Multi-person Decision Making

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Overview

- Introduction
- Group decision making
- Organizational decision making
- Societal decision making
- Requisite decision modeling
- Concluding remarks

(Based on Paul R. Kleindorfer, Howard C. Kunreuther and Paul J.H. Schoemaker, "Decision Sciences: An Integrative Perspective," Cambridge University Press, 1993)

Multiperson decision making: introduction

Multi-person decision making is important in practice

- Very often the decision maker is a group of people.
- For example, in case of decisions involving a university department, the decision maker are the faculty.
- This is quite a common situation.
- In general, a lot in common with individual decision making.

Group Decision Making

Group decision making

- Introduction
- Groupthink (and remedies)
- Group decision support systems (GDSSs)
- Dialectics
- Social judgment theory
- Aggregation of opinions and probabilities

Performance of group decision making

Performance of group decision making depends on several factors

- **The nature of the task** (requirements, resources available, incentives, pressure)
- **Group composition** (size, homogeneity/heterogeneity, knowledge, values)
- **Group process** (communication, cooperation, trust, responsibility)

Famous blunders

Examples of famous, well-documented public sector blunders

- Bay of Pigs invasion
- Pearl Harbor
- Invasion of North Korea
- Vietnam war
- Watergate scandal
- Iran-Contra scandal
- Corporate blunders, such as Challenger

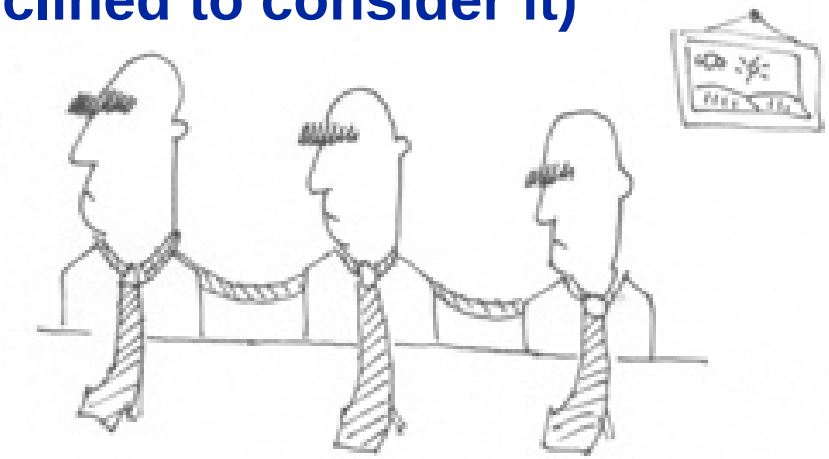
Often groups of very smart people end up making very unwise decisions.

Why?

Reasons for failure: Groupthink

Several reasons for failure of group decision making have been postulated

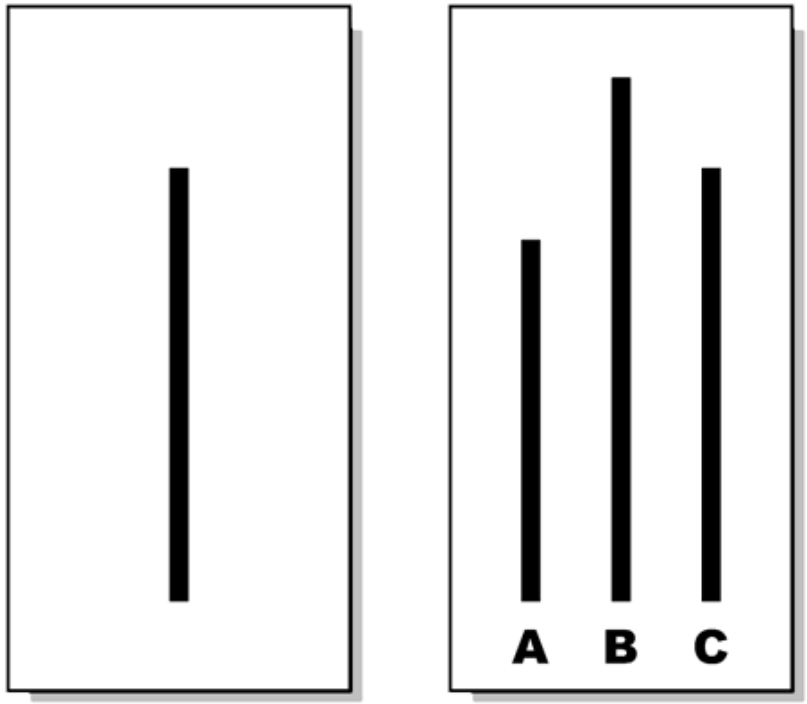
- **High cohesiveness** (people knew each other well and liked each other, self-censorship for fear of ridicule or the desire to keep harmony: strong empirical evidence for people's conformity to groups, here a little bit of support fares a long way, if there is at least one person who holds a given view, people are inclined to consider it)



Asch conformity experiments

Which of the three lines on the right is as long as the one on the left?

Subjects who are told what others think suppress their own sound judgment and agree with others



http://en.wikipedia.org/wiki/The_Asch_Conformity_Experiment

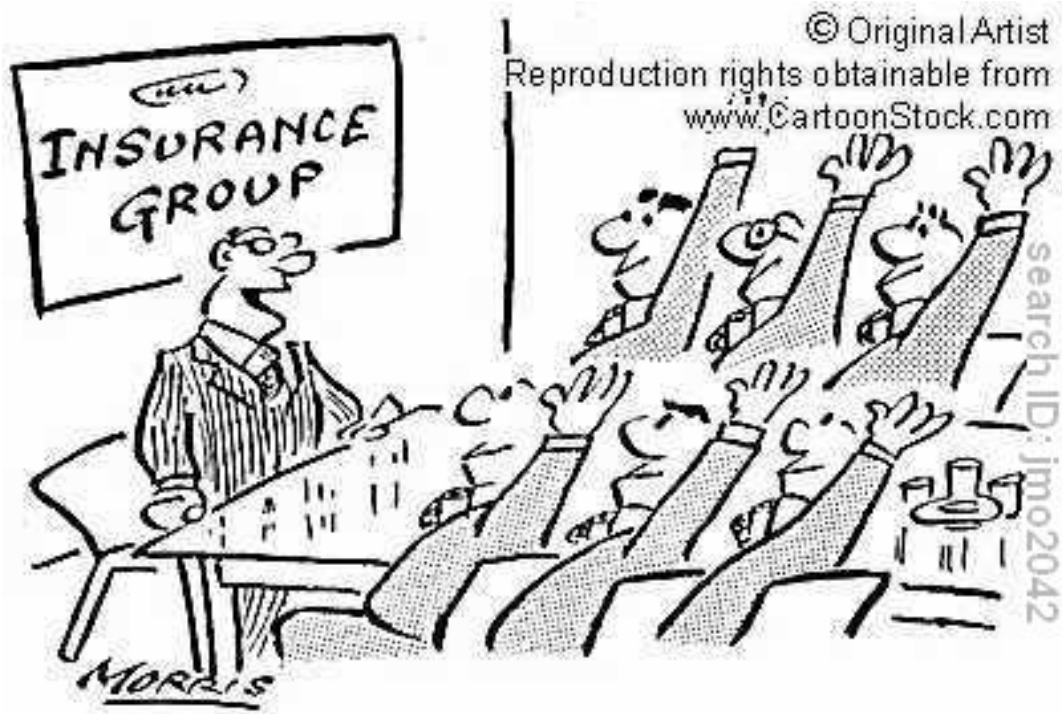
https://www.youtube.com/watch?v=TYIh4MkcfJA

https://www.youtube.com/watch?v=Cp8zBCYbJ2U

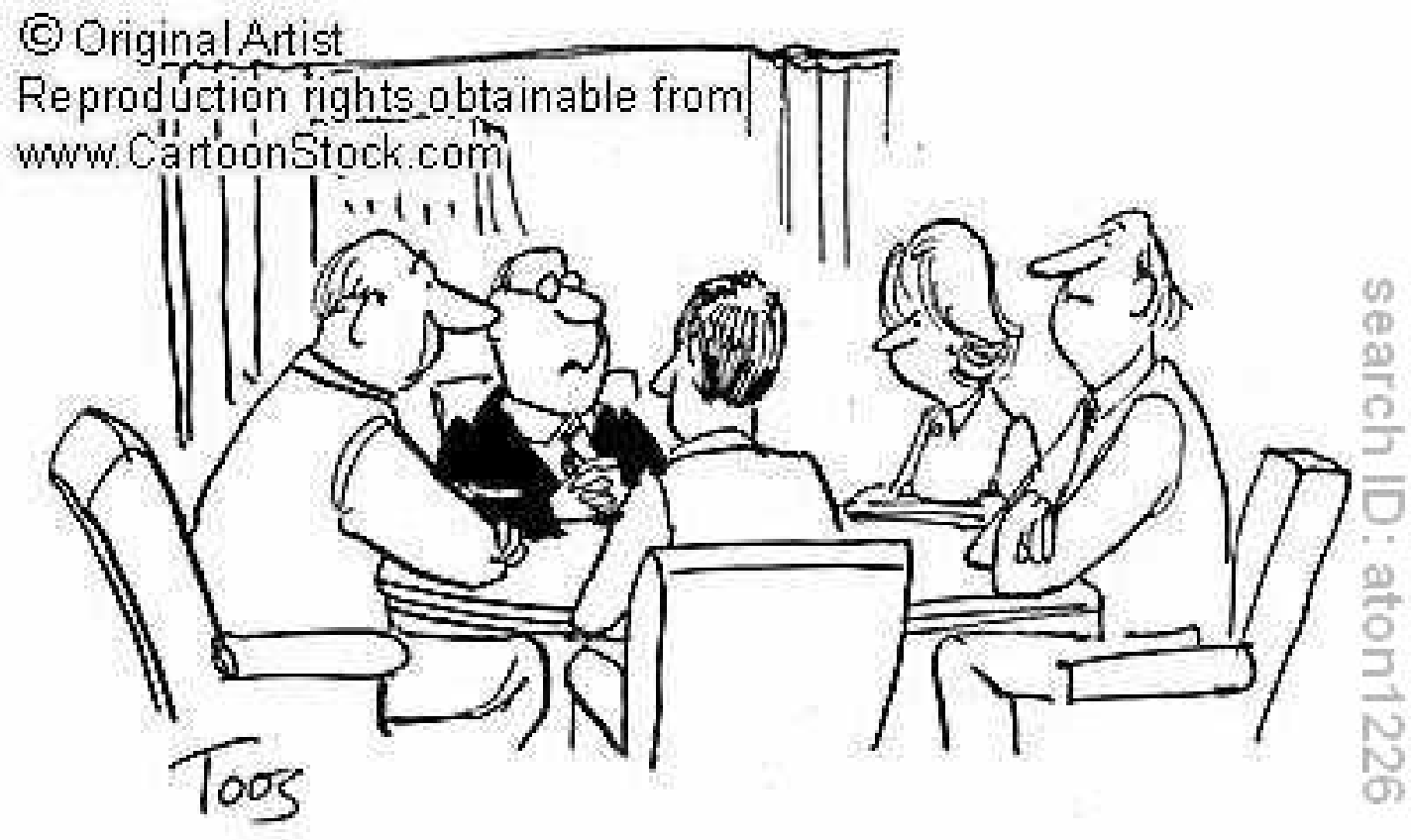
Reasons for failure: Groupthink

Several reasons for failure of group decision making have been postulated (cont.)

- **Isolation of the group (for example due to secrecy, stereotyping the people outside the group, illusion of invulnerability)**



Illusion of invulnerability

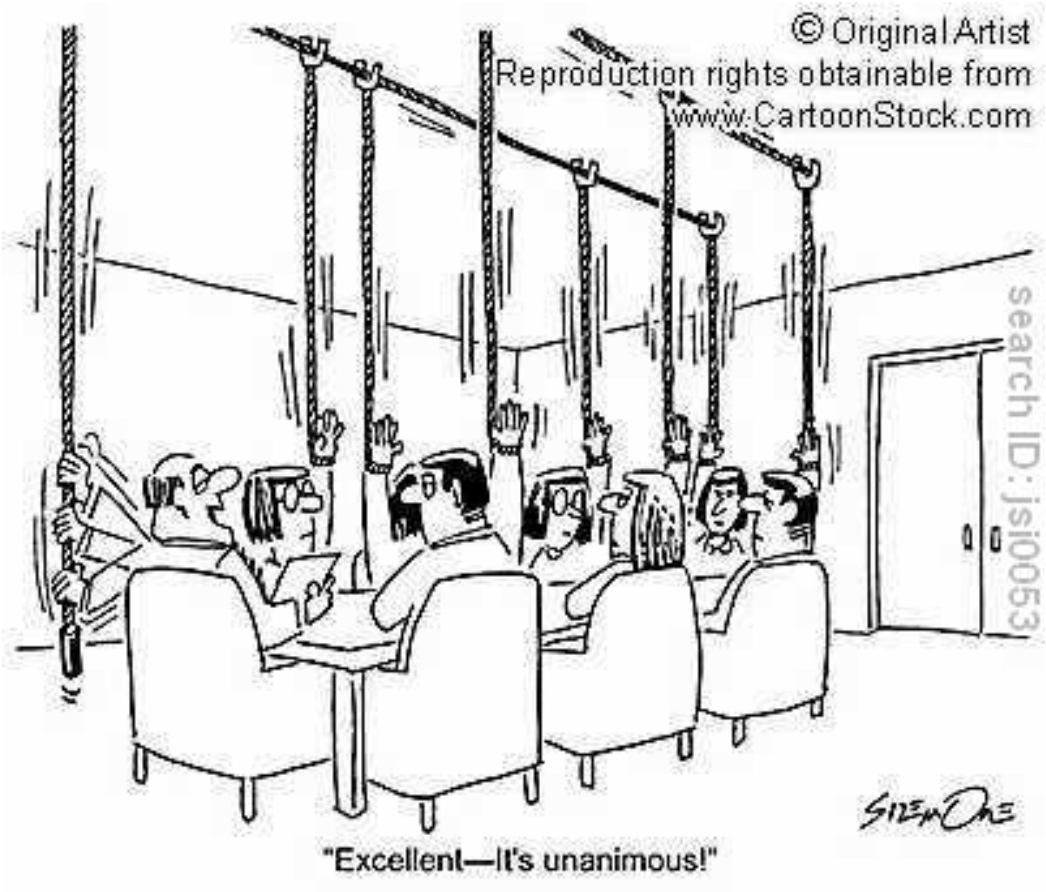


"Make sure everything is done ethically. Within reason, of course."

Reasons for failure: Groupthink

Several reasons for failure of group decision making have been postulated (cont.)

- **Strong directive leadership with the chairperson saying clearly what he/she favored (including pressure on those group members who disagree with the majority opinion to remain silent)**



Reasons for failure: Groupthink

Several reasons for failure of group decision making have been postulated (cont.)

- **High stress (deadlines, importance of the decision, its complexity)**

"There's no time for thinking. We have to make a *management decision*."

Reasons for failure: Groupthink

Several reasons for failure of group decision making have been postulated (cont.)

The result is that too few alternatives are examined too few objectives are taken into account. The desire to be efficient or not to rock the boat becomes more important than the quality of the decision.

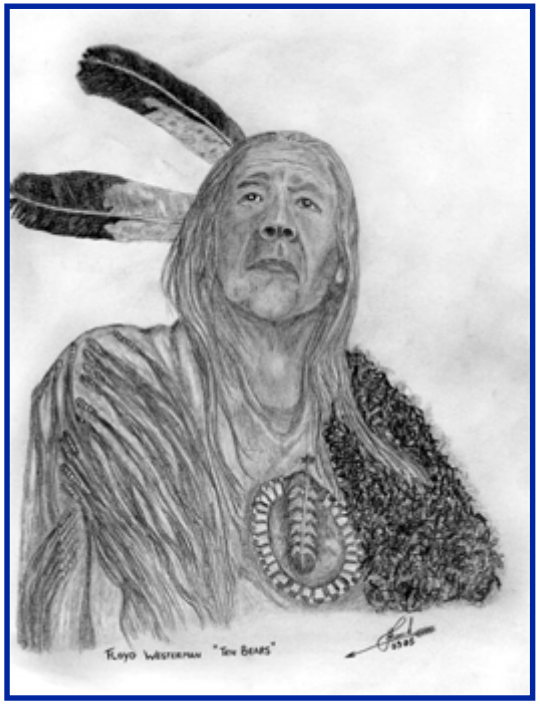
Fiascoes of this sort have become known as **groupthink**.

Groupthink: Remedies

Some remedies to groupthink

- spreading power
- seeking additional inputs
- encouraging conflicts among ideas (as opposed to among people)
- preserving impartiality of the leader
- delaying consensus

Delaying consensus



"It's easy to become confused by these questions.

It's hard to know what to do.

We should talk about it some more.

That is all I have to say."

Seven Bears (in "Dances With Wolves")

Groupthink: Remedies

Some remedies to groupthink (cont.)

- Role playing (adversaries, stakeholders, etc.)
- “Devil's advocate" position (perhaps rotated)

advocatus diaboli (advocate of the devil)

advocatus vinculi matrimoni
(advocate of the bond of marriage)

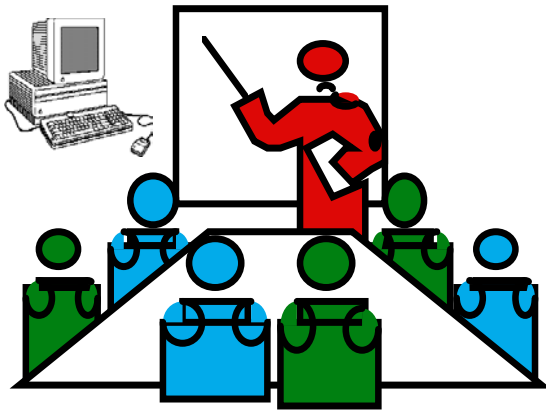
Groupthink: Remedies

Some remedies to groupthink (cont.)

- breaking the group into subgroups and asking the subgroups to report back to the main group
- inviting outside experts (especially those who disagree with the initial leaning of the group) introduces new considerations

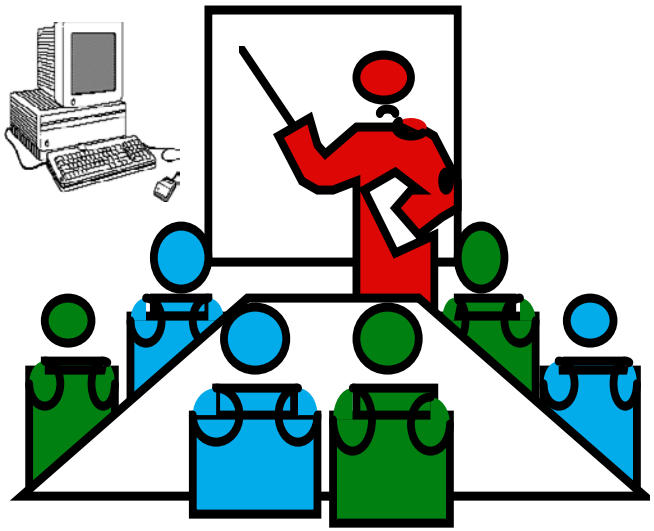
Group decision support systems

- Essentially facilitate communication as well as generation and evaluation of alternatives.
- Often an electronic meeting room: A room with enough computer terminals (networked and serviced by a master workstation) to accommodate a group of 10-15 individuals.
- The input of any member as well as summaries of the group's inputs and decisions are shared visually through an overhead projection controlled by the facilitator.



Group decision support systems

- Essentially a brainstorming of ideas that will be displayed on the big screen, classifying them, discussing, prioritizing them, assigning responsibilities for working them out.
- Simple but (believed to be) a powerful invention.
- Electronic record of the session, anonymous voting that reduces conformity.



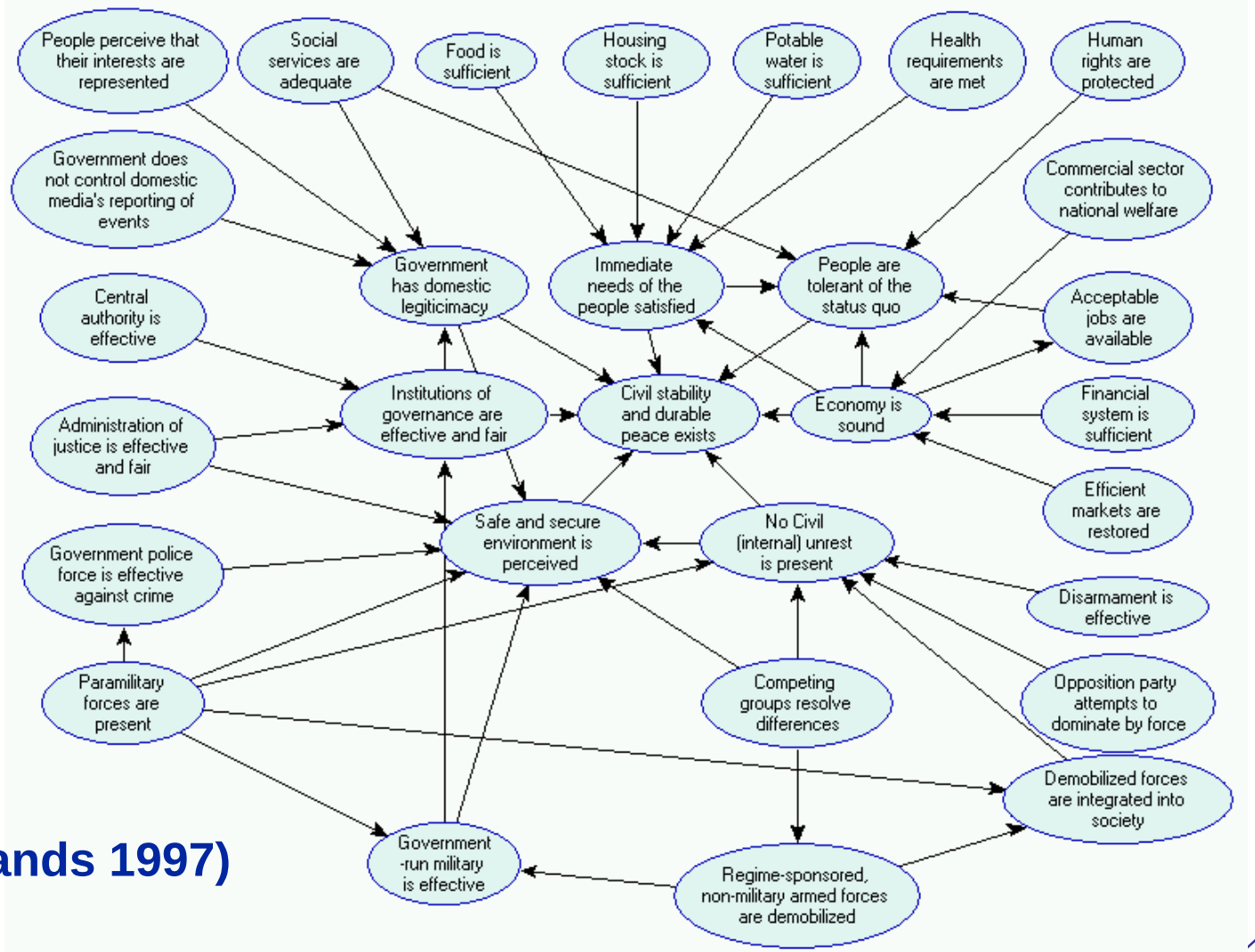
Group DSSs: Electronic meeting rooms

Example applications: Group decision support

(joint project with the US NWC DSS department)

- Bayesian networks are potentially a very useful tool for group decision making sessions.
- They can encode knowledge of various experts, each of whom knows well a fragment of the network.
- A session with a Bayesian network as a visual aid in the discussion can help in achieving consensus.

Example applications: Group decision support



(Hayes & Sands 1997)

Dialectics

Another approach to group decision making

- All sides advance their arguments, a third party tries to reconcile the conflicting viewpoints.
- Procedures used usually in legal disputes, sometimes adopted in corporations, where different subgroups are given the task of advocating their plans/views/projects.

Aggregation of opinions and probabilities

- In general a tricky problem. There is a lot of theoretical work on how to do it "right."
- By applying whatever procedure to combine expert judgments we can lose information, either the form of the distribution, or independence, both quite robust data (examples in Kleindorfer et al., pages 229-231).
- Delphi method: combining expert opinions.
- The idea is that you have several rounds of estimations and after each round share with each participants the statistics concerning combined estimations and other materials that group members find interesting enough to share with others.
- This constitutes an anonymous feedback and is important for debiasing the group members.

Organizational Decision Making

Organizational decision making

- Introduction
- Types of organizational decisions
- Approaches to organizational decisions
- Unitary actor perspectives
- Decisions within organizations
- Decision support systems

Organizational decision making: introduction

- One might view organizational decision making as a special case of group decision making.
- There are certain specific characteristics, however, such as the size and the structure (usually hierarchical), systematization of procedures, interrelated activities, specialization of tasks, overall complexity, and limited liability.
- Typically, a variety of opinions and considerations: Everybody has a different view of the objectives and their importance, often strongly depending on their position within the organization.

Types of organizational decisions

- **strategic**: choices of new products, markets; affect directly the well-being and nature of the firm, usually novel decisions occupying thinking of senior management
- **tactical**: pricing, personnel choices, marketing strategy, customer interaction, operations scheduling, etc.; domain of middle management
- **routine**: machine maintenance, supply ordering, invoicing, payroll, office maintenance, etc.; repetitive in nature, local in scope, minor in consequences (per case) and guided by organizational rules, guidelines, or policies

Approaches to organizational decisions

View the decision as a play against an opponent behind a curtain

- **unitary-rational**: assumes one person behind the curtain (most appropriate for strategic decisions as well as routine and recurrent)
- **organizational**: assumes multiple decision makers (introduces more detail into the picture, best for tactical decisions)
- **political**: emphasizes the divergence between the individual and the departmental goals, as well as the fact that actions are part of a portfolio of decisions, the outcomes of which influence the relative power positions of the organizational participants, considers hidden agendas
- **contextual**: each decision context becomes its own reality

Unitary actor perspectives

- **Economic approaches.**

  The firm is a black box in which the inputs are transformed optimally into outputs. A production function is often the centerpiece of analysis. The objectives include NPV (net present value) or decision alternatives.

- **Management science and operations research.**

  Both disciplines aim at improving performance. Assume that all members of the firm share its overall objectives (such as cost minimization or profit maximization).

Unitary actor perspectives

- **Strategic planning**

  The objective is usually viewed as positioning business units optimally. Usually involves:

  (1) examination of environmental threats and opportunities,

  (2) assessment of one's competitive strengths and weaknesses,

  (3) a conceptual match of 1&2 to identify areas of high profit potential, and

  (4) the design of policies, plans, incentives, and information systems to move the firm in the desired direction.

  The main challenge is to simplify the complex business reality into a limited number of key battlefields, so as to understand better on what basis to compete.

Decisions within organizations

Usually micro view of the organization, focusing on transactions, individual managers, power, and context. Some approaches:

- **Transactions cost economics: theoretical models.**
- **Behavioral perspectives: various enhancements to theory based on observations (such principles as bounded rationality, sequential goal attention, local rationality, uncertainty avoidance, environmental negotiation).**
- **Contextual views: how do the decision makers really operate and what context they are in.**

Decisions within organizations

Some approaches (cont.):

- **Prescriptive issues**: how should managers decide what to focus on? They are limited as information processors, often do not appreciate the lags, have mental inertia, personal agendas, and often derail "sound strategies." It is not enough to think rationally. Strategists have to think organizationally and politically in order to implement new courses of direction.

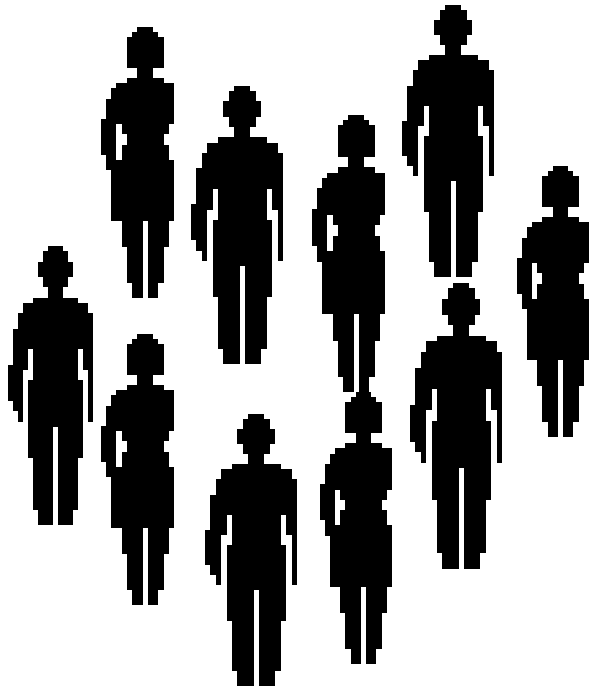
Decision support systems

- Decision Support Systems are defined as computer oriented resources aimed at aiding decision makers, either by providing better data, quicker access, better models, or more powerful solutions (in the form of software or consulting). They do not seek to replace the decision maker or take over large chunks of the problem but instead supplement or aid.
- How much aid to offer and in what form depends on (1) the problem's complexity, (2) the decision maker's skill, (3) the power of the DSS solution kit, and (4) the organizational context.
- Provide up-to-date information on customers, products, prices or solve problems formally (e.g., job scheduling or inventory ordering). In more sophisticated systems "what if" questions may be asked.

Societal Decision Making

Societal decision making

- Introduction
- Decision analysis
- Benefit-cost analysis



Societal decision making: Introduction

Some characteristics of societal decisions

- Many problems affect not only individuals but have important societal consequences. Smoking is bad for health and the society is paying for that, not only through secondary smoking but also through medical care of all affected. Drinking is the same. Teenage pregnancies, AIDS, seat belts, incinerators, nuclear power plants, fire arms, radon, pollution, flood insurance. What methods are (or should) be used here?
- Interesting issues. All drivers feel that they drive better than average. People in flood, hurricane areas often count on federal support in case of a disaster. People support building a nuclear power plant but not in their neighborhood.

Societal decision making: Introduction

Some characteristics of societal decisions (cont.)

- **High consequences**, low probability events are important in people's decision making. Many various biases. Sometimes you know what is "rational" and want to influence the society (informing what is best, introducing regulations like requiring automobile insurance or using seat belts, standards, or economic incentives, e.g., fines, tax breaks for insulation of your home). Sometimes you want to give the society a chance to make a well-informed decision.

Societal decision making: Decision analysis

Why not !?

(Henrion and Morgan paper and model)

Societal decision making: Benefit-cost analysis

- Essentially bringing every attribute of the decision to a common denominator, usually money.
- Weighting all reasons pro against all reasons contra.
- Heavily criticized: all aspects on the same scale?
- Can be abused: Famous Ford Pinto case.

Requisite Decision Modeling

Requisite decision modeling

- Introduction
- Requisite approach
- Some lessons learned

(Based on Lawrence D. Philips, "Requisite Decision Modeling: A Case Study", Journal of Operational Research Society, Vol. 33, 1982, pp. 303-312, reprinted in Simon French (ed), Readings in Decision Analysis, Chapman and Hall, 1989)

Unfriendly climate for decision analysis

There were various objections to using decision analysis in organizational setting

- **It can be used for individuals only**
- **Management does not like probabilities**
- **There are different views of the problem, it is difficult to obtain consensus about the subjective judgments of probabilities**

The case study shows that none of these objections is a real obstacle to implementing successful decision analysis. Most of the obstacles disappear if decision theory is seen as providing a framework for the iterative development of a coherent representation of the problem.

Requisite approach

- You put everything that is relevant in the model.
- It is expected that people will change their view of the problem during the development of the model.
- That is why the process has to be iterative.
- Sensitivity analysis plays a key role in facilitating structural change, in showing the extent of disagreements, and in resolving disagreements about the implications of differing assumptions and judgments that can be tolerated for a give decision.
- In short, requisite decision modeling treats problem solving as a dynamic process in which all relevant actors become clearer about the problem and develop a deeper understanding of it over time.

Lessons demonstrated and learned

- Importance of involving the key decision makers (managing director pointed out that it's uncertain whether the product will be well received by the consumers).
- Importance of sensitivity analysis.
- Importance of preserving common sense. Even though they have not agreed on the actual probabilities, their disagreements were not synergistic enough to push the decision over the threshold.
- The model gave them insight into the problem. It did not model reality it was reality. The managing director realized that he would be justified in spending £11.6 when developing the product and still be alright.