

# Paradigms of development in contemporary organizational structures

**IT-architecture and user driven software design (BUITA)**

Systems Development and design  
(SDD3)

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Organizational models and their relevance

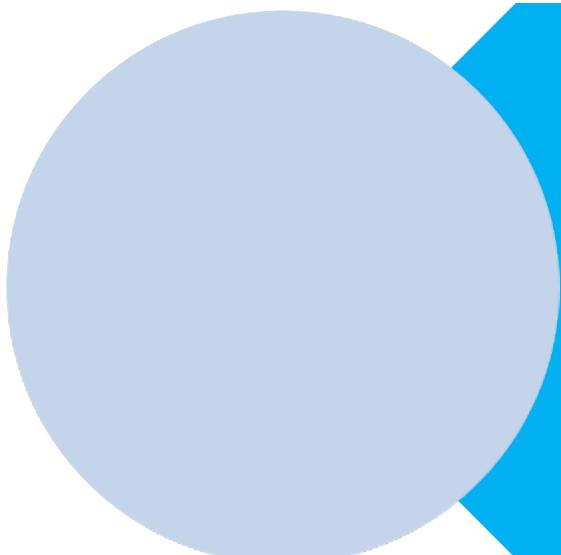


Paradigms of systems development



Presentation by IBM “Mogens Kyllesbech”

# Articles:



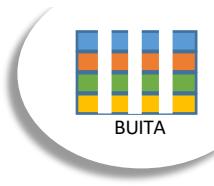
Hirschheim, R., & Klein, H. K. (1989). Four paradigms of information systems development. *Communications of the ACM*, 32(10), 1199-1216.

# Learning goals

- Know the four different paradigms to work under as a system developer/designer/architect
- Know the relevant methods for each systems development paradigm
- Relate paradigm to organisational structure and choose and identify an appropriate systems development paradigm on a given/chosen case

# First a quick brainstorm

- 10 minutes in each group
- What did you find to be the most central themes and concepts in the article?
- Which ones did you not understand **at all?**



# Some pleasant repetition

An outlook on organisations when being a developer

## Rogers:

- “an organization is a stable system of individuals who work together to achieve a common goals through a hierarchy of ranks and a division of labor” – Rogers, 2003

# People ORGANIZE – Weick



# Morgan, 1986

- “Any realistic approach to organizational analysis must start from the premise that organizations can be many things at one and the same time”  
– Morgan, p. 321
- Machine image
- Organism image
- Cultural image
- Political image

# Machine image

- Taylor's "Scientific management"
- "Cogs in a wheel"
- Production-minded
- No individuality
- Formal
- Hierarchical
- Responsibility moves to middle line managers
- Direct supervision and monitoring
- "Stable" environments

"I have heard my teacher say that whoever uses machines does all his work like a machine. He who does his work like a machine grows a heart like a machine, and he who carries the heart of a machine in his breast loses his simplicity. He who has lost his simplicity becomes unsure in the strivings of his soul. "

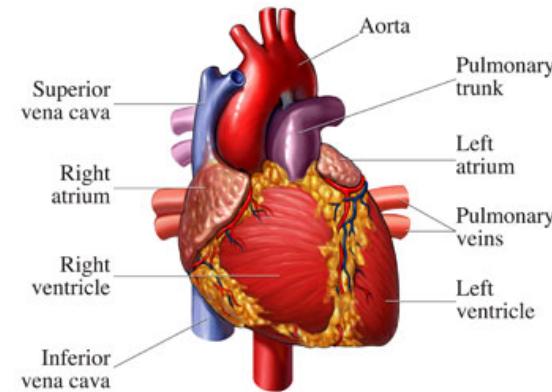
– Chuang-tzu, p. 10

# Machine image corresponds to old “ISD” goals

1. Analysis and design as formal
2. Achieve user satisfaction
3. Complete and stable abstract requirements
4. Complete specifications
5. Rigorous advance planning

# Organism image

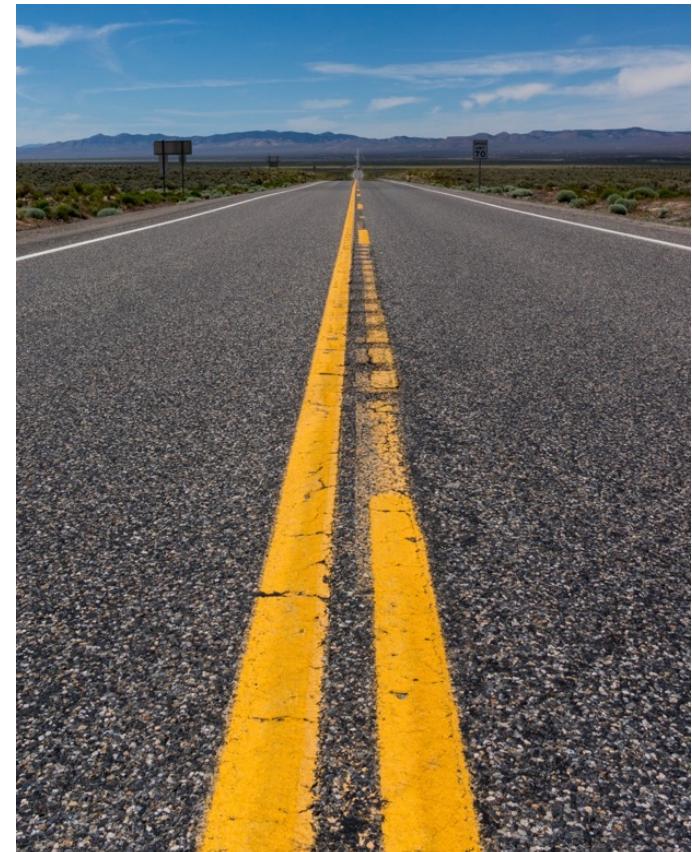
- Survival minded
- Hawthorne effect (1920s)
- Focus on individual needs:
  - Physiological, security, social, ego, self actualization
- Everyone playing a role (except for the appendix!)



- Input and output within the organisation
- Must also react to the outside needs of the organisation - open
- “Sociotechnical systems”

# Culture

- A system of “shared meaning” through symbolic discourse
- People “enact” organisation to reproduce its meaning
- Retrospective
- Ritualistic
- Subcultures and identity



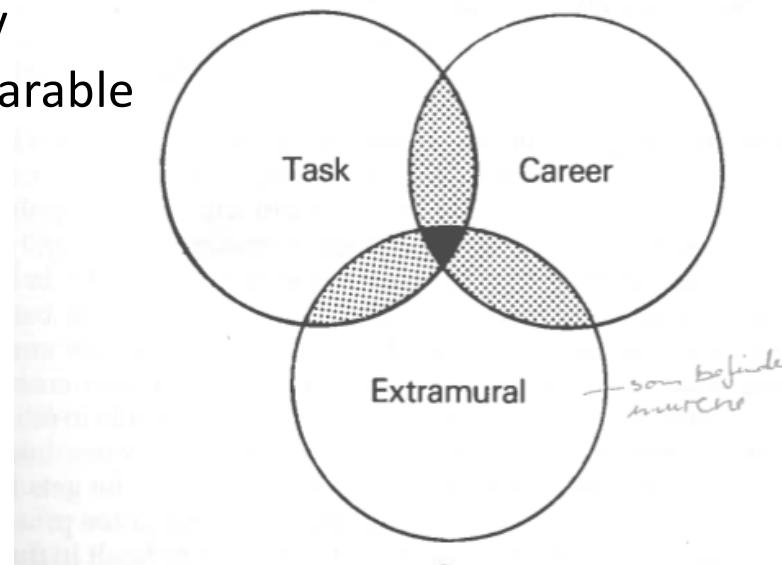
# Political image

- “You can vote with your feet. If you don’t like it here, leave”
- Strongly divided into “classes” and “groups”
- Divergent interests from all groups and individuals



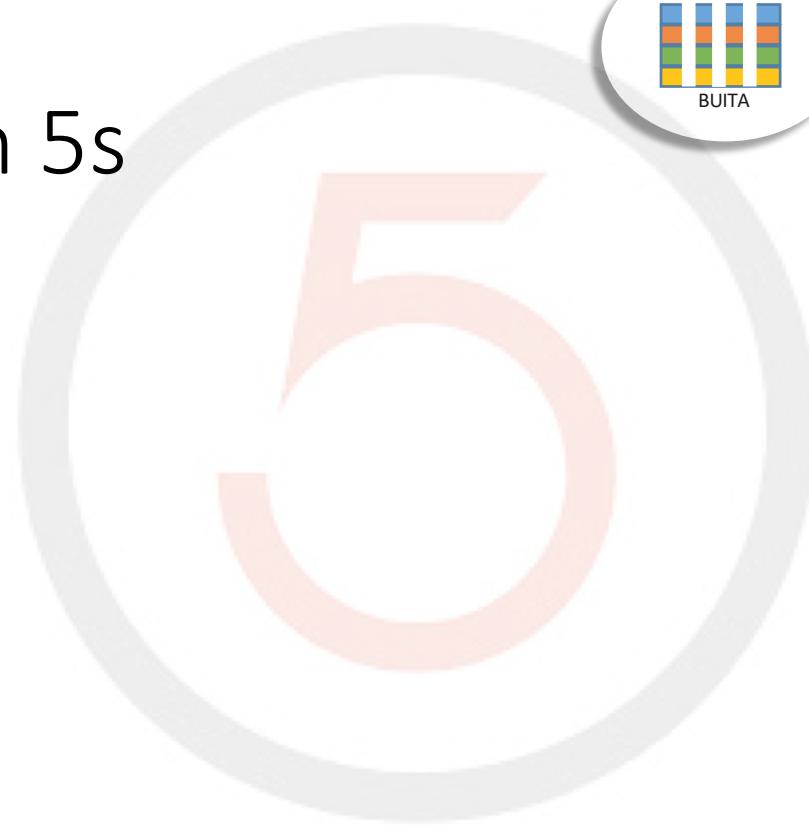
# Political systems, cont.

- Interests, conflicts and power
- Power = control
  - exerted through control activities horizontally as well as vertically
  - control and autonomy as inseparable
  - Resources
  - Technology
  - Rules, regulations
  - Information & knowledge

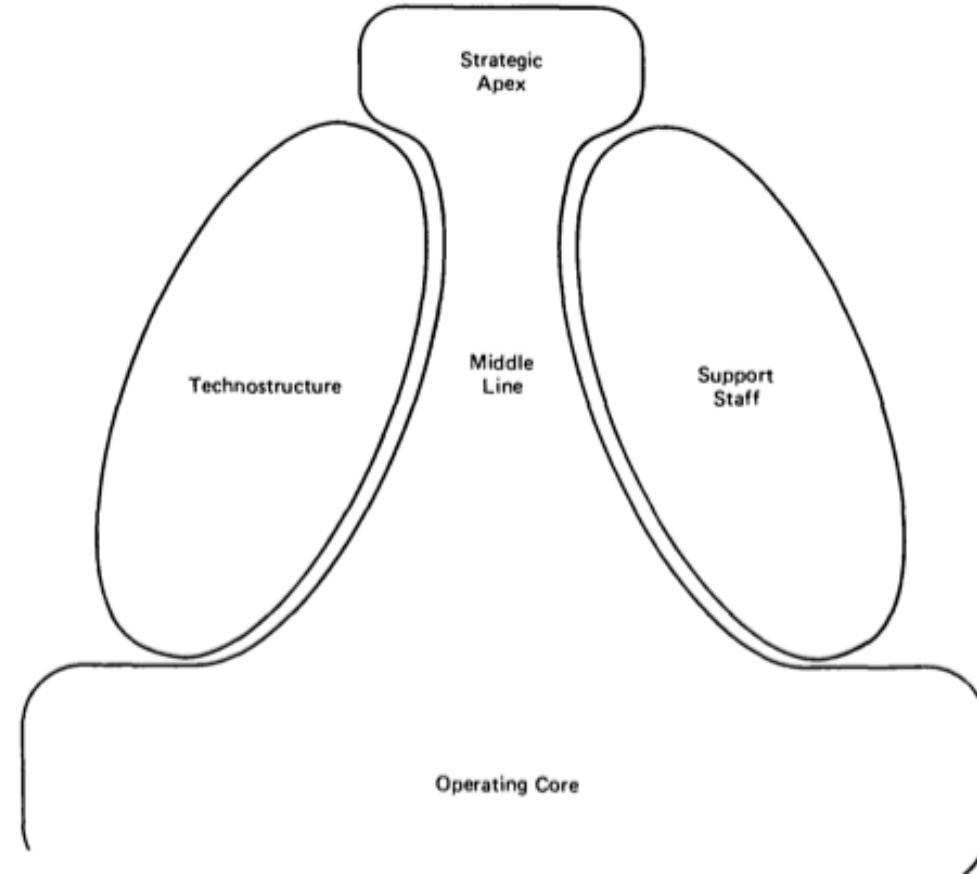


# Mintzberg, 1980 – structure in 5s

- Five basic configurations
- Five basic parts of the organisation



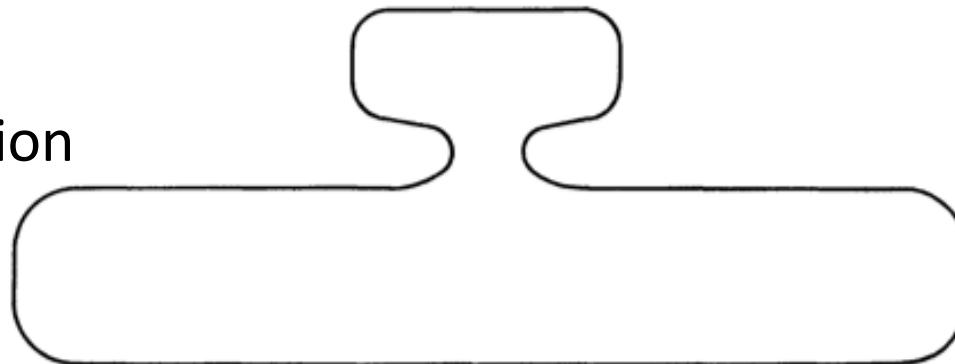
Mintzberg,  
1980 –  
parts of a  
structure



**FIGURE 1. The Five Basic Parts of the Organization.**

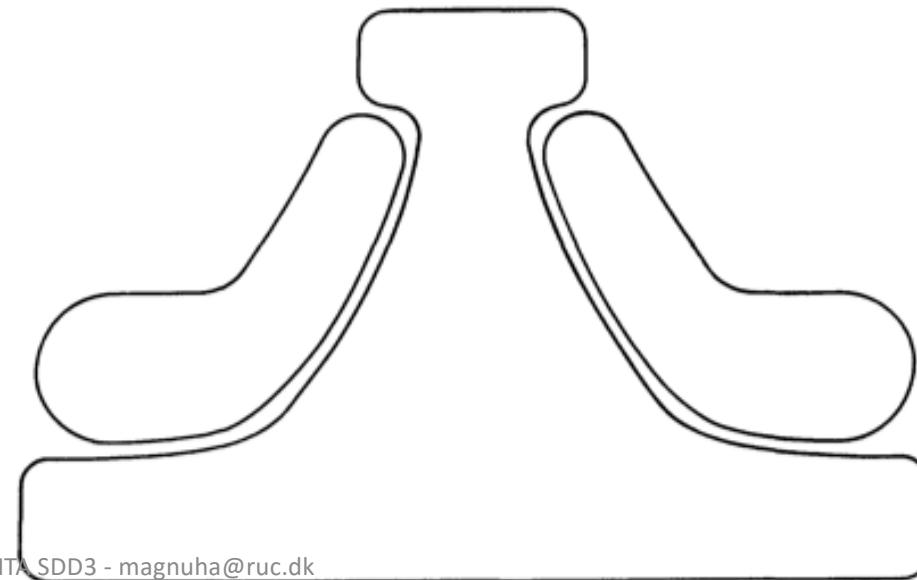
# Mintzberg, 1980 – simple structure

- Organic
- Little or no support staff
- Little or no middle line
- Minimal differentiation
- Direct supervision
- Examples?



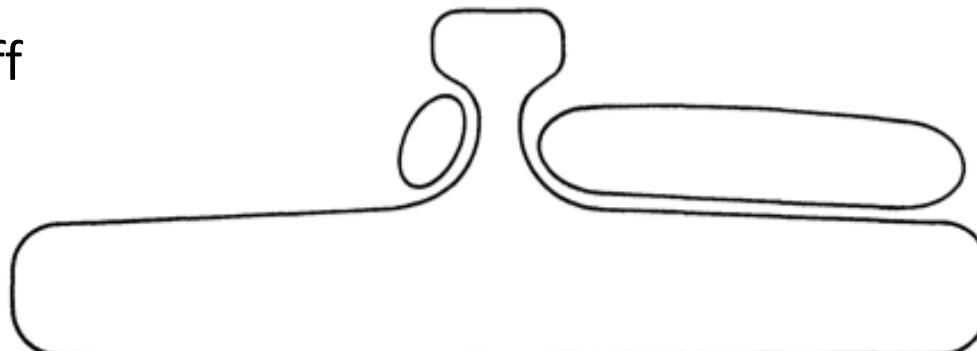
# Mintzberg, 1980 – machine bureaucracy

- Highly specialized
- Standardized work tasks
- Routine tasks
- Centralized power
- Strong technostucture
- Strong support staff
- Strong middle line
- Examples?



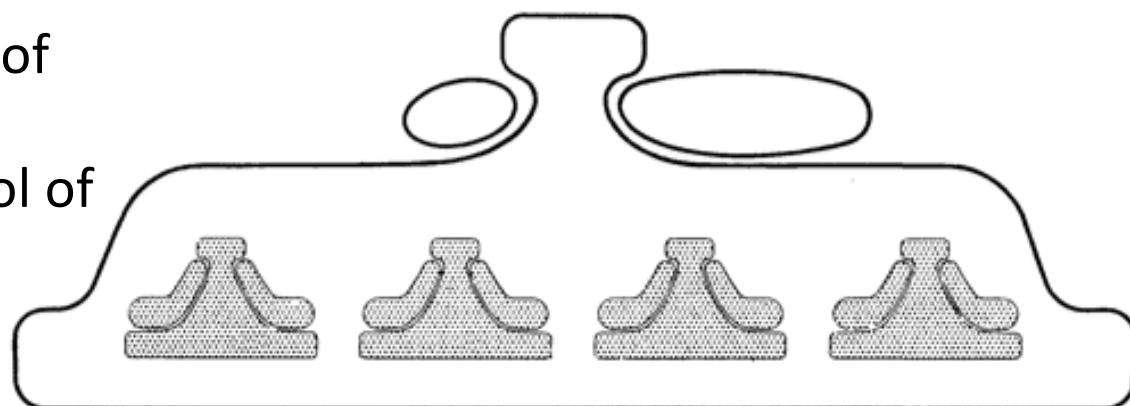
# Mintzberg, 1980 – professional bureaucracy

- Decentralized
- Strong operating core
- Operating core maintains control of administration
- Strong support staff
- Highly fashionable
- Examples?



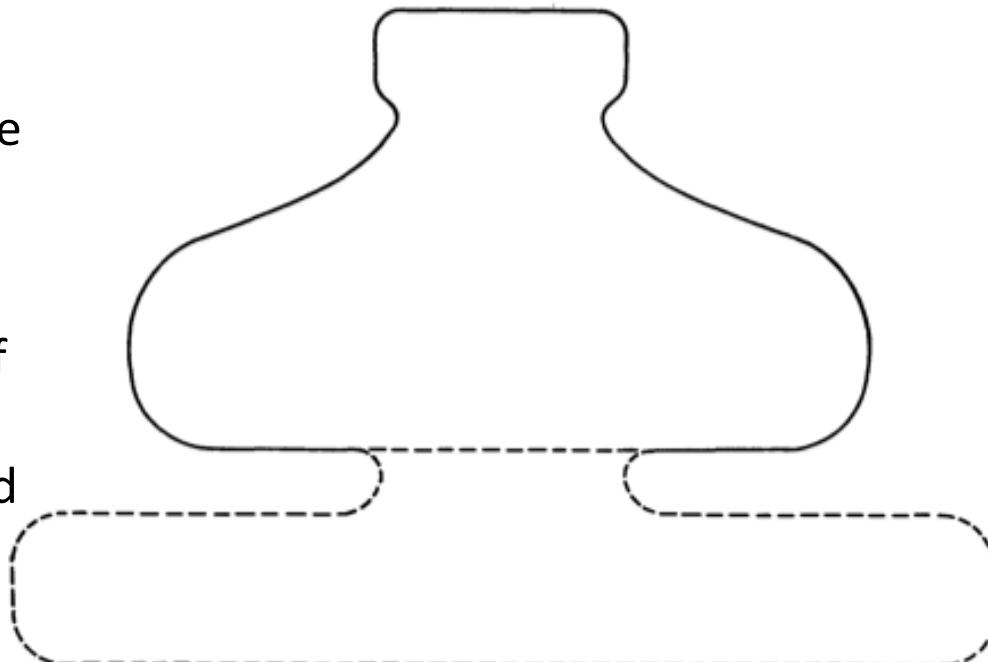
# Mintzberg, 1980 – divisionalized form

- Superimposition of structures in a metastructure
- Smaller machine bureaucracies inside
- Consistent set of goals
- External control of divisions
- Examples?



# Mintzberg, 1980 - adhocracy

- Deploying job specializations
- Various mixtures of support staff, middle line and operating core
- Operating core maintains control of administration
- Strategy determined by projects
- Examples?



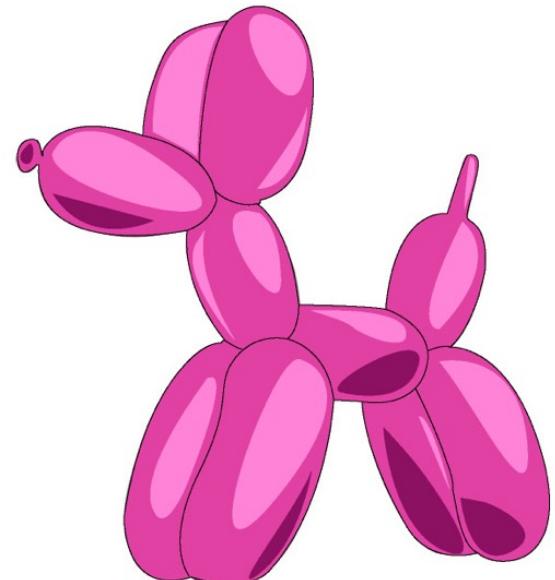
# Rich Picture



- A "Rich Picture" is a snapshot of a "purposeful activity" of interest drawn on a piece of paper
- Provides an overview of important people and groups, context and relations
- Besides 'hard' facts, 'soft' facts need to be included as speech bubbles, crossed swords or bombs for conflicts

## Task:

- Identify the best fitting “balloon” for your case organisation
- Draw a rich picture where you place the stakeholders in- or outside the balloon
- Reflect on the best approach way for you to engage in a systems development process



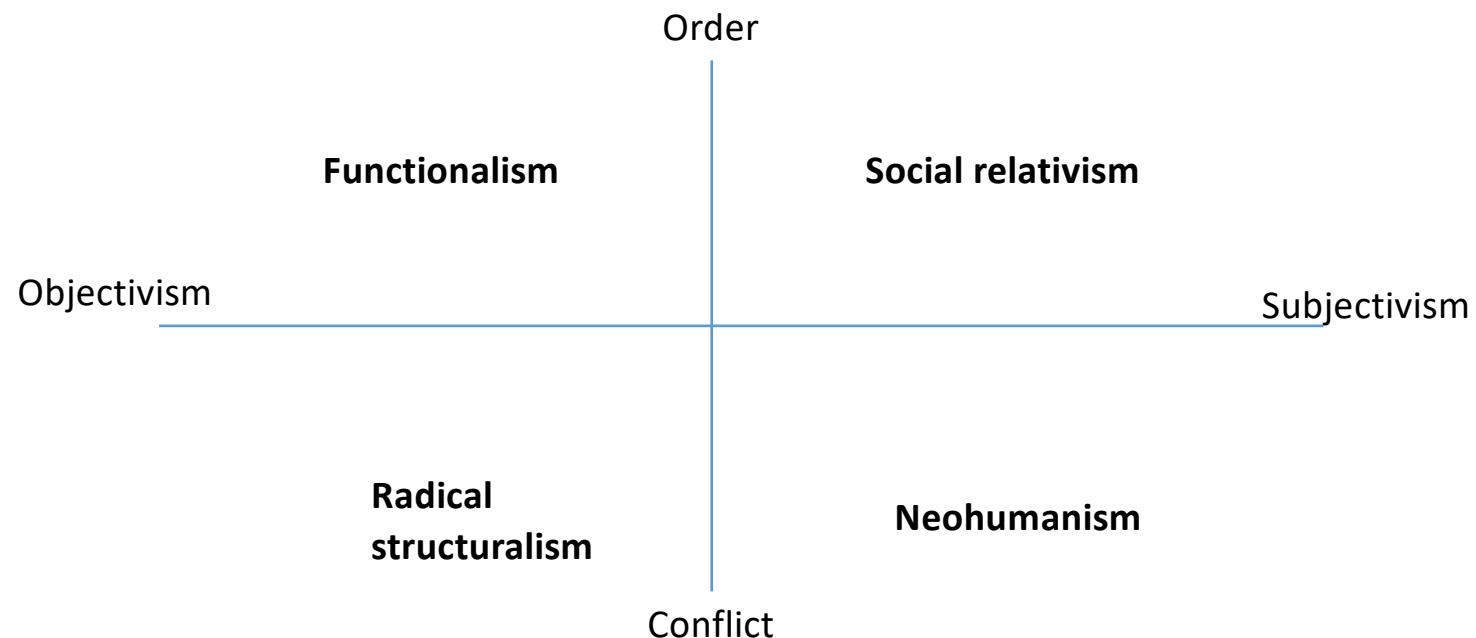
# Paradigms in systems development

Hirschheim & Klein, 1981

Or "how to act when engaging different development processes in organisations"

# Epistemology and ontology

- Knowledge and the social world



# 4 paradigms:

## Functionalism:

- objective – order: explanations of:
- status quo, social order, social integration, consensus, need satisfaction, and rational choice
- **Integrated whole**

## Radical structuralism:

- objective – conflict: explanations:
- overthrow or transcend the limitations placed on existing social and organizational arrangements. It focuses primarily on the structure and analysis of economic power relationships.

## Social relativism:

- subjective – order: explanations of:
- Individual consciousness and subjectivity, frame of reference of the social actor as opposed to the observer of the action.

## Neohumanism:

- subjective – conflict: explanations of:
- radical change, emancipation, and potentiality, and stresses the role that different social and organizational forces play in understanding change. It focuses on all forms of barriers to emancipation-in particular, ideology (distorted communication), power, and psychological compulsions and social constraints-and seeks ways to overcome them.

# Each paradigm related to an archetypical story

- 1. Key actors
  - 2. Narrative
  - 3. Plot
  - 4. Assumptions
- 
- 1. The central actors interacting with each other – the "who"
  - 2. The "what" happens: Information systems are developed in the paradigm
  - 3. "Why": The goal of the Information System
  - 4. Epistemological and ontological assumptions

# Story 1: analyst as expert

- 1. Key actors
  - 2. Narrative
  - 3. Plot
  - 4. Assumptions
- 
- 1. Developers, managers and users
  - 2. Effectiveness and efficiency
  - 3. Profit maximization
  - 4. Positivism and realism

## FUNCTIONALISM

# Consequences of story 1

## Advantages

- Developer as neutral and objective
- Aids in alternatives to the system design
- Conflict outside organisation

## Problems

- Means are discussed, ends are implicitly agreed upon
- Legitimacy

*Which structure + image would fit this story?*

# Story 2: analyst as facilitator

- 1. Key actors:
  - 2. Narrative
  - 3. Plot
  - 4. Assumptions
- 
- 1. Users as organizational agents and the system developer as change agents
  - 2. Creating new meaning through development
  - 3. None manifest, under continuous evolution
  - 4. Anti-positivism and nominalism (socially constructed)

## SOCIAL RELATIVISM

# Consequences of story 2

*Which structure + image would fit this story?*

## Advantages

- Does not conceal complexity of reality
- Unique experiential knowledge
- No rationality
- Favors learning as systems development method

## Problems

- Direction
- No way of distinguishing between valid and fallacious consensus
- Completely uncritical of dysfunctional side effects of using products, tools and techniques for ISD, all is valid

# Story 3: analyst as labor partisan

1. Key actors
2. Narrative
3. Plot
4. Assumptions

## RADICAL STRUCTURALISM

1. Two classes, owners and labourers. Management and systems development in a classic struggle
1. Information Systems are developed to favor managerial control, the owners
2. The ideal of moving to a planned economy with democratic control
2. Materialist positivist, empirical realism

# Consequences of story 3

Which structure + image would fit this story?

## Advantages

- Predictable since conflict follows a pattern
- Cultural norms and values as subtle ways of behavioural control
- User resistance is seen as positive sign because they are becoming aware of the collective
- Advocates a participatory approach
- Cooperation between laborer and developer
- Systems enhancing craftsmanship and power of users

## Problems

- Activism: change more important than understanding
- Uncritical of social differentiation within one class
- Oversimplifying reality
- Lack of conflict undesirable

# Story 4: analyst as emancipator or social therapist

## 1. Key actors

## 2. Narrative

## 3. Plot

## 4. Assumptions:

## NEOHUMANISM

1. Stakeholders as a diverse group of people and the system developer
2. Development guided by three knowledge interests
  - Technical sensitivity to efficiency and effectiveness in management
  - Mutual understanding
  - Emancipation reflecting the rational discourse
3. The ideal of emancipation of all unwarranted constraints and compulsions
- 4a. Epist: two types, positivism in the technical knowledge, anti-positivism for mutual understanding and emancipation
- 4b. Ont: two also, realism for technical interests and nominalism and social constructivism for the other two.

# Consequences of story 4

Which structure + image would fit this story?

## Advantages

- What could be rather than what is
- Using human reason to recognize deficiencies and improvements
- *“intelligibility, veracity, truthfulness, and appropriateness of all arguments are checked through maximal criticism.”* – p. 1209
- Using rationality to pragmatically overcome barriers

## Problems

- How to root in practice?
- Normative with very little details
- Are people willing even willing to give up and in?
- No natural limits for the human potential

Paradigm	Developer archetype	Systems development process	Elements in definition of IS	Examples
Functionalism	Expert or platonic philosopher	From without	People, hardware, software, rules (organizational procedures) as physical, or formal, objective entities	Structured analysis, formal engineering
Social relativism	Catalyst or facilitator	From within	Subjectivity of meanings, symbolic structures affecting evolution of sense, making and sharing of meanings, metaphors	Ethnographic approaches
Radical structuralism	Warrior for social progress or partisan	From without	People, hardware, software, rules (organizational procedures) as physical or formal, objective entities put in the service of economic class interests	Trade-union led approaches
Neohumanism	Emancipator or social therapist	From within	People, hardware, software, rules (organizational procedures) as physical, or formal objective entities; subjectivity of meanings and social intersubjectivity of language use in other knowledge interests	Critical social theory

# Discussion and task

- Where are the central actors in the paradigm graph?
  - You, what are your paradigmatic preferences?
  - Project owners, what are their expectations of you?
  - What are the actual needs and product of the project?
- Have you changed your paradigm location during your process?
- Will you change your paradigm location?

# Discussion and task

- Based on your own case and yourselves
- How does your "story" go in terms of key actors, narrative, plot, and underlying assumptions?

Paradigm	What would you do with the users?	How would you define the systems development process	Which elements of the workspace would be the main "informants" for the "to be" information system?	Who should be "in charge" of the project?
Functionalism	...	...	...	...
Social relativism	...	...	...	...
Radical structuralism	...	...	...	...
Neohumanism	...	...	...	...

# The type of story can be defined by considering 8 features

1. Technology architecture matched with structural units of org.
2. Kinds of information flows and their intended meanings
3. Control of users contributing or diminishing opportunities for power
4. Control of systems development and influence on the process
5. Access to information by stakeholder or interest groups
6. Error handling; detection and how to deal with it
7. Training and the role of education of who gets what knowledge
8. Raison d'etre and the reason for the system's existence



Organizational models and their relevance



Paradigms of systems development



Presentation IBM Mogens Kyllesbech

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