

Fundamentals of Total Quality Leadership

Module 3: System of Profound Knowledge

Lesson 1: Systems

Instructor Information

Lesson Outline

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Lesson Objectives

By the end of this lesson the student will be able to:

- EO 3-1 Define system.
- EO 3-2 Explain the relationships among systems, subsystems, and processes.
- EO 3-3 Identify the elements of an extended system.
- EO 3-4 Explain the concepts of optimization/suboptimization.
- EO 3-5 Explain the importance of viewing an organization as a system.
- EO 3-6 Explain the importance of measures in the extended system.

Length of Instruction

This lesson takes approximately 2 hours

Methods of Instruction

Lecture and discussion

Instructor Information (continued)

Media Required

Overhead projector, screen, chartpack, and felt-tip pens

Videotape

None

Additional Readings

None

Fundamentals of
Total
Quality
Leadership

Module 3
System of Profound Knowledge
Lesson 1
Systems

Fundamentals of Total Quality Leadership (FTQL)

Module 3: System of Profound Knowledge

Lesson 1: Systems

In this lesson you will learn about the importance of viewing your organization as a system. The lesson builds on the importance of knowing your customers and focusing on process improvement.

Learning Objectives

At the end of this lesson the student will be able to:

- ◆ Define system
- ◆ Explain the relationship among systems, subsystems and processes
- ◆ Identify elements of an extended system
- ◆ Explain the concepts of optimization/suboptimization
- ◆ Explain the importance of viewing an organization as a system
- ◆ Explain the importance of measures in the extended system

Learning Objectives

By the end of this lesson the student will be able to:

◆ Define system

You will learn the importance of understanding what a system is and how to define it.

◆ Explain the relationships among systems, subsystems and processes

You will learn that systems are made up of subsystems and processes, and may themselves be subsystems of a larger system.

◆ Identify the elements of an extended system

You will learn the concept of the extended system and the importance of viewing the organization as part of the extended system.

◆ **Explain the concepts of optimization/suboptimization**

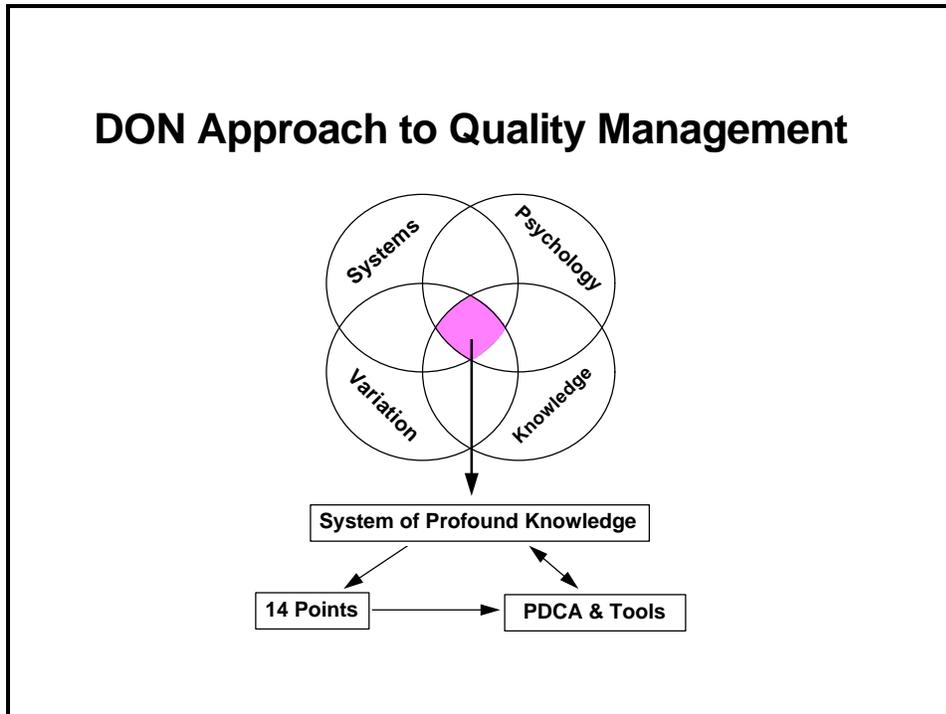
You will learn why it is important that everyone work to support the aims of the organization to avoid suboptimization. Optimization and suboptimization will be defined and related to the systems view.

◆ **Explain the importance of viewing an organization as a system**

You will learn the importance of viewing the organization as a system with an aim that is determined by management.

◆ **Explain the importance of measures in the extended system**

You will learn that establishing meaningful measures will enable you to gain knowledge of an extended system, minimizing the possibility of suboptimization, and optimizing improvement efforts.



DON Approach to Quality Management

Module 1 (DON Quality Approach) described why it was important for you to understand that while productivity can be improved in a variety of ways, the improvement we are talking about here is the result of improvement through a **new** approach to achieving quality management. A new approach requires new knowledge.

DON's quality management approach is made up of three elements - the System of Profound Knowledge, the Fourteen Points, and the PDCA cycle with process improvement tools.

Now let's look at one element: the System of Profound Knowledge.

Instructor Direction: Point to **System of Profound Knowledge** on the viewgraph.

The application of the System of Profound Knowledge provides **knowledge that leads to understanding** of how to improve quality. The use of such knowledge will result in better products and processes.

When Deming spoke of quality, he repeatedly used the phrase, "**There is no substitute for knowledge.**" By this he meant a System of Profound Knowledge. It is important to note the word system. Profound knowledge is a **system**.

 **Instructor Direction:** On the viewgraph, point to the four parts that make up the **System of Profound Knowledge** and then point to the intersection of the four parts.

The System of Profound Knowledge is made up of four interrelated parts: **Systems, Psychology, Variation, and Knowledge** .

The four parts cannot be separated. They are interdependent. Together they form a **system**. You cannot focus on one or two parts and neglect the others.

 **Instructor Direction:** It might be helpful to draw other versions of the four overlapping circles on the easel and pad:

- Once showing the circles not touching or barely touching,
- Once showing the circles similarly intersected as on the viewgraph,
- Once showing a greater overlap to represent the continuous growth of knowledge of all four parts of the System of Profound Knowledge.

Point out that as people learn more about each part and how it interrelates with the other parts, the center area grows larger, which shows that their understanding of profound knowledge is increasing.

The order of presenting the four parts of the System of Profound Knowledge does not imply a ranking of importance. The four parts form a system. Each is important and necessary.

What is required is a **basic understanding** of each of the four parts and how they interact as a system. With increased knowledge, the intersection of the four parts grows.

What is a System?

- ◆ Collection of interacting parts functioning as a whole
- ◆ Collection of subsystems that support the larger system
- ◆ Collection of processes oriented toward a common goal
- ◆ The organization as a system

What is a System?

One part of profound knowledge comes from systems theory. You don't have to become an expert on systems theory, but you do need to learn how to look at organizations as systems.

★ **Additional Information:** "A leader understands the meaning of a system and how the work of the group is to support these aims." (Deming, Some Attributes of a Leader, December 1989)

Myron Tribus, former Director of the Center for Advanced Engineering Study, Massachusetts Institute of Technology, supports Deming's ideas about taking a systems approach to quality leadership. He writes in his paper, Deming's Redefinition of Management, "The manager should be able to articulate the purpose of the system or systems being managed, and therefore be able to tell what constitutes improvement." (Tribus, 1983)

◆ **Collection of interacting parts functioning as a whole**

What is a system? A system may be defined as a collection of parts that interact with each other to function as a whole. They work together to try to accomplish the aim of the system. **A system must have an aim** . Without an aim, there is no system. Everyone in the organization must have a clear understanding of the aim. (Deming, 1993)

A familiar example of a system and subsystems is the human body. It is a marvelous collection of parts that **interact** with each other to promote the health and well-being of an individual. When the performance of any part starts to degrade or fails outright, the overall effect on the human body system can be disastrous, resulting in a handicap, illness, or death. Some parts are more important to the individual than others (heart vs. leg), but they are all necessary for the effective performance of the body as a system.

★ **Additional Example:** Another example of a system is an orchestra. The musicians, as parts, are there to support each other in order to promote the whole; that is, the performance of the orchestra as a system. (Deming, 1986)

◆ **Collection of subsystems that support the larger system**

A subsystem is a secondary or subordinate system. Within the human body, we may think of respiration and circulation as subsystems or parts that support the existence of a larger system. When the human body is at peak health and all the subsystems or parts are functioning as designed, it is said to be at its **optimal** condition.

★ **Additional Examples :** Examples of subsystems are:

- Automobile cooling systems
- Sanitation departments
- The DON field activities, supply systems, and acquisition systems

◆ Collection of processes oriented toward a common aim

Systems and subsystems are made up of many processes oriented toward a common aim.

☺ Discussion Questions:

1. Who do you think is responsible for seeing that all the processes in an organization are oriented toward a common aim?

- *Leaders and managers*

2. Why?

- *The implication for the leader of an organization is to start looking at the organization as a system made up of a variety of functions (Engineering, Weapons, Operations, Supply, Administration, etc.) and activities (behaviors - individual and group) that must work together for the good of the organization and the customer.*
- *Leaders and managers are in a position to know how decisions made in one area may affect other areas in the organization.*
- *Decisions that affect any department or function within an organization must be evaluated in terms of their effects on other departments or functions as well as the system itself -- the entire organization.*

◆ The organization as a system

In an effective organization, all functions and activities work together to support the aims of the entire system -- the organization. Often there are conflicts of interest across functions or activities. Departments, which are subsystems within the larger organizational system, lose sight of their supporting role. They waste valuable resources supporting their departmental aims at the expense of the larger system -- the organization. The aims of the system must be determined by management and understood by everyone working in the organization. People can do their work more effectively if they understand what the organization is trying to accomplish.

In the Rummler and Brache (January 1991) article, Managing the White Space, the authors talk about how the **critical interfaces** in an organization occur in the **white spaces** on an organizational chart. You only see this when you take a systems view of the organization. A systems view requires managers to know how the parts of the organization link together for best performance to achieve the aim of the system.

 **Instructor Direction:** The article, Managing the White Space by Rummler and Brache should have been assigned reading for Module 2 so the students should have a clear idea of the cross-functional nature of organizational processes. If the article was not assigned prior to this lesson, omit the following discussion questions, but review the main points of the article with the class. This can be done using the discussion questions and expected answers.

 **Discussion Questions:**

1. In the article you read, Managing the White Space, what do you think the authors mean when they say that managers do not understand their business?

Managers don't have a systems view of their organizations which means knowing how all the parts link together, such as suppliers, the entire production process, their customers, and their employees.

2. **What is meant by the vertical view of an organization?**

- *The vertical view shows all the departments within an organization are managed as if they were independent.*
- *The organization has a traditional hierarchical structure.*
- *Shows reporting relationships.*
- *Shows chain of command.*
- *Managers of different functions compete.*
- **Silo management** - *where all decisions are forced upward.*

3. **What does the vertical view fail to communicate?**

- *This view doesn't show how the products or services are produced.*
- *It doesn't show the work flow.*
- *It doesn't show the customers.*

4. What is meant by the horizontal view of an organization?

- *The horizontal view shows the customer, the work flow, processes, products and services, and the internal customer-supplier relationships.*
- *It is a systems view of an organization and it contains the **white spaces** -- the area outside the boxes where the critical interfaces occur. These are the best areas for performance improvement, and the areas where managers above the second level should manage.*

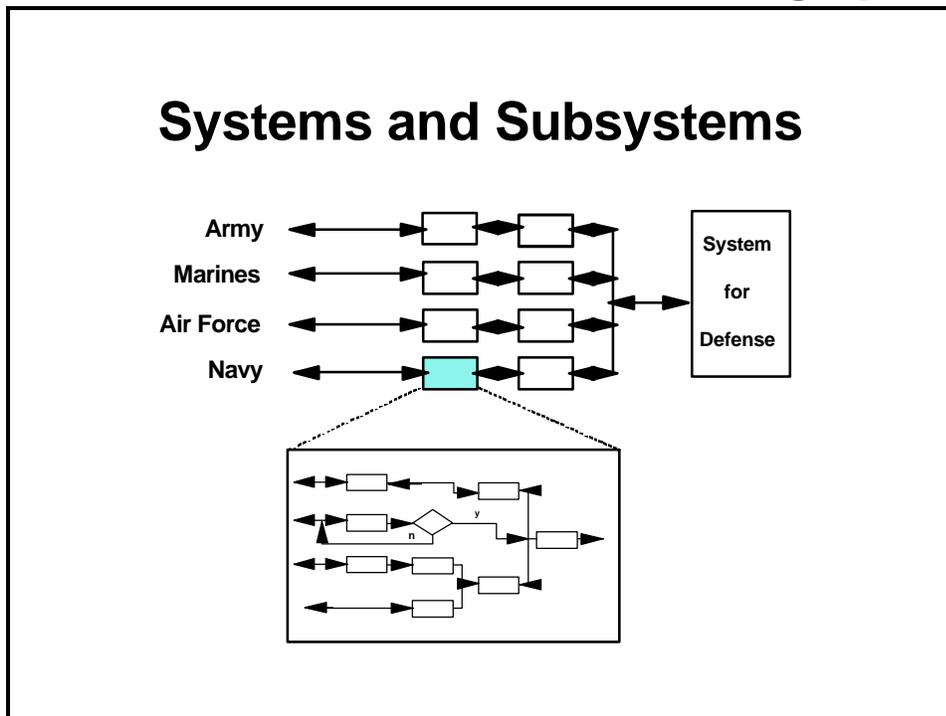
5. What is the significance of recognizing and organizing in accordance with process ownership?

- *Allows for the greatest contribution to a lasting process management,*
- *Helps to ensure permanence and continual improvement,*
- *A process owner bridges the **white space** and champions the process.*

★ **Additional Information** : Some characteristics of complex systems are:

- **Self-stabilizing** : Act to minimize disruptive effects of the environment.
- **Aim-seeking** : Appear to have purposes that are actively pursued.
- **Program following** : Able to carry out a sequence of steps and use feedback to decide when each step is completed.
- **Self-reprogramming**: Able to learn from errors and modify actions to avoid repeating them.
- **Anticipation** : Able to predict or foresee changes in the environment which aids the system in avoiding harmful changes.
- **Environment modifying** : Able to change the environment in an effort to make it easier to deal with.
- **Self-replicating** : Able to reproduce.
- **Self-maintaining and repairing** : Capable of revitalizing themselves and repairing damage.
- **Self-reorganizing** : Able to rearrange parts and change relationships among parts to meet new conditions or seek new aims.
- **Self-programming** : Able to create new goals to pursue.

(From Systems Thinking, a seminar presented to the DON ESG, June 1990)



Systems and Subsystems

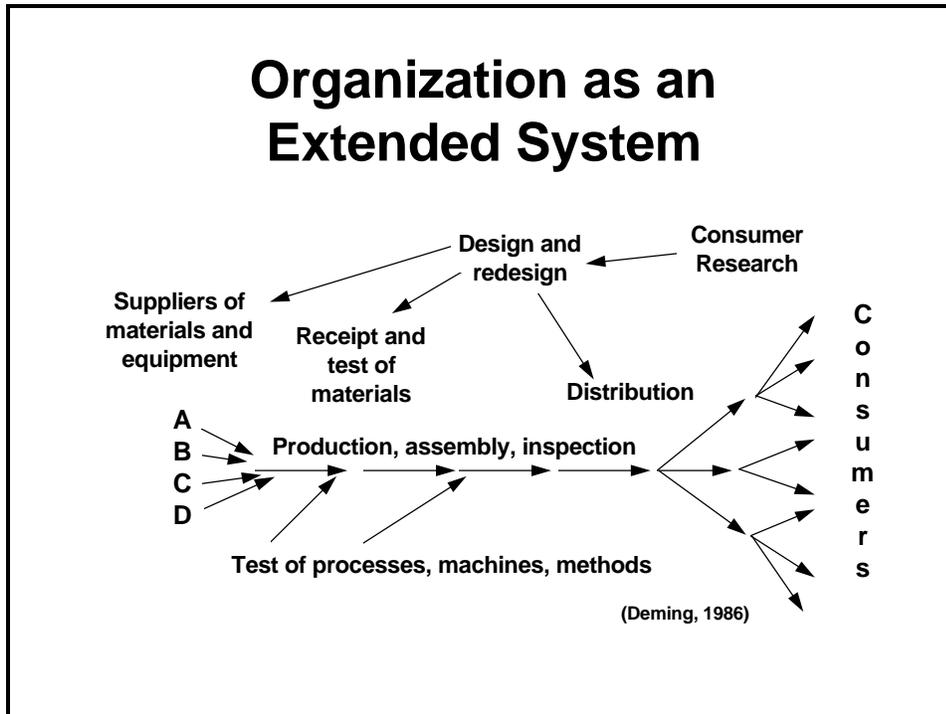
We first defined a system. A **subsystem** is a secondary or subordinate system. The parts that make up the whole are called subsystems.

Each system may, in turn, be a subsystem of a still larger whole. For example, an aircraft carrier or amphibious craft is a subsystem of the Pacific Fleet, which is a subsystem of the entire Fleet, which is a subsystem of the Department of the Navy, which is a subsystem of the Department of Defense, which is a subsystem of the Federal Government. From this perspective, we are able to see the needs and operations of each department in an organization (such as the Department of the Navy) as a part of the larger whole. *However, leaders and managers have not traditionally taken advantage of the systems approach as a way of doing business.*

While the Department of the Navy might operate as a set of subsystems, it also operates in the context of a larger system, the Department of Defense. It is important to understand this concept. Not having a systems view may negatively affect the outputs and outcomes of the whole. Often, we are so focused on our particular subsystem that we don't consider the context and the effect on the entire organization. Lack of a systems view can lead to suboptimization.

For example, a commanding officer who tries to improve the productivity of the organization by shifting resources away from job training and skill development toward new technology, without determining the effect on the organization, may be **suboptimizing** the system. Focusing purely on meeting a schedule may result in short-term gains but elicit long-term quality problems, such as more rework, increased costs, and dissatisfied end-users and employees. In other words, we may unintentionally suboptimize organizational aims by maximizing the aims of a subsystem.

However, in situations where the larger system does not participate in or promote the achievement of a subsystem aim (such as improving end-user satisfaction), that subsystem should still pursue the aim, as long as it does not interfere with or minimize the organizational aim. The subsystem aim could be pursued on a pilot basis. Data could be collected to figure out the success of the efforts. If the efforts are beneficial, the results could be used to justify continued or expanded efforts. If they are not beneficial, they could be eliminated without wasting any substantial organizational effort.



Organization as an Extended System

An organization includes not only the typical functions that operate inside a company (e.g., receipt of materials, production, assembly, inspection, distribution), but also includes **external** functions (suppliers and consumers).

Instructor Direction: Refer to the **Consumer Research** and **Consumers** on the right side of the viewgraph.

Managers must understand, "The consumer is the most important part of the production line." The consumer here refers to the end-user or customer. (Deming, 1986)

Learning to conduct consumer research helps to improve current products and to develop products that can have a market in the future.

No longer can poor materials be accepted from **external** suppliers. Organizations cannot produce quality products at a competitive price if their raw materials are of poor quality. Organizations must work with suppliers for mutual improvement.

 **Instructor Direction:** Refer to **Receipt and test of materials** , **Production, assembly, inspection** , and **Tests of processes, machines, methods, costs** in the middle of the viewgraph.

It is important to improve **internal** customer-supplier relationships among the various departments and subsystems within your organization. Managers must be concerned with the test and evaluation of processes that involve the production and assembly functions of the organization.

Most leaders think their responsibilities lie between **receipt** of materials and **distribution** of products or services. This is not true. An organization's responsibilities go beyond these internal functions or boundaries. Anything that happens anywhere in the system, whether internal or external to the organization, affects the entire system in some way -- either positively or negatively.

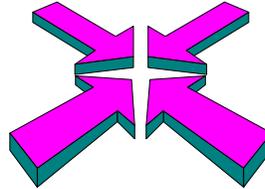
★ Additional Information: Top managers are the only members of the organization who can observe the behavior of the whole system and act on problems affecting it. Managers must be concerned with suppliers and customers, design and redesign of products and services, and constant test and evaluation of processes.

In Module 1(DON Quality Approach), a systems view of an organization (including the customers, the products and services and the work flow, and the suppliers) is represented by the three boxes that make up the TQL model. Organizations must be viewed as "open," going beyond the internal organization (middle box) to include suppliers and customers. We call this the **extended system**. All functions and activities associated with the extended system should work together with a common aim.

How does the extended system apply to the TQL definition? Look at purchasing as an example. Does this activity belong in one department only or does it cross departments? If we look at this process, we would see that purchasing actually does cross departments. It involves suppliers (both internal and external to the organization), activities within the organization, and customers (both internal and external to the organization).

Optimization of the Organization

- ◆ Occurs when the aims of the subsystems or parts support the aims of the organization
- ◆ May result in a delayed effect
- ◆ Must be managed



Optimization of the Organization

In thinking about an organization as a system, where all the subsystems are **interdependent**, you want the subsystems or parts to work together to **optimize** the entire system. **Optimize** means to make as perfect or effective as possible. For an organization, optimize means to make the entire organization as effective as possible in achieving its stated aims -- what the organization is trying to accomplish.

- ◆ Occurs when the aims of the subsystems or parts support the aims of the organization

Optimization occurs when the aims of the subsystems or parts **support** the aims of the organization.

Working to optimize the system means that **doing one's best** is good only if it supports the aims of the organization. People, at all levels in an organization, need to work together and see themselves as members of a team. If there are several people on a team, each pulling in a different direction, or trying to compete or win over other members, then the effectiveness of the organization will suffer. Which would you prefer, a team of champions or a championship team?

◆ **May result in a delayed effect**

Some changes to the system may have a delayed effect. For example, the immediate result of training would be increased costs. The effect of training may not be evident for months or years and difficult to measure.

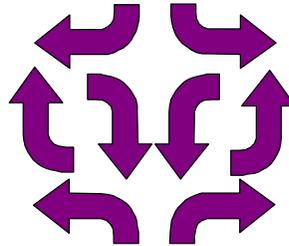
◆ **Must be managed**

Best efforts, hard work, or new technology will not automatically lead to optimization of the system without guidance and knowledge. For optimization to occur, a system must be managed. The larger the system, the more difficult it is to optimize. It is the responsibility of leadership to work toward the optimization of the organization over time. This will lead to improvement. Improvement requires prediction and flexibility to be ready to change the boundaries of a system to better serve its aims. A pilot makes changes in the course of the aircraft due to changes in wind, temperature, traffic, etc. Leaders must be able to anticipate the needs of the customers for new products and services.

Scherkenbach (1991) states that while we strive toward optimization, it can never be fully achieved. There is always one more factor or one more period of time that can be included. However, optimization of the organization should always be an aim.

Suboptimization of the Organization

- ◆ Occurs when the aims of the subsystems or parts do not support the aims of the organization
- ◆ Occurs when management fails to lead the organization as a system



Suboptimization of the Organization

When one or more subsystems or parts of an organization are maximized at the expense of the organization as a whole, the aims or goals of the organization cannot be achieved and the result is **suboptimization** .

- ◆ Occurs when the aims of the subsystems or parts do not support the aims of the organization

Suboptimization occurs for different reasons. If one department in an organization makes a change, that change might affect other departments. Tasks might change, budget resources might be altered, people might be reassigned, and so on. If a change occurs, a danger exists that another subsystem or part in the organization may be adversely affected or **suboptimized** .

For example, at the end of the fiscal year, sometimes we have to spend money quickly or we lose the money. Procurement rules sometimes prevent use of the money from one fiscal year to the next.

★ **Additional Example** : A \$5 billion cut in the military supply and parts budget was considered by Congress as a means of forcing the services to better control their spare parts inventory. However, cutting off funds for **new** spare parts and supplies would not solve the problem of current overstocked supplies and would adversely affect training and operations on new systems. It was reported that the reduction would cover a year's worth of aircraft and ship spare parts for the Department of the Navy and adversely affect both flying and steaming hours. (From Navy Times, 18 May, 1992)

◆ **Occurs when management fails to lead the organization as a system**

The overriding cause of suboptimization is the failure of top leadership and middle management to understand and lead the **total** organization as a **system**.

Decisions at all levels must be made while considering what is best for the entire organization. Leaders must consider the aim of the whole organization, and not just its individual subsystems. Such decision making requires both vertical and horizontal communication and cooperation throughout the organization.

For example, management of a research organization hires large numbers of support staff. The cost of increasing the support staff has a negative impact on the funds available for the organization's primary mission, that of research. This is an example of win-lose thinking, where one part of the organization, the support staff, increases at the expense of the other part, the research staff. This can have a negative impact on the organization as a system.

★ **Additional Example** : Focusing on meeting unrealistic milestones may result in short-term gains but create long-term problems through rework, increased costs, and unhappy personnel and customers. Again, this is an example of win-lose thinking and not having a systems view of the organization.

Conditions Leading to Suboptimization

- ◆ **A lack of organizational aims**
- ◆ **Improper recognition of people**
- ◆ **Ineffective organizational design**

Conditions Leading to Suboptimization

Suboptimization results from taking a narrow or short-term view instead of a broad (systems) view of an organization.

◆ **A lack of organizational aims**

To achieve organizational aims, leaders must consider the effects of decisions on the organization as a system for both the short-term and the long-term.

For example, a commanding officer may try to improve productivity by shifting resources away from areas such as training and equipment maintenance to buy new technology. Unless the commanding officer has carefully considered the impact that shifting resources has on organizational productivity, he or she may be suboptimizing the system instead of improving it. In this case, the new technology might be useless if no one knows how to use or maintain it.

◆ Improper recognition of people

Reward is often used as a substitute for leadership. There is a saying in the work place that, "you get what you reward." Behavior is controlled largely through reward systems. **What** is recognized is the key. Recognition can be based on individual performance or on team performance. If rewards are given for individual efforts, this can discourage teamwork and create win-lose situations. In performance appraisal systems, if people are rewarded for meeting standards or goals, that is what they will do. If the goals of the departments are not aligned with the goals of the organization, suboptimization can occur.

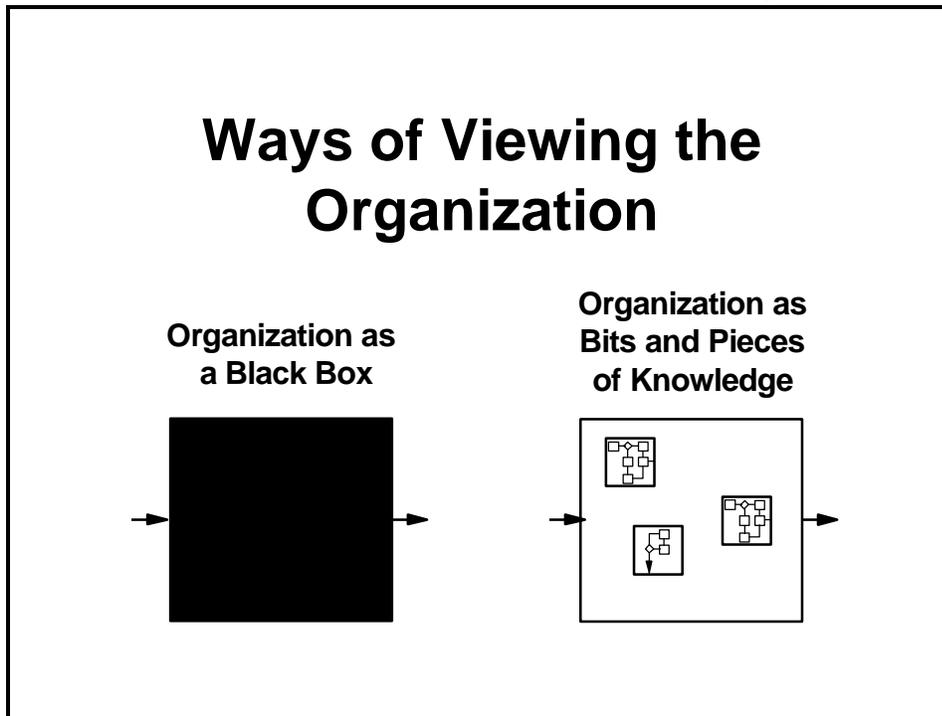
★ **Additional Example** : If you reward people for the number of forms they fill out, they will fill out great quantities of forms, even at the expense of quality.

◆ Ineffective organizational design

In the article Managing the White Space, **silos management** fosters suboptimization where each department is separated from the others and there is little cross-functional communication or cooperation. The design of the organization prevents it.

An organization structured around functions can operate effectively if close communication is maintained throughout the organization. Close communication means **cooperative** efforts toward achieving the aims of the organization.

Sometimes, department heads in the same organization have conflicting goals. A production supervisor may be given a goal to increase the output of overhauled rotor heads by ten percent. A percentage of the completed rotor heads goes to the supply department for future issue. Meanwhile, the supply department warehouse manager has been told to maintain an inventory of 30 rotor heads, plus or minus five. If the warehouse manager exceeds the goal, they will incur the additional costs of handling and storing extra inventory. If the warehouse manager drops below the goal, they might not have enough stock on hand to meet requisition orders. In this example, the goals of the production supervisor and the warehouse manager are in conflict.



Ways of Viewing the Organization

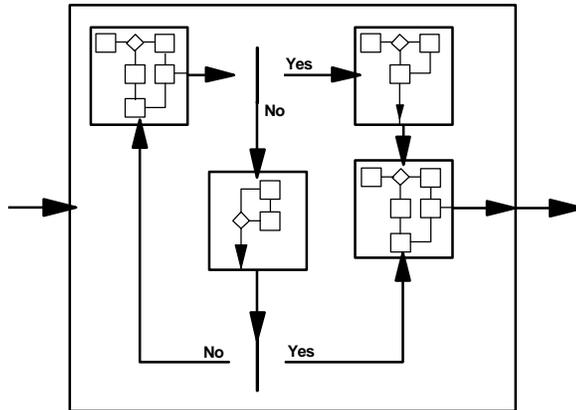
Organization as a Black Box

Organizations can't operate like a black box. An organization is not a container that has supplies going in one end and products or services coming out the other and only darkness inside the box. We must know all about what goes on inside the organization, the "who, what, when, where, why, and how" of the organization. We can't manage by only looking at results. Waiting to see the end of the year budget report to decide if you succeeded or failed is not an acceptable practice anymore.

Organization as Bits and Pieces of Knowledge

The same opportunity for suboptimization exists when we understand only subsets of the organization. Process improvement that leads to optimization can't be done in the black box mode, and it can't be done with bits and pieces of knowledge. Fragmented knowledge doesn't provide leaders with the understanding needed to lead process improvement efforts that will result in optimization.

The Organization as a System, Subsystems, and Processes



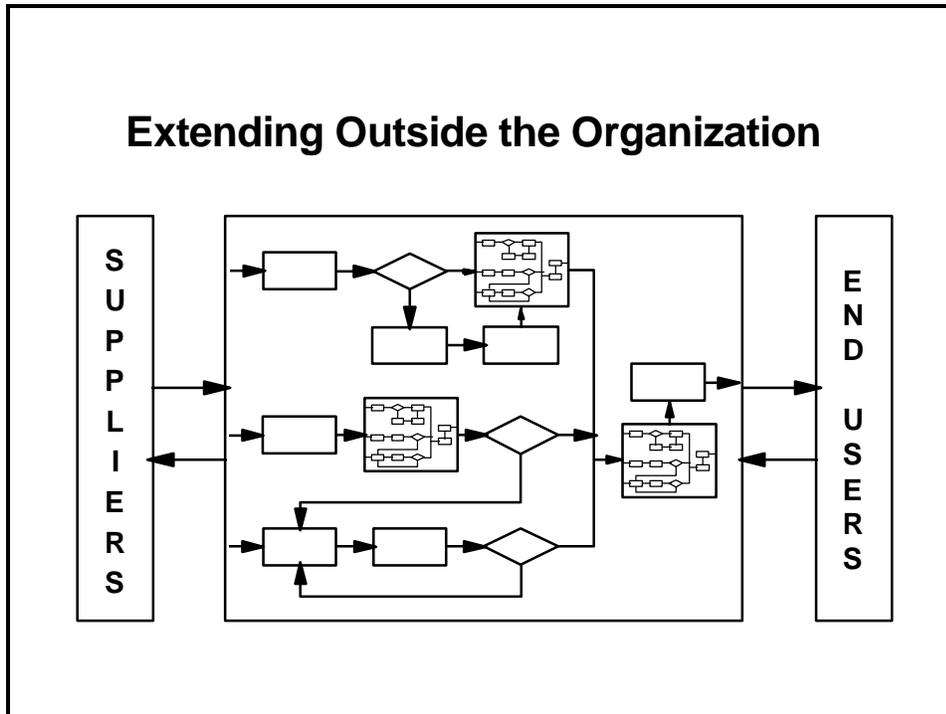
The Organization as a System, Subsystems, and Processes

TQL requires an emphasis on the importance of understanding and managing the organization as a system. A ship, an airplane, or a shore command could operate as a system itself. Each of these systems contains many subsystems that contribute to the effectiveness and the efficiency of operations. Subsystems of an organization such as an aircraft carrier might include fire control, antisubmarine warfare (ASW), fuel handling, and food preparation. Processes involved in food preparation, for instance, might include meal planning and dish washing. The interaction of these activities and their contributions to the product and service provided must be well understood before attempting process improvement.

Top leaders and managers cannot delegate the activity of understanding their system as a whole or as part of a larger system. They are the only members of the organization who are in positions that allow them to "observe" the behavior of the whole system and provide the guidance to improve it.

Leadership and management need to understand and manage the organization as a whole. It is vital to have a broad understanding of the sequence of activities and decisions needed to produce the products and services. *Top leaders and managers don't need to know every detail. What they need is a macro-level understanding*

to optimize the system. They need to understand the organization as a whole. This is a prerequisite for process improvement.



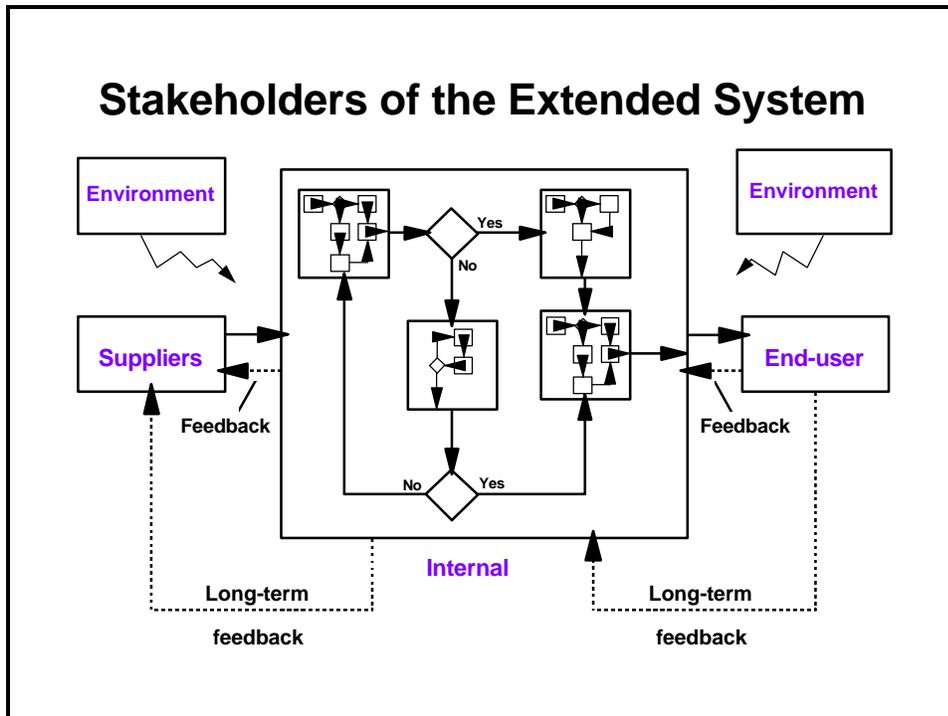
Extending Outside the Organization

Every service or product you produce in your organization is a result of many activities. These activities, when designed to be repeated, are processes. Generally, think of a process as a sequence or series of operations and decisions (steps, tasks, activities) that result in a specific output. The output may be a product such as a repaired airplane, or a service, such as delivering a part to an end-user. Because processes are activities, they are expressed using action verbs.

In other words, a **process** is a blending of several causes that work together to produce a desired effect. The production of an operationally ready aircraft (desired effect) requires the coordination of many variables -- machines, methods, materials, people and the environment. Thus one good representation of a process is the fish-bone diagram; depicting the cause and effect nature of a process. Improvement in processes comes from changing the causes of a process that produce a given product or service.

The best way to examine the steps in a process is with a flowchart. If a flowchart can't be drawn, the "process" probably isn't really a process.

Processes exist within processes. For example, obtaining a repairable part from supply is a process. The customer or requester in this situation cannot simply go to a shelf and pick out the part he or she needs. Someone must identify the part and fill out a requisition -- another process. A supply person must enter this information in a computer and determine if the part is available, and where it can be found -- yet another process. Finally, the customer receives the part or is told that it is not available.



Stakeholders of the Extended System

This viewgraph depicts the extended system for an organization, the end-users (customers), suppliers, internal customer-supplier relationships, and the environment the organization operates within. These are collectively known as **stakeholders**.

Stakeholders are defined as: **The groups and individuals inside or outside the organization who affect and are affected by the achievement of the organization’s mission, goals, and strategies.** It is important to realize that a systems approach to process improvement starts with knowledge of the organization's stakeholders.

Internal

Internal stakeholders are the people who work within the organization. Generally, they have three roles: customer of an internal supplier, processor of that input into some product or service, and supplier to another internal (or external) customer.

The extended system is a framework for TQL because it emphasizes a wider view of the role of leadership and management that includes the interaction between the organization and its environment. The extended system includes feedback loops and requires communication among all parts.

End-user

End-users are one type of stakeholder. End-users are defined as those who actually use whatever is produced or provided by the organization.

Process improvements have to be aimed at satisfying the end-user. The DON has identified the Sailor and Marine as the end-user. Organizations need to develop products and services that the end-users (or their sponsors) will buy. This means the needs and requirements of ALL stakeholders, not just end-users, must be identified if the organization wants to provide end-user satisfaction at a price that the end-user (or their sponsors) will be willing to pay.

Studying customer needs is the only way that the organization can anticipate what will be bought in the future. Once organizations can anticipate, they can plan. Planning is essential to direct and synchronize the efforts needed to provide end-user satisfaction. Fostering and supporting process improvement activities without studying customer needs might lead to efficient production of products or services that have no market.

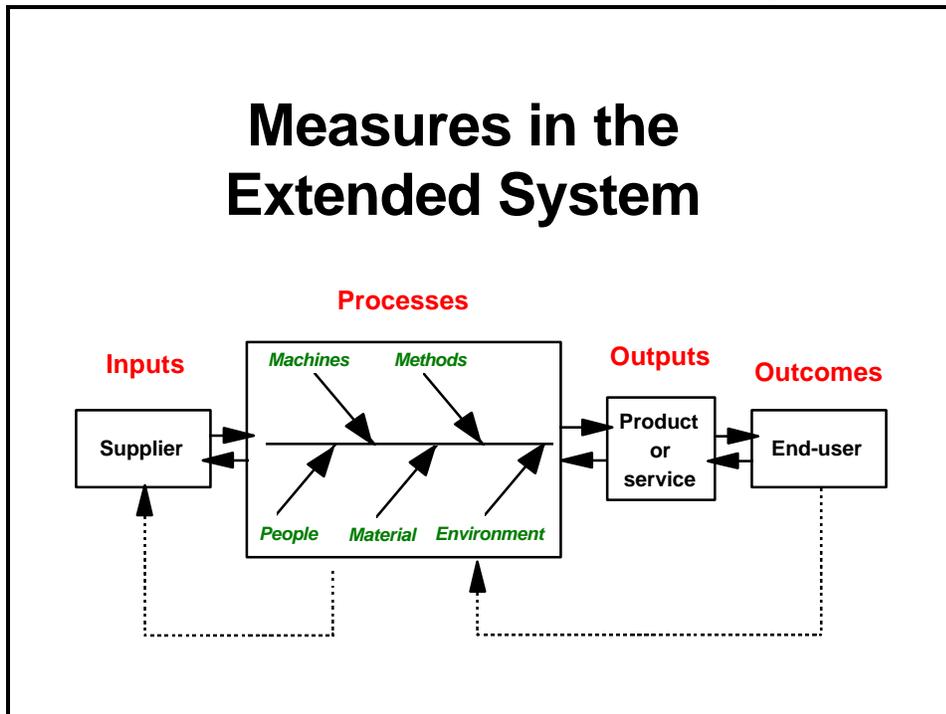
Suppliers

Another type of stakeholder is the supplier. These are people or organizations that provide a product or service to our organization. The supplies become the inputs to our processes, and may be in the form of raw materials, equipment and machinery, personnel, regulations or procedures, or even utilities.

Organizations need to seek a long-term relationship with suppliers. Also important is the reduction in the number of suppliers for any given product or service. *More suppliers mean greater variation in input performance.* So, the top leaders and managers of the organization need to understand and manage the entire system, from end-users through the organization to suppliers.

Environment

The environment refers to those circumstances and conditions that interact with and affect an organization. These can include economic, political, cultural, and physical conditions inside or outside the boundaries of the organization.



Measures in the Extended System

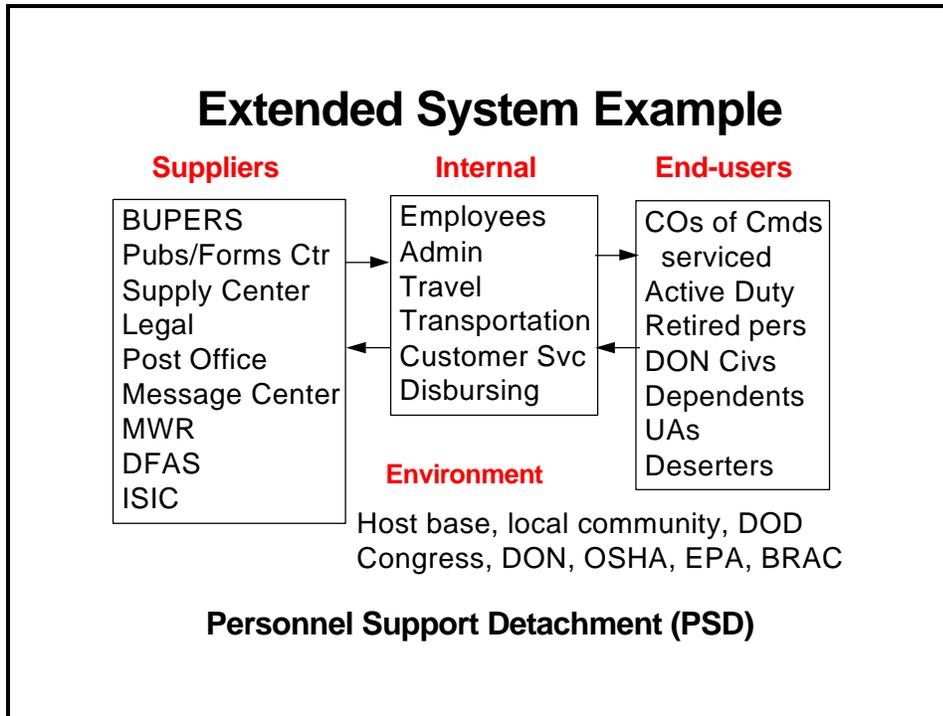
This viewgraph shows another way of depicting the systems view of the organization. Four major opportunities to gather performance measures in this perspective are: outcomes, outputs, processes, and inputs.

Unlike the traditional approach, which begins with **inputs** (materials or information used to produce a product or service), the total quality orientation begins with identifying **outcomes** in terms of end-user requirements and communicating them to the organization. We always start on the right and work backwards. The end-user is viewed as the most important element in this model. **Outcomes** are the way the end-user responds to the product or service. How satisfied are they? How willing are they to tell others about the products and services they receive? How likely are they to continue to be an end-user? So, it is important to develop not only a way to identify end-user needs, but also a way to assess how well end-user needs are being satisfied. Assessment of end-user needs considers not only present performance, but also what needs to be done to ensure satisfaction in the future. This requires the application of consumer research to identify future requirements. Outcomes, because they are descriptive, include an adjective or adverb (e.g., timely, useful, accurate).

The organization, in turn, must translate its end-users' needs into those qualities they produce in their products and services. The organization must find a way to describe and define their **outputs** (the products or services produced by processes) so they can be measured. Outputs should also include an adjective or adverb as they are descriptions of quality we desire to measure (e.g., available, on time, properly fitted).

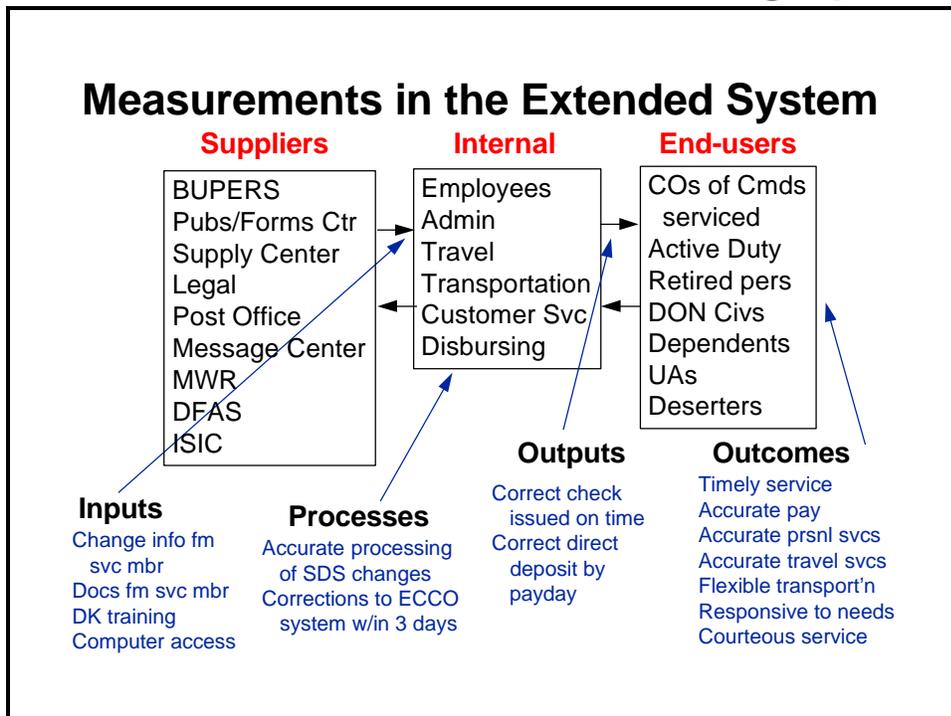
The **process** is what the organization does to produce the output. Improvement occurs by identifying improvement opportunities in the processes that are identified as most critical to the resultant quality in outputs and outcomes. As we said earlier, processes are expressed in terms of action verbs (e.g., sort, prepare, transport, calibrate).

The inputs to our processes also provide an important measurement opportunity. Inputs include such things as materials, human resources, utilities, funding, information and equipment. If you want "quality" inputs, it will again be necessary to describe these qualities to suppliers. Again, use adjectives/adverbs to stipulate requirements (e.g., qualified, adequate, conforming).



Extended System Example

This viewgraph shows a Personnel Support Detachment (PSD) as the organization and its extended system. Some of the end-users are the commands serviced, retired personnel, dependents, and individual military personnel. Some of the suppliers are the Bureau of Naval Personnel (BUPERS), the Post Office, the Message Center, the Defense Finance and Accounting Service (DFAS) and the Immediate Superior In Command (ISIC). Other stakeholders include employees, the community, and any regulatory agencies. The environment in which the PSD operates includes external circumstances and conditions that interact with and affect the organization (e.g., sponsor, headquarters, customers, and suppliers).



Measurements in the Extended System

This viewgraph shows an example of a PSD and types of inputs, processes, outputs, and outcomes. Notice the types of measures that could be collected as inputs, processes, outputs, and outcomes. We must learn to think of using measurements to describe what has happened or is happening in a process, *why* we are getting those results, and how we can use this information to improve the process.

From the systems perspective we need to measure not only what occurs inside our organization, but also what information we can obtain from end-users, suppliers and other stakeholders. Typically, we tend to measure the final product or service -- this is our **output**. For example, in a supply center this might include things such as the number of units delivered, the condition of the shipment, and the length of time it took to reach the end-user. The end-user response or reaction to the product or service is the **outcome**. Outcomes are indicators of how well the product or service satisfied the end-users' needs.

★ **Additional Information:** In the viewgraph under **Processes**, **SDS** stands for Source Data System and **ECCO** for Error Correction and Control Online.

Process causal factors include how such things as machines, methods, material, and people interact to produce the organization's product or service. These are often overlooked as sources of measurement. Analyzing what occurs during the production and after the customer receives the product allow us to figure out how we can improve these processes.

Additionally, we must have measures of our **inputs**. We need to measure those aspects of our supplies and materials that will help us meet our end-users' requirements. For instance, we might measure the quality, cost, and delivery time of the raw materials.

Although the earlier discussion emphasized the importance of the process improvement approach, the realities of organizational life often dictate that outputs or products are most important to the end-user. End-users don't really care about process improvement as long as they get what they consider quality products at a reasonable price. **This suggests that both process improvement and product control may be used at the same time.** In the beginning, we can continue to try to control products to satisfy end-users. At the same time, we can try to improve the processes to reduce the need for product control.

Lesson Summary

- ◆ It is important for managers to view the organization as a system
- ◆ Everyone must work toward the aims of the organization to avoid suboptimization
- ◆ Boundaries of a system extend beyond the organization itself (customers, suppliers)

Lesson Summary

- ◆ It is important for managers to view the organization as a system

You learned elements of systems theory, one part of the System of Profound Knowledge. You learned that it is important for leaders and managers to see organizations as systems, where all the parts, subsystems, and processes need to work toward the aims of the organization.

- ◆ Everyone must work toward the aims of the organization to avoid suboptimization

You learned that to optimize the system everyone must contribute to improvement and work toward the aims or goals of the organization. Suboptimization of the system occurs when the focus is on personal aims or the subsystems at the expense of the organization aims.

◆ **Boundaries of a system extend beyond the organization itself (customers, suppliers)**

You learned the boundaries of the organization's system extend beyond the internal functions to include customers and suppliers -- the extended system. It means every element of the system must be considered on the basis of its contribution to the aims of the organization.