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Lecture 4
Case Examples of Epoch Shifts and Their Impact

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It is 1981, the U.S. seeks air superiority over the Soviet Union. The current solution, F-15, had major reliability/maintainability issues. A new, far superior fighter was desired that would be easier, cheaper, superior.
It is 1991, the Soviet Union collapses. Desert Storm and Kosovo add to the argument for general air superiority. The F-22 reaches production, and few question the program continuing.
New Threats

It is 2007, threats no longer come from the air. UAVs rise to prominence as a very inexpensive alternative to combat aircraft. The F-22 program “truncated.”

- Easy to fly
- $
Outline

• Single epoch shift construct
• Illustrate examples of epoch shifts across a variety of system types and epoch categories
  – Disruptive change in “context” or “needs” that affect system “success”
Basic Epoch Shift Construct

System Definition

Baseline Epoch → New Epoch

Response → Effect

Success?
“Finger-lickin’ Good”
Setting the Stage

Context
“fried” food = negative connotation

Past Epoch
02-21-1991 Peter O. Keegan (). "KFC shuns ‘fried’ image with new name – Kentucky Fried Chicken has changed its name to KFC". Nation's Restaurant News. http://findarticles.com/p/articles/mi_m3190/is_n8_v25/ai_10403447/.

Baseline Epoch
The Kentucky Fried Chicken Brand and Image

The “System”:
The “System”:
The “System”:
The “System”:
The Kentucky Fried Chicken Brand and Image

Baseline Epoch:
A market that is looking for comfort food

Past response:
Changed name from “Kentucky Fried Chicken” to “KFC” to diversify image

Current response:
Develop new brand image playing up “Southern Cooking”, resurrecting old name, mixed branding depending on market
Epoch Change!

Baseline Epoch

Context
Desire for comfort food

New Epoch

Context
Health conscious!

The “System”:
The Kentucky Fried Chicken Brand and Image

New Epoch:
Health conscious customer base

Response:
“Kentucky Grilled Chicken” introduced

Success?
CEO David Novak called the launch the most successful in KFC’s history and now accounts for 40% of KFC’s chicken-on-the-bone sales

Images from: www.kfc.com


New York Transportation at Turn of the Century
Setting the Stage

Context
Horse-based transit pollution problems

Baseline Epoch:
100k-200k horses in late 1800s to early 1900s
22 lbs manure, 1 qt urine /day/horse = 3-4 million lbs/day


Dilemma of the day:
Fear of death from flies related to horse manure and carcasses (est. 20,000 deaths/yr in 1908)


“In 1894, the Times of London estimated that every street in [New York] city would be buried 9 feet deep in horse manure by 1950.”

The “System”: NYC urban transportation infrastructure

Baseline Epoch: Horse-drawn vehicles principal mode; major health concerns

Current response: Add-hoc horse waste and body clean-up;
baseline epoch

context

horse-based transit pollution problems

100k-200k horses in late 1800s to early 1900s
22 lbs manure, 1 qt urine /day/horse = 3-4 million lbs/day


new epoch

context

the automobile (1920s)


the “system”:

NYC urban transportation infrastructure

new epoch:

availability of the automobile

response:

NYC embraces the auto, reconfigures roads, develops traffic codes

success?

At least in the short term, the city avoided being buried in manure; created host of new problems
“Full-Cost” Accounting at NASA
Setting the Stage

Context
Salary allocated from “pools”, freedom to pursue “experimental” side projects

Baseline Epoch

The “System”: NASA innovation stream
Baseline Epoch: Salaries allocated separately from projects
Current response: Ad-hoc innovation possible, when scientists, engineers and technicians free to work collaboratively outside of main projects
Epoch Change!

Baseline Epoch

Context
Salary allocated from “pools”, freedom to pursue “experimental” side projects

The “System”: NASA innovation stream

New Epoch:
Implementation of “full cost” accounting

Effect:
All time allocated to projects, no side projects or “creative” time; managers beg for FTEs

Success?
Innovation is widely considered to have plummeted as a result, since projects don’t want to pay for “extra” work


Context
“Full cost” accounting

P.S. “full cost” accounting to be cancelled for FY11!

Helicopters in the Desert
Setting the Stage

Context
Intended mission contexts

Baseline Epoch

The “System”: UH-60 Sikorsky Blackhawk helicopter
Baseline Epoch: Urban, mountain, forest, jungle uses
Current response: Current design very effective

Photo: by Cherie A. Thurlby (DoD)
Epoch Change!

The “System”: UH-60 Sikorsky Blackhawk helicopter
New Epoch: Missions in desert, with sand like powder
Effect/Response: Major efficiency losses, damage to blades/engine; ad-hoc fixes eventually replaced by design modification
Success? The short term fix only delayed the problem, but kept helicopters in operation longer; design modification eliminates problem
Setting the Stage

**Context**
Minimal OJT; schools produce “usefully” trained workforce

11-05-08. What’s New in German Higher Education. Magazindeutschland.de.

**Baseline Epoch**

**The “System”:** German education system

**Baseline Epoch:** Close academia-industry ties result in job-specific training during education; strong job stability in workforce

**Current response:** Focused education system creating immediately “useful” students for the workforce
Epoch Change!

Baseline Epoch

Context
Minimal OJT; schools produce “usefully” trained workforce

The “System”:
German education system

New Epoch:
EU harmonization for education

Effect:
Long term: unknown; short term: industry and student concerns for adequately trained and appropriate workforce

Success?
Unknown. Remains to be seen, as diversity of economic types in Europe require different workforce types (e.g. liberal market economies vs. coordinated market economies)

Context
Employers and universities rail against the “half-engineers” that the 3-year bachelor system would produce; some bachelor students face curricula that call for 100 hours of work per week

11-05-08. What’s New in German Higher Education. Magazin-deutschland.de.
Developing the Ultimate Communication System
Setting the Stage

**Context**
Cold War

**Baseline Epoch**
Cold war, strategic need for secure, worldwide communications even in event of nuclear war

**The “System”:**
Milstar satellite system

**Current response:**
Extremely hardened, high power, expensive constellation of satellites; terminals; mission control

Banke J. Milstar Safely Arrives in Orbit Following Titan 4B Rocket Ride
Epoch Change!

Baseline Epoch

The “System”: Milstar satellite system
New Epoch: High bandwidth, tactical communication
Response: Upgraded ground stations and software; later: new payload, relaxed structural req’ts
Success? Yes, though still runs into bandwidth limitations; very expensive since based off of a very “hardened” design

Context
Cold War, must launch on STS

Source: USAF illustration
Banke J. Milstar Safely Arrives in Orbit Following Titan 4B Rocket Ride

Context
Post-cold war, no STS

Source: Space.com
Friedman M. First Lockheed Martin-Built Milstar Satellite Marks 15 Years On Orbit

Source: Army Logistician
Banke J. Milstar Safely Arrives in Orbit Following Titan 4B Rocket Ride
Other Examples
Public Transit Planning Dilemma

System Definition
Public transportation

Baseline Epoch
Low oil price; low demand

Response
New/upgraded system planning

Success?
Usually no; epochs often change faster than planning, budgeting, execution of public transit projects

New Epoch
High oil price; high demand

Effect
Overcrowding and wearing on public transit systems

Rise of environmentalism

System Definition
Coal power industry

Baseline Epoch
Lax pollution standards

Response
Retrofit with “scrubbers”; design new plants

Success?
Maybe; coal is still major source of energy in U.S. and abroad; “clean coal” efforts reduce emissions (>80 projects in U.S.)

New Epoch
“Clean Air Act” and other emissions reductions

Effect
Increases in cost of coal power; reduction in pollution
Class Examples

Do you have any examples of epoch shifts that disrupted your organization, business, or technology?
Summary

• Epoch shifts occur all of the time
• Definition of whether a disruption is an epoch shift is whether it is a change in “exogenous factors” that influence success
• Systems can succeed or fail across an epoch shift
  – Some require a “response”; some fair well even left alone
  – You will use these concepts in the next exercise