Enterprise Engineering

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Overview

- Define enterprise engineering
- Describe types of enterprises
- Describe the enterprise design methodology
- Describe the intellectual developed that have contributed to modern thought on enterprise engineering
- Describe the requisite knowledge and skills for enterprise engineering
- Describe the dynamic environment enterprise operate in
Enterprise Systems

- We use the term ‘enterprise’ because it encompasses all types of enterprises; moreover, we later use the term organization to discuss a single view of the enterprise.
An enterprise is a complex, socio-technical system that comprises interdependent resources of people, information, and technology that must interact with each other and their environment in support of a common mission.

- *Interactions* important to behavior - include such activities as coordination of functions, sharing of information, and allocation of resources.
- *socio-technical system* - it involves people and technology.
- *open system* - it interacts with its environment.
- *purposeful* - it has goals that it works towards accomplishing.
Common Characteristics

- All enterprises are systems, where a system is an integrated collection of components (people and technology).

- All enterprises use resources, an important resource class is the people employed by the enterprise.

- All enterprises produce a product, provide a service, or do both.

- All enterprises have customers who receive the benefits of the product or service.
Enterprise Engineering

The body of knowledge, principles, and practices to design an enterprise

- Enterprises are not designed just once – they are continuously being designed
How Enterprise are designed

- Enterprises have existed for millennium
- To a large extent the enterprise was not viewed as a whole system that could be designed
- Ad hoc, short-term, local design
- Ernst & Young study found that many companies have processes that were designed long before the advent of IT
Enterprise Engineer

- Business Systems Analyst (Business Analyst, System Analyst, and Process Analyst)
- Enterprise Architect
- System Architect
- Project Manager
- System Designer
- Change Manager
- System Engineer
- Application Developer (web application developer, Java developer, ERP developer, etc.)
Enterprise Life-cycle

1. System identification – The system boundaries, purpose, and project scope are defined. The system strategy is identified.

2. Analysis – The system problems are analyzed, requirements are generated.

3. Design – The system design is generated.

4. Construction – The system is built.

5. Implementation – The system is implemented and deployed into its environment.

6. Operation and Maintenance – The system is operated and maintained.

7. Decommission – The system is retired.
Enterprise Design Method

- Problem Solving consists of three activities
  - Scope Problem
  - Generate Solution
  - Test Solution

- Not necessarily iterative; as you scope you’re thinking about solutions, etc.
- Related to Plan, Do, Check, Act.
Enterprise Architecture

- An architecture provides a holistic design of the enterprise with which all enterprise projects must conform.

- Guarantee’s design consistency towards the enterprise goals.
Enterprise Engineering Projects

- Strategy-initiated Project
- Subsystem Design
- Reengineering or other large-scale transformation projects
- Enterprise Information System
- Continuous improvement
- Supply chain project
Enterprise Environment

Understanding the rapidly changing environment enterprises operate in

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Enterprise Environment

- Enterprises are open systems, which means they interact with their environment
  - Must understand enterprise in the context of its environment
- Competitive, dynamic, and global environmental
Closed versus Open Perspective

Too often we think about, analyze, and design enterprises as if they stand alone.

When in fact, we need to consider the external environment (labor, capital, competitors, regulatory, natural).
Trends towards Globalization

- trends are:
  - Fast, easy movement of people, knowledge, and technology
  - Cheap, ubiquitous telecommunications, mobile devices, and pervasive computing
  - Global competition
  - Demanding customers requiring competition on price, quality, features/performance, and speed
  - Increasing cost of natural resources and their greater scarcity
Globalization

- The removal of barriers to the world-wide flow of materials, information, people, and knowledge

- Products & Services are no longer confined by geography or culture
GLOBALIZATION ÜBER ALLES!

The FTAA.
Here's how our benevolent lords and masters envision it...

by derf

Prescription Drug Outlet
Bill Gates
More Liberals
Disney
Your Former Job
 bowed

Home Depot Lumber Yard
Mahogany Bedroom Sets
Whoppers and Big Macs

Globalization
Factory Workers
Gun nuts
Cooperative
Factory Voter
Cooperative
Cold

Easily Duped
Southern Voters
Our ATM

Fur City, cloak shack
You can think of the world
as good and right with the

Fur City, cloak shack
You can think of the world
as good and right with the

Designated Roped Off FTA Protest Area
Falklands
New IRS HQ
New SEC HQ

Oil
Free Oil
Fast, Easy Movement of People

- First cross-country trip made by auto was in 1903 by Dr. Horatio Nelson Jackson – 63 days and $8,000.
  - No gas stations in 1903
  - Only 150 miles of paved roads
Fast, Easy Movement of People

- Transatlantic travel (or across any ocean) was done by ship – about 1 week

- In 1927 Charles Lindbergh succeeds in NY to Paris flight (33 hrs)
Fast, Easy Movement of People

- Commercial jet air-travel started with the Boeing 707 in 1959

- Nowadays, a business traveler can go from NY to Tokyo in a day on a Boeing 777
Cheap, ubiquitous communication

- No longer are phones stuck to the wall
- In third-world countries, cell phones are found everywhere
- Price has decreased, features have increased
Global competition

- Products compete globally
  - Few trade barriers (free trade)
  - Rapid, cheap, efficient logistics

- Telecom & Internet have made it possible to outsource services too
  - Call centers
  - IT & Software development
World Population

- Growth has been exponential & is uneven (dropping in Europe – Growing in Africa)

- In a world of limited resources there will be scarcity and higher prices
Scarce & Expensive Resources

- Resources are limited (metals, land, water, fuel)
- As demand increases then prices increase
- Greater consumption of meat, use of biofuel exaggerate the increase demand
Summary

- The world environment is changing rapidly
- Globalization is affecting all phases of life
- A problem in one part of the world now affects other parts of the world
- Enterprises must
  - Be designed to efficiently use resources (sustainability is growth area)
  - Be agile to quickly respond to environmental changes
    - Monitor their environment
  - Constantly improve
History of Enterprise Engineering

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Scientific Management

- Application of the scientific method to management
- Primary goal efficiency of resources
- The work is systematically analyzed (time studies) it is broken down into its miniscule operations, each operate is assigned to a separate worker, and an elaborate set of procedures is generated to regulate each operation
Scientific Management Principles

- Division of labor
- Time studies
- Functional supervision
- Standardization of tools
- Standardization of work methods
- Separate planning the work from doing the work
- Management by exception principle
- Instruction cards for workmen
- Differential rate or pay for performance
- A routing system
- Modern costing system
Humanist School of Management

- Shifts focus from processes to the people --
  A reaction to Scientific Management that views man mechanistically (as a machine)

Maslow's Hierarchy of Needs is shown above. The pyramid illustrates the five levels of human needs. The most basic are physiological and safety/security, shown at the base of the pyramid. As one moves to higher levels of the pyramid, the needs become more complex.
General Systems Theory

- Argues that all systems share common properties
- Systems must be studied holistically
- You cannot break system into its constituent parts, study the parts, and then understand the behavior of the system
Summary

- Brief overview of three intellectual developments that contributed strongly to enterprise engineering.
- The concepts of the human relations school did not replace the earlier scientific management school, nor has the more recent systems thinking school replaced the human relations school.
- The older ideas are not abandoned by incorporated into the new ideas.