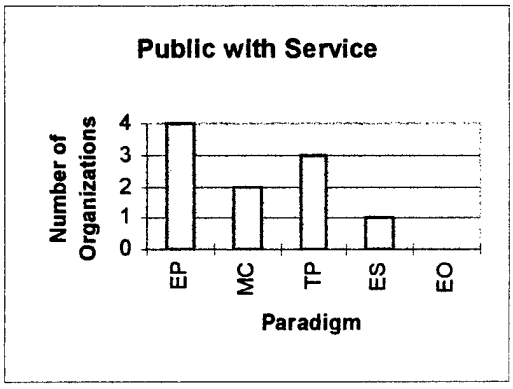
	Chi-Squared Analysis	EP	MC	TP	ES	EO
Group 1	Observed	0	1	5	4	0
	Expected	2.00	1.50	4.00	2.50	0.00
	Chi-Squared Result	2.00	0.17	0.25	0.90	0.00
Group 3	Observed	4	2	3	1	0
	Expected	2.00	1.50	4.00	2.50	0.00
	Chi-Squared Result	2.00	0.17	0.25	0.90	0.00

Overall Chi-Squared Result: 6.63 P-Value: 0.0845 Degrees of Freedom: 3

TABLE 10

HISTOGRAM OF PRIVATE WITH PRODUCT VERSUS PUBLIC WITH SERVICE





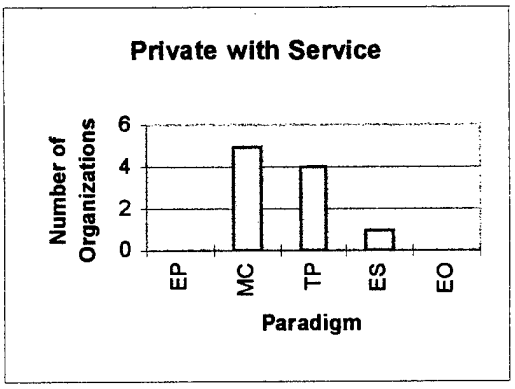
From the above results, there is suspect significance regarding a difference between private with product organizations and public with service organizations. The private with product arena progresses to more involved environmental perspectives with a heavy representation in the *Total Production* paradigm. The public with service arena moves towards *Economical Pursuance*. With a fair amount of confidence, it may be stated that private with product organizations have a more progressive environmental outlook.

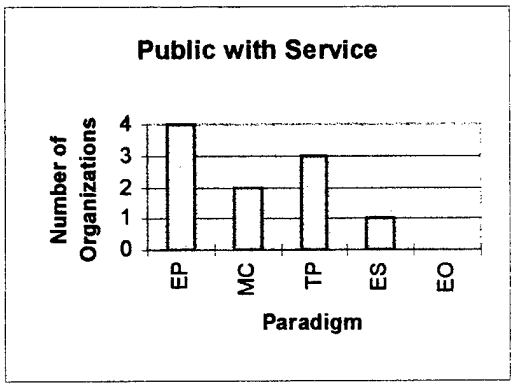
TABLE 11
CHI-SQUARED ANALYSIS OF PRIVATE WITH SERVICE VERSUS PUBLIC WITH SERVICE

	Chi-Squared Analysis	EP	MC	TP	ES	EO
Group 2	Observed	0	5	4	1	0
	Expected	2.00	3.50	3.50	1.00	0.00
	Chi-Squared Result	2.00	0.64	0.07	0.00	0.00
Group 3	Observed	4	2	3	1	0
	Expected	2.00	3.50	3.50	1.00	0.00
	Chi-Squared Result	2.00	0.64	0.07	0.00	0.00

Overall Chi-Squared Result: 5.43 P-Value: 0.1430 Degrees of Freedom: 3

TABLE 12
HISTOGRAM OF PRIVATE WITH SERVICE VERSUS PUBLIC WITH SERVICE





From the above results, there is insufficient evidence of a difference in paradigms between private and public organizations in the service arena. Although private with service companies tend to have a *Methodological Consideration* paradigm and public with service organizations are represented best by the *Economical Pursuance* paradigm, both implement lesser degrees of environmental involvement. With similar tendencies, there is not enough evidence to support a difference of paradigms in the service sector.

Summary

When the private with product, private with service, and public with service arenas are statistically analyzed together, there is a statistical significance that each classification has different environmental management paradigms. Furthermore, with statistical significance, it may be seen that there is a difference in paradigms between the private sector as a whole and the public with service arena. There is suspect significance when ascertaining if paradigms differ between product (private) producing companies and service (private and public) oriented organizations. There is also suspect significance when observing if private with product and public with service arenas may be linked to different paradigms. There is insufficient evidence of a difference in paradigms between private with product and private with service companies. There is also insufficient evidence that paradigms differ between private with service and public with service organizations. Insufficient evidence may be due to convenience sampling.

It is noteworthy to identify two outliers: PepsiCo and Duke Power. In the private with product sector, PepsiCo markets a product but may be considered to be a food service; thus, it does not have a product focus to the degree of the other organizations in the same classification. Duke Power, in the private with service sector, is a member of the Global Environmental Management Initiative (GEMI), which seeks "to promote a worldwide business ethic for environmental management performance" (Global Environmental Management Initiative, 1992). As a member of GEMI, Duke Power is encouraged to be a proactive environmental leader, resulting in the company's concern for ecology. Nonetheless, general conclusions may be drawn from the statistical results.

Chapter V: Conclusions and Recommendations

Introduction

After observing and analyzing the environmental management paradigms of thirty organizations, ten from each of three categories, conclusions and recommendations are drawn. Conclusions aim to develop a rationale for understanding fundamental or theoretical reasons for obtained results. Recommendations seek to give advice for conducting similar studies in the future. To reiterate, the purpose of this study is to determine if organizational classifications (private versus public and product versus service) are linked to ecological perspectives.

Overview

This portion of the thesis summarizes the findings of the study, explains possible constraints, and points the way to future research. The summary shows the results of the chi-squared analysis in determining organizational differences with respect to paradigms. Constraints show possible limitations of this study with regard to research and methodology. Guidance for future study presents recommendations to improve validity and topics that build on this thesis.

Conclusions

There are two sets of conclusions that may be drawn regarding a difference in environmental management paradigms among organizational classifications. The first

set of conclusions (Figure 38) examines a comparison between the private sector and the public sector. The second set of conclusions (Figure 39) presents a comparison between the product arena and the service arena. The following table shows the results of comparing private and public organizations.

Analysis	Conclusion
Private with Product/Service versus Public with Service	Group paradigms are significantly different
Private with Product versus Public with Service	Group paradigms are suspected to be different
Private with Service versus Public with Service	Not enough evidence exists to indicate a difference between groups

Figure 38. Private Versus Public Conclusions

When comparing the private sector as a whole to the public with service sector, there is statistical significance when stating that paradigms differ between organizations. The private sector tends to focus on *Total Production*, whereas the public with service sector leans towards *Economical Pursuance*. Therefore, it appears that private companies tend to be more environmentally proactive than public organizations. Such results may stem from the reasoning that private companies have a more direct influence over suppliers and outputs than public organizations who rely upon contractors to perform the majority of production work. The private sector has substantial interaction and control regarding the overall production process, providing the ability to control environmental standards of both inputs and outputs to a greater degree.

Comparing private with product companies versus public with service organizations, there is suspect significance of differing paradigms. The private with product arena centers on *Total Production* with many organizations leaning to *Environmental Sustainment*, while the public with service sector tends to move towards *Economical Pursuance*. Private with product corporations have direct managerial influence over environmental initiatives due to controlling inputs, processes, and outputs, making long-term planning of environmental impacts possible. Public with service organizations may exercise controls over processes, but outputs (such as national defense and public satisfaction) are often intangible and thus uncontrollable due to constantly changing political agendas.

Between the private with service arena and the public with service sector, there is insufficient evidence of paradigm differences. Private with service companies tend to have a *Methodological Consideration* paradigm, while public with service organizations have environmental perspective leaning towards *Economical Pursuance*. The paradigms are so close to one another on the environmental management continuum that a difference may not be reasonably inferred. In this case, when analyzing public and private organizations, differences may not be apparent because both classifications produce services.

Comparing product and service oriented organizations to one another, a new set of conclusions is drawn. The following table shows the results of determining whether there is a difference between organizations when comparing the product arena versus the service arena.

Analysis	Conclusion
Product (Private) versus Service (Private/Public)	Group paradigms are suspected to be different
Private with Product versus Private with Service	Not enough evidence exists to indicate a difference between groups
Private with Product versus Public with Service	Group paradigms are suspected to be different

Figure 39. Product Versus Service Conclusions

Observing product (private) organizations and service (private and public) organizations, there is suspect significance when concluding if organizations have different paradigms. The product (private) sector tends to move towards *Environmental Sustainment* in the development of environmental management. The service (private and public) sector aims towards *Methodological Consideration* in environmental directives. Product organizations have tangible outputs that come from processed ecological resources; such organizations have a direct influence on the environment. Service organizations have outputs that use ecological resources but have outputs that are intangible; thus, there is internal methodological control but not as much influence on outputs. As a result, product oriented companies are dependent on the environment to sustain operations while service organizations are reliant on ecology only to the degree which society thinks is necessary.

When comparing private with product versus private with service organizations, there is insufficient evidence when determining if there are differences in environmental

management paradigms. Although private with product corporations tend to pursue *Environmental Sustainment* and private with service organizations evidently operate according to *Methodological Consideration*, both have a central tendency of *Total Production*. One arena produces products and the other focuses on services; however, managerial control of the private sector allows organizations to have similar environmental perspectives.

Comparing private with product versus public with service organizations, there is suspect significance that there are differences between environmental management paradigms. Private with product corporations tend to seek *Environmental Sustainment*. Public with service organizations are at the other end of the spectrum in *Economical Pursuance*. There is a major difference between both classifications of organizations, but there is a suspect amount of confidence due to both the limited sampling size and the overlap of paradigms along the continuum. The primary difference is the percentage of organizations within each classification that focuses on the environment before performing any operations. Private with product organizations have a tendency to implement environmental initiatives before production while public with service organizations seem to consider the environment after establishing programs.

In general, it appears that private companies have a higher degree of environmental management paradigms than public organizations. Furthermore, it seems that product oriented corporations have a higher intensity of ecological concern than service oriented entities. Private companies have a greater control of internal agendas than do public companies because of managerial consolidation; there is a focus on the

corporation -- to make financial profit. Product organizations are moving towards the realization that their existence is dependent on sustaining the environment, for products rely on raw materials and natural resources. The public sector has a very complex structure of management and a focus more so on satisfying people than on improving processes. The service arena is more dependent on people than on ecological resources for continued existence. As a result, private versus public and product versus service categorizations seem to influence environmental directives and paradigms.

Constraints

There are at least four evident constraints in this study. First, this thesis analyzes organizations of varying sizes according to the number of personnel. Some organizations are smaller and others are larger. The size of an organization often determines the number of operational levels and the ability to disseminate information. The complexity of an organization can influence paradigms due to difficulties when desiring to move in certain directions. Analyzing similarly proportional organizations would aid in understanding ecological involvement.

Second, public organizations are interconnected with one another and are thus given respective responsibilities. All public organizations work together to accomplish national productivity. Certain organizations in the public arena complement one another; this is evident in the Environmental Protection Agency's developing environmental management programs for both the Department of Energy and the Department of Transportation. Because such organizations work in conjunction, there is a complex

intertwined system of environmental management. It is not the primary responsibility of all facets of government to ensure environmental welfare. The Department of Labor does not initiate environmental programs due to the nature of its mission. However, the lack of environmental initiatives in one area may be compensated by actions in another area. Nonetheless, there are divisions such as the Department of Defense that have a drastic impact on the environment and whose actions are not complemented by other organizations. Certainly, the complicated and intricate matrix structure of the public arena makes environmental management a difficult task.

Third, constraints come when comparing organizations whose respective activities use varying amounts of both raw materials and natural resources. The nature of organizational processes, products, and services often determines the degree of environmental impacts and thus environmental initiatives. Production processes differ greatly between services as landfill companies and retailers, so comparing environmental paradigms can be either unfair or inaccurate.

Fourth, the development of both environmental reports and annual reports is different between the private and the public sectors. In the private sector, organizations who lead environmental efforts are those who produce reports to show their advanced methods. Organizations in the private sector develop reports on a voluntary basis, whereas public organizations create annual reports on a mandatory basis. Private companies are not accountable to the public and do not need to show their processes. Public organizations are responsible for society and need to make their methods publicly available. Thus, private reports tend to show ecological initiatives to a greater degree.

Recommendations

To build on this thesis, the several suggestions may be made. First, there could be the addition of more organizations for statistical validity. Analyzing ten conveniently selected organizations in each category can produce inaccurate results. Second, there should be a random selection of organizations if possible, whether or not annual reports are produced. This would remove the constraint of studying only private companies who develop environmental initiatives and would remove related biases. Third, for a more in-depth organizational study, there could be more classifications analyzed. Rather than using just private versus public and product versus service comparisons, there could be the inclusion of more divisions for a greater understanding of organizational perspectives on ecology. Finally, instead of using environmental reports, future studies could investigate actual EMSs to determine the actual processes involved when implementing environmental programs according to respective paradigms. Studying EMSs allows for an application-based approach where environmental paradigms will be based on actual meetings and investigated processes.

Future Research

When developing future studies, the following issues may be considered when building on this thesis effort. Developing organizational classifications for the purpose of random sampling would allow a clear distinction between organizations for advancing theoretical understanding of corporate behavior. Using a random selection of

organizations within classifications would possibly reduce bias. Another consideration is understanding how and why various organizations develop environmental management programs. Comprehending why ecological developments occur may reveal the basis of environmental paradigms. Finally, a cost-benefit analysis for environmental management between the private arena and the public sector would develop an understanding as to why certain organizations have certain paradigms. Cost-benefit analyses could observe political, economical, technological, legal, ecological, cultural, and societal factors.

Summary

This thesis determines that organizational classifications influence environment management paradigms. Private companies tend to have more extreme paradigms than public organizations. The product related sector tends to have more intense ecological perspectives than the service oriented arena. Organizational perception of environmental importance potentially influences the way it advances ecological practices.

Developing a categorical method of environmentally understanding organizations aids in understanding why certain organizations spearhead environmental initiatives and why others do not. There is universal legislation applicable to private, public, product, and service sectors when implementing environmental management. Perhaps a development of legislation and requirements that are specific to organizational types could be more beneficial for the environment as a whole as organizations work in cooperation rather than competing with one another. After all, environmental management paradigms are unique to each organization.

A proper understanding of environmental management paradigm differences in various types of organizations provides a defined framework for understanding the purpose of ecological initiatives. Environmental management paradigms develop a spectrum of thought to understand organizational perspectives on ecology. Environmental corporate responses show reactions to environmental legislature and societal pressures. Environmental management systems put theory into application. Understanding the development of environmental management prompts organizations to enhance ecological views and practices that move towards bettering the environment.

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Vita

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13. ABSTRACT *(Maximum 200 words)*

The extent of environmental management in organizations is largely determined by what paradigms are espoused with respect to maintaining both natural resources and raw materials. Environmental management paradigms possibly stem from whether an organization is private or public, producing a product or providing a service. However, no established methods exist for comparing organizations with regard to environmental management approaches and perspectives. The purpose of this thesis is to determine whether particular organizational classifications are linked to specific environmental management paradigms. This study incorporates several environmental management concepts to develop an analytical instrument for observing organizations. Environmental management paradigms provide a common spectrum of comparing organizations to one another. Environmental management systems provide a common basis on which to evaluate organizations. Environmental corporate responses identify environmental perspectives. The combination of paradigms, systems, and corporate responses results in the creation of a tool for analyzing organizations. After analyzing ten of each type of organization, it is found that private with product organizations appear to have the highest overall degree of environmental management, followed by the private with service arena and finally the public with service sector. Theoretical reasons for the results include: financial benefits, production control, long-term planning, and managerial cohesion.

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