Complex Adaptive Systems and Quality Management:
Are They Compatible?

ASQ Section 1508

December 10, 2012

Basic Question

- **Increased interconnections and competition has caused us to use new metaphors to describe organizations**

    Mechanical ⟶ *Organic*

- **Will QM still work in organizations that are complex adaptive social systems?**

Frame of Reference

- **Mechanical systems are linear, have unidirectional cause & effect relationships, and are predictable**

- **Complex adaptive systems are nonlinear, have reciprocal causality, and are unpredictable**

What is a System?

Environment

| Suppliers | → Inputs → | PROCESS | → Outputs → | Customers |

Feedback
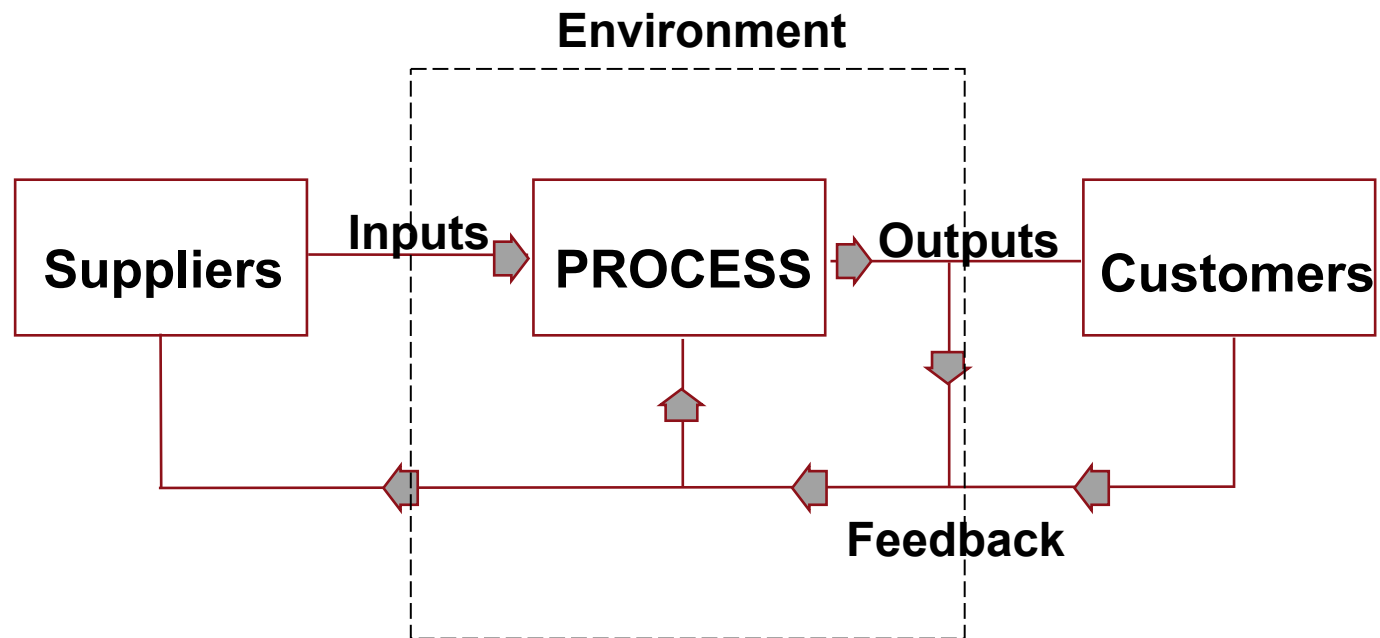
Changes in environment = society, technology, economics, etc.

Types of Systems

Number of Components

	Low	High
High	Simple	Complicated
Low	Chaotic	Complex

Predictability

Organizations as Complex Adaptive Social Systems
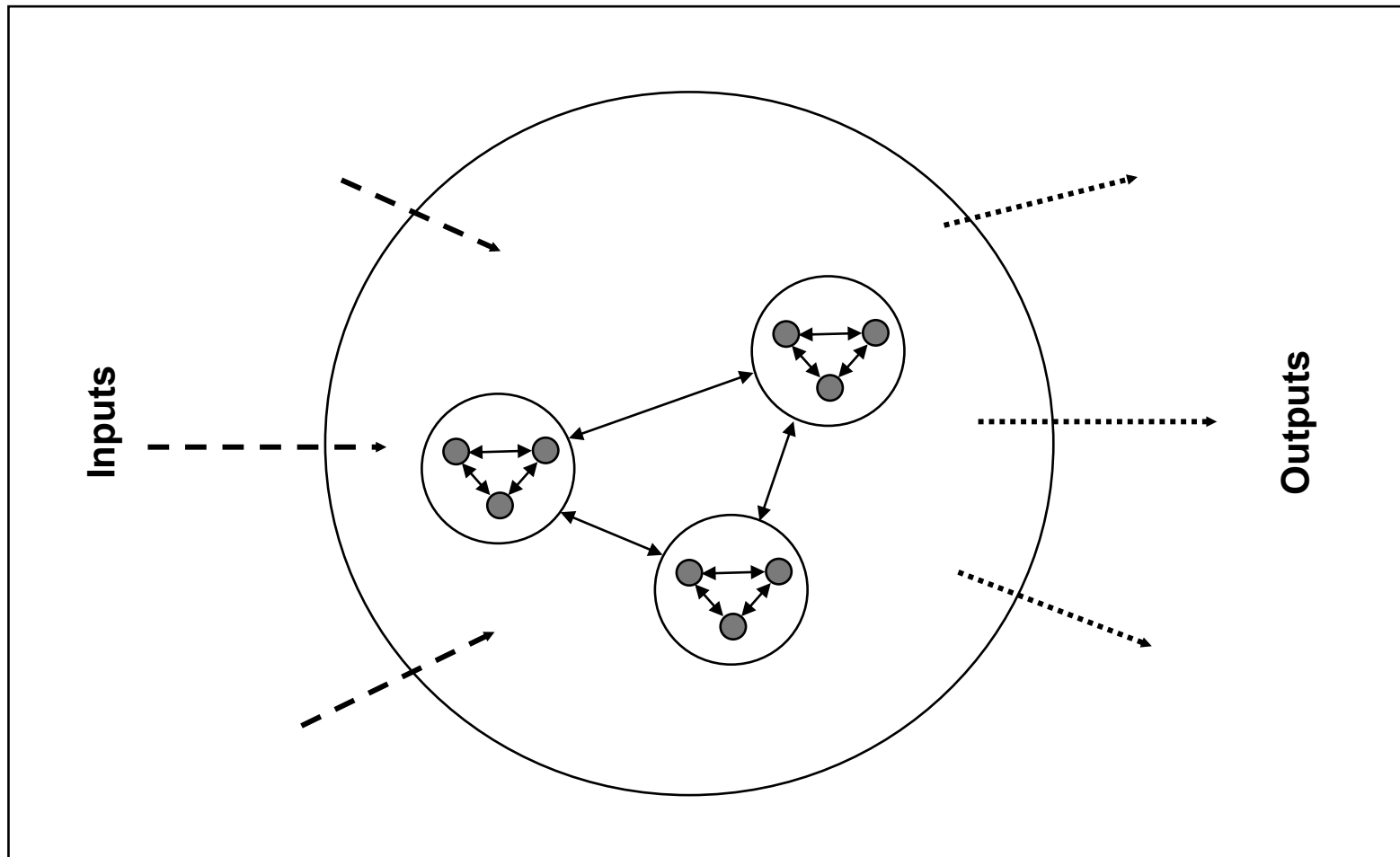
Role of Management

Mechanical View:

Set strategy, specify organizational design and provide resources, monitor results

Complex System View:

Clarify boundaries, ensure resource availability, ensure alignment of subsystems

Hoshin planning and self-directed teams more appropriate for a complex system

Quality Management

- **Baldrige focus on values/principles (boundaries), customer (environment)**

- **2000+ editions of ISO 9000 with reduced focus on documentation and increased focus on customer interface**

- **Process control methods should consider whether or not process is linear and predictable**

Examples

Linear & Predictable:
- Filling an order at McDonalds
- Processing a bank deposit
- Most assembly lines

Nonlinear and Unpredictable:
- Creating an advertisement
- Delivering leadership training
- Selling a house

Important Features of Complex Social Systems

- **They are adaptive**
- **They self-organize**
- **Creative outcomes emerge**
- **They can deal with multiple landscapes**

People are neither machines nor animals …
they have intent and choice,
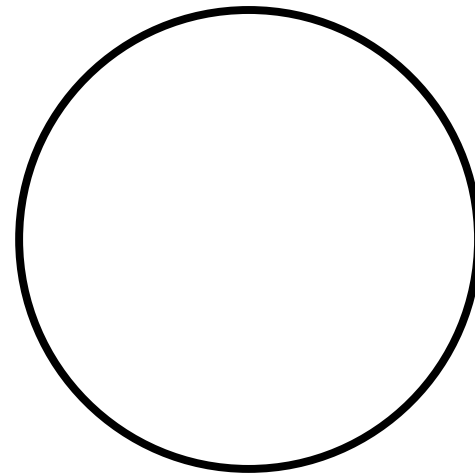*and will exercise both.*

Matching Controls to Type of Process
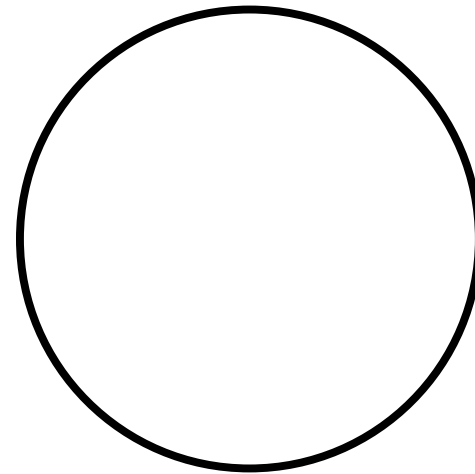
Linear & Predictable

Nonlinear & Unpredictable

The Polarities & Difficulties
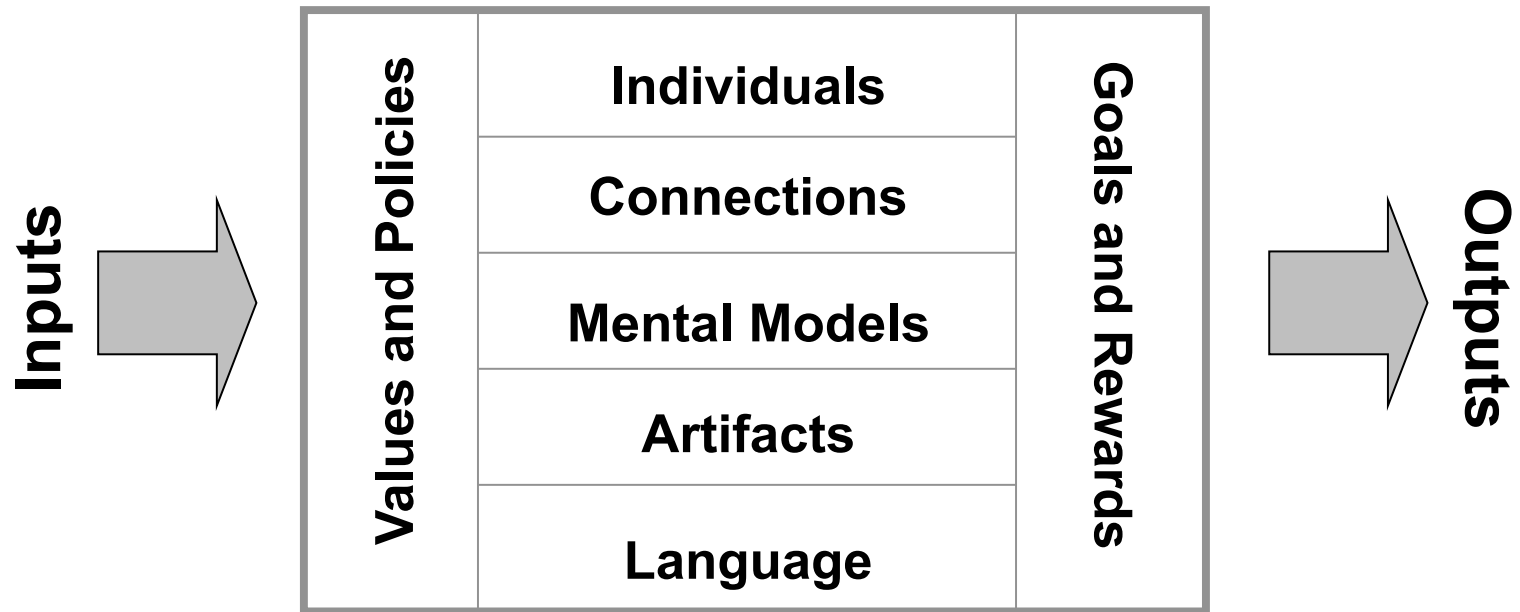
ISO in the 1990s   **TQM in the 1980s**

"SEE—IT'S NOT IMPOSSIBLE FOR AN OBSESSIVE-COMPULSIVE TO GET A RESPONSIBLE JOB."

Changing a CAS

Inputs → [Values and Policies | Individuals / Connections / Mental Models / Artifacts / Language | Goals and Rewards] → Outputs

How to Start a Forest Fire?

Changing an organization, when:

- You have a strong wind at your back

  vs.

- When you don't!

The Job of Management

Per Dr. W. Edwards Deming:

Prediction

Per Duke Okes:

Adaptation

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