

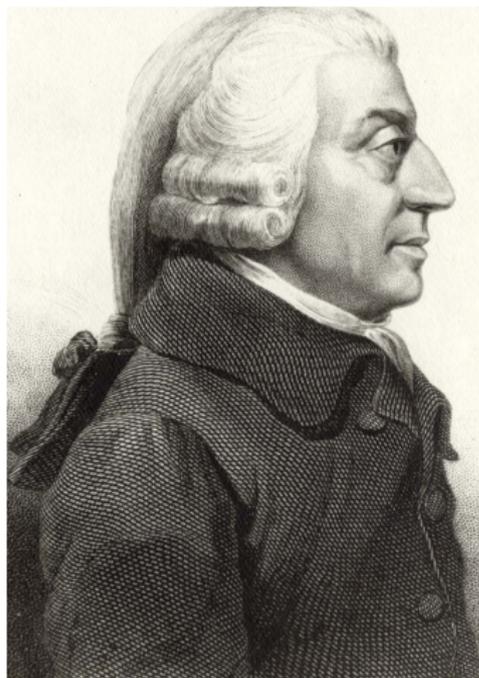
Personnel Economics
Decision Making
(Chapter 5)

- How can firms be structured?
- Who should make decisions in the firm? The CEO? The employees?
- What are benefits and disadvantages of centralized decision-making?
What are benefits and risks of decentralization?
- What authority structures are more likely to lead to correct or incorrect decisions? What mistakes are made?

The organization of an economy

- Largest organization: the economy itself
- Optimal organization of an economy one of most debated issues in the 20th century
- Centralized economies (largely run by the government) vs. decentralized market-oriented economies
- \implies Market-oriented economies more efficient (economic growth, jobs, prosperity, creativity and innovation)

The invisible hand



*“ . . . he intends only his own gain,
and is . . . led by an invisible
hand to promote an end which
was no part of his intention . . .
By pursuing his own interest he
frequently promotes that of society
more effectually than when he
really intends to promote it.”*

*Adam Smith
The Wealth of Nations, 1776*

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Why is a chaotic, undirected market of individual, selfish decision makers more efficient than a central planner?

● Information

- Information is needed to allocate resources effectively (How many products are needed? Where? What is the value of these products to consumers? What technology is needed for production? How many inputs should be used to produce certain goods? etc.)
- Markets make use of systematic type of knowledge \implies Prices

● Incentives

- Private property provides strong incentives for profitability
- Central planning generates bureaucrats
- Unprofitable businesses: resources sold (allocate differently)

● Innovation

- Incentives to invest and to create products/services that are profitable
- Decentralization makes use of ideas of many individuals
- Ability to respond flexibly to local circumstances

Benefits of central planning

- **Natural monopolies:** created by economies of scale, average total costs decline as the firm gets larger
- **Public goods:** will not be provided by profit-seeking firms because they are unable to charge enough, one reason is that consumption can not be prevented
- **Externalities:** costs or benefits to a third party that are not part of transaction, prices send wrong signals
- **Technological spillovers:** positive externality, firms may copy ideas of others, reduced incentives to invest in R&D
- **Standards:** positive network externality, value of having more consumers of a certain product

Decision making in firms: Centralization versus decentralization

Who should make decisions in an organization?

- **Centralized decision making**
high level in hierarchy, eg. CEO
- **Decentralized decision making**
low level in hierarchy, eg. employees
- **Intermediate approach**
middle level in hierarchy, eg. middle manager

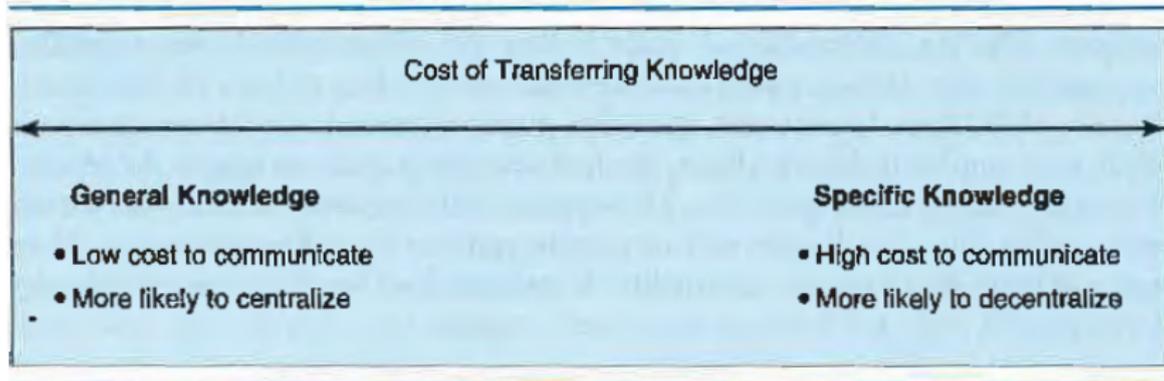
Benefits of centralized decision making

- Different units of firm share **common assets** (also intangible assets, such as brand name, corporate culture)
- **Central knowledge** is important (information from different units resides at the top of the firm, “big picture view” for strategic decisions)
- **Coordination** is valuable (outputs from different units must be combined, different units need to synchronize, strategic decisions are involved)
- **Control** to avoid downside risks (lower-level decision makers take actions that affect other parts of the organization)

Benefits of decentralized decision making

Depends on the whether there is valuable information at lower levels that is costly to communicate. If there is, firm should decentralize decisions to make use of this knowledge.

FIGURE 5.1
SPECIFIC VS GENERAL KNOWLEDGE



Costly to communicate: costly to transmit or costly to understand once received (if receiving person does not understand the information, it has not been communicated)

Attributes of knowledge that make it more specific

- Information that is perishable (quick action required, communication takes time, eg. trader on stock exchange)
- Information that is complex
- Information that requires technical skills
- Information that is unforeseeable/idiosyncratic (frequent communication necessary, environment more dynamic and random)
- Information that is subjective/experiential (difficult to quantify and describe)

Further benefits of decentralization

- Saves management time (less important and less coordination-dependent decisions tend to get pushed farther down in the firm, so that top management can focus on important decisions)
- Develops management skills (development of future managers, some room to make decisions)
- Intrinsic motivation (decision making as part of job enrichment, next to assigning more tasks, may increase motivation of employees)
- Creativity (intrinsic motivation, fewer limits on how employees perform duties, utilizes ideas and expertise)

Wrong decisions

- Organizational structure influences the likelihood that wrong decisions are made
- **Two types of errors**
 - Accept bad project (Type I error: **false positives**)
 - Reject good project (Type II error: **false negatives**)
- Example: Should a new product line be produced?

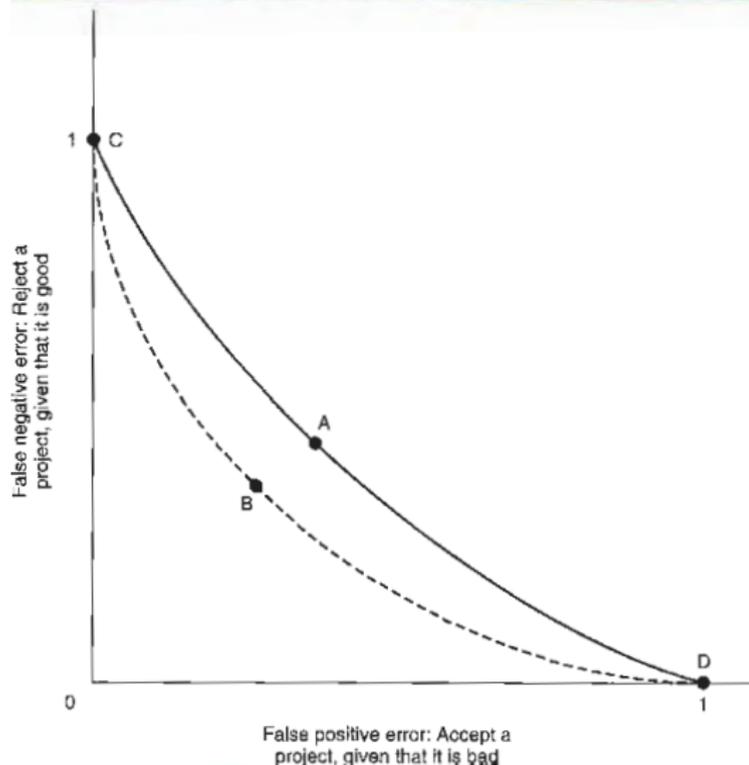
TABLE 5.1

POSSIBLE TYPES OF CORRECT OR INCORRECT DECISIONS

	<i>Produces</i>	<i>Does not produce</i>
<i>Line is profitable</i>	Good decision	False negative error
<i>Line is unprofitable</i>	False positive error	Good decision

Tradeoff between two types of errors

FIGURE 5.2
ERROR TRADEOFFS AND AUTHORITY STRUCTURE



- D: all projects are accepted
- C: all projects are rejected
- A: interior point
- B: better decisions (dotted line)

- By structuring authority relations in different ways, different kinds of errors are more likely
- **Hierarchical structure**
 - Decisions at lower levels have to be approved \implies Decision control
 - e.g. recommended projects are re-evaluated (veto right)
 - *Errors*: false positive \downarrow , false negative \uparrow
- **Flat structure**
 - Employees have authority to decide whether a project is accepted or rejected \implies Decision management
 - *Errors*: false positive \uparrow , false negative \downarrow
- **Second opinion structure**
 - Combination: accepted and rejected projects are re-evaluated
 - *Errors*: in between

Example: Willie and Gladys's firm

- **Authority structures**

- *Hierarchical structure:*

- Willie evaluates projects, rejects some and recommends the rest to Gladys. Gladys evaluates projects and implements some.

- *Flat structure:*

- Each evaluates some projects, those that are accepted by one are implemented.

- *Second opinion structure:*

- Both evaluate all projects, if there is disagreement the firm uses some resolution procedure.

- **Parameters**

- Number of projects: N

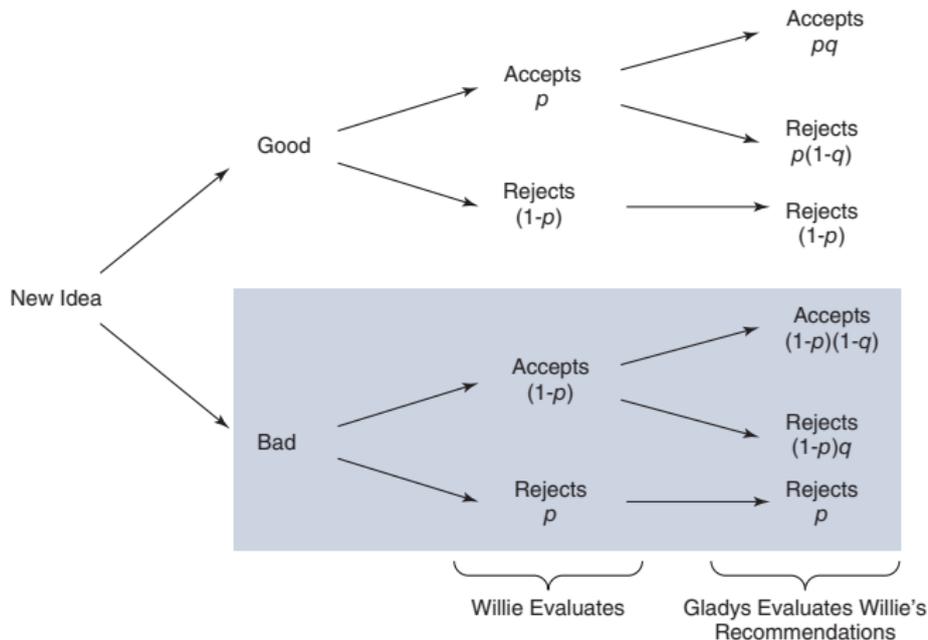
- Probability of correct decision at first evaluation: $p > 0.5$

- Probability of correct decision at second evaluation: $q > p$

- Resolution procedure acceptance rate: $\lambda = 0.5$ ($\lambda < 1$)

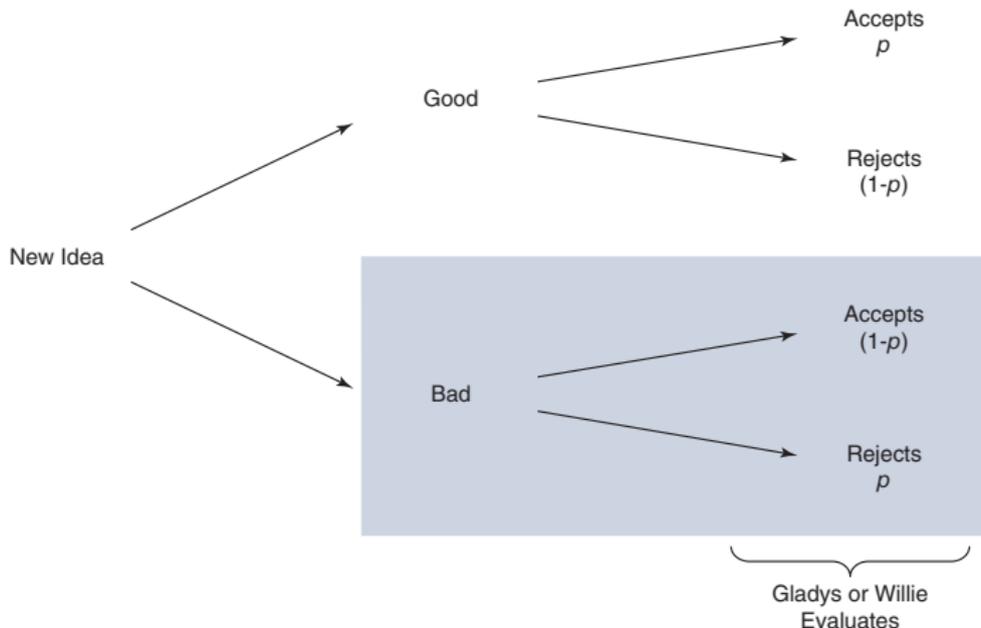
Authority structures and errors: Willie and Gladys's firm

FIGURE 5A.1
HIERARCHICAL STRUCTURE



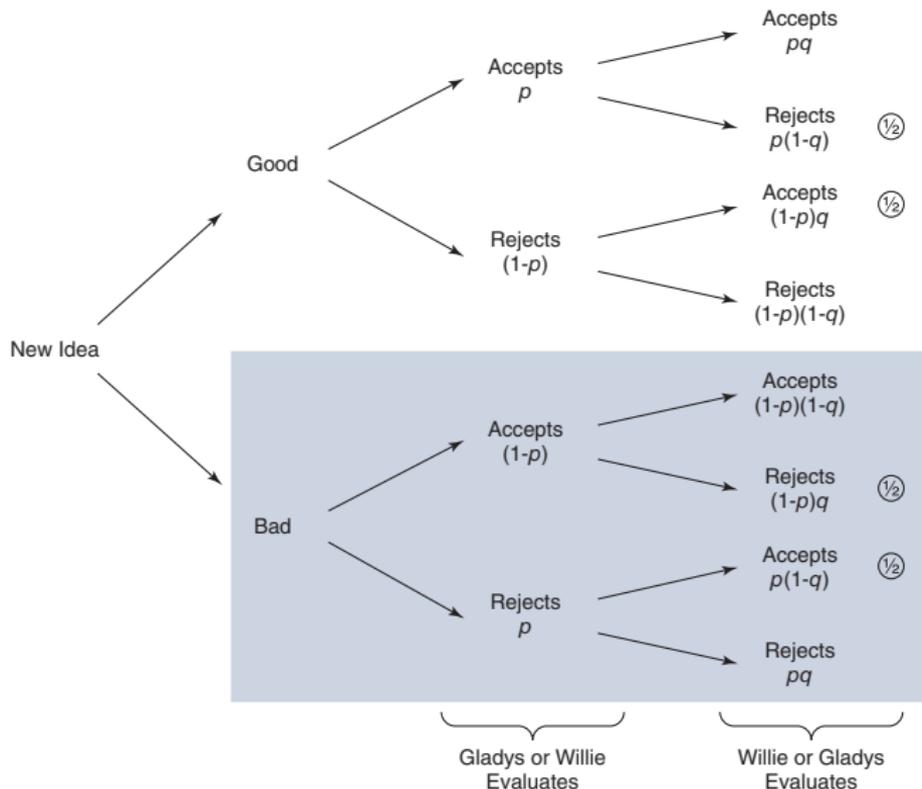
Authority structures and errors: Willie and Gladys's firm

FIGURE 5A.2
FLAT STRUCTURE



Authority structures and errors: Willie and Gladys's firm

FIGURE 5A.3
SECOND-OPINION STRUCTURE



Example: Authority structures and errors

Draw flow charts and calculate the likelihood of false positive and false negative errors in the hierarchy, the second opinion and the flat structure. Assume that the probability of a right decision at first evaluation is $p = 0.6$ and at second evaluation is $q = 0.7$. In the second opinion structure, in the case of disagreement a fraction $\lambda = 0.6$ of projects is accepted and implemented. Think about the value of λ . How will the error probabilities change if λ is very low or very high?

Authority structures and errors

- Flat structures result in most accepted profitable projects, but also most wrong decisions (false negatives, false positives), decisions are made more quickly
- Second opinion structures are intermediate, compared to hierarchy: good projects are given a second chance (fewer false negatives), but also bad projects get a second chance (more false positives)
- Hierarchical structures are the most conservative ones: smallest number of accepted projects

TABLE 5A.1
COMPARISONS OF AUTHORITY STRUCTURES

	<i>Flat</i>	<i>Second Opinion</i>	<i>Hierarchy</i>
<i>Rate for One New Idea</i>			
<i>Accept Good Idea</i>	p	$\frac{1}{2}(p + q)$	$p q$
<i>False Negative</i>	$1 - p$	$1 - \frac{1}{2}(p + q)$	$1 - pq$
<i>False Positive</i>	$1 - p$	$1 - \frac{1}{2}(p + q)$	$(1 - p)(1 - q)$
<i>Reject Bad Idea</i>	p	$\frac{1}{2}(p + q)$	$1 - (1 - p)(1 - q)$
<i>Overall Throughput</i>			
<i>Accept Good Ideas</i>	$2N p$	$N\frac{1}{2}(p + q)$	Npq
<i>False Negatives</i>	$2N(1 - p)$	$N[1 - \frac{1}{2}(p + q)]$	$N(1 - pq)$
<i>False Positives</i>	$2N(1 - p)$	$N[1 - \frac{1}{2}(p + q)]$	$N(1 - p)(1 - q)$
<i>Reject Bad Ideas</i>	$2N p$	$N\frac{1}{2}(p + q)$	$N[1 - (1 - p)(1 - q)]$

TABLE 5A.2
SUMMARY OF RESULTS

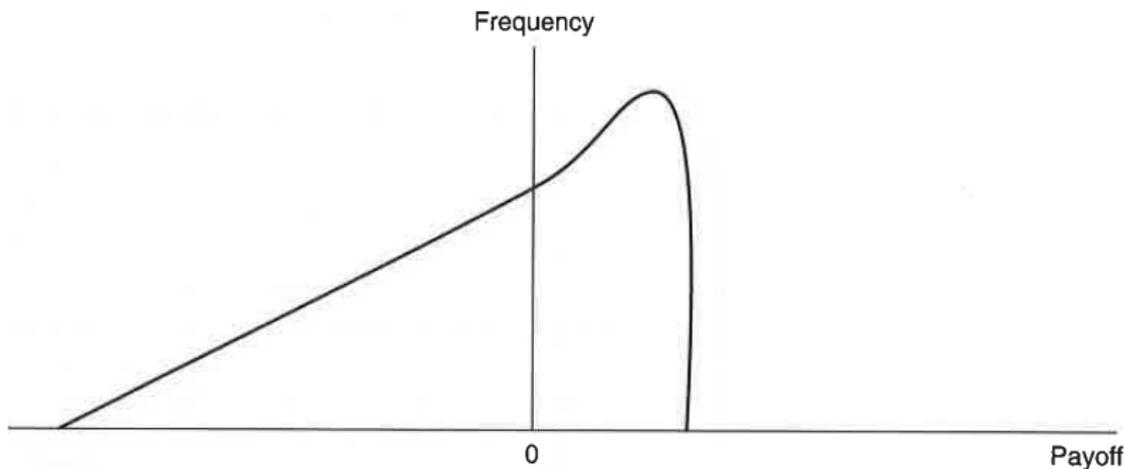
	<i>Most</i>		<i>Middle</i>		<i>Least</i>
<i>Rate for One New Idea</i>					
<i>Accept Good Idea</i>	Second opinion	>	Flat	>	Hierarchy
<i>False Negative</i>	Hierarchy	>	Flat	>	Second opinion
<i>False Positive</i>	Flat	>	Second opinion	>	Hierarchy
<i>Reject Bad Idea</i>	Hierarchy	>	Second opinion	>	Flat
<i>Overall Throughput</i>					
<i>Accept Good Ideas</i>	Flat	>	Second opinion	>	Hierarchy
<i>False Negatives</i>	Flat	>	Hierarchy	>	Second opinion
<i>False Positives</i>	Flat	>	Second opinion	>	Hierarchy
<i>Reject Bad Ideas</i>	Flat	>	Hierarchy	>	Second opinion

Optimal authority structure

- Which structure should a firm use?
- Depends on payoffs associated with each outcome
- **Small upside, large downside**
doing a good job results in small gains, making a mistake produces a huge loss (e.g. airlines)
- **Large upside, small downside**
doing a good job results in large gains, making a mistake produces a small loss (e.g. young, small firms)

Authority structure depends on expected payoffs

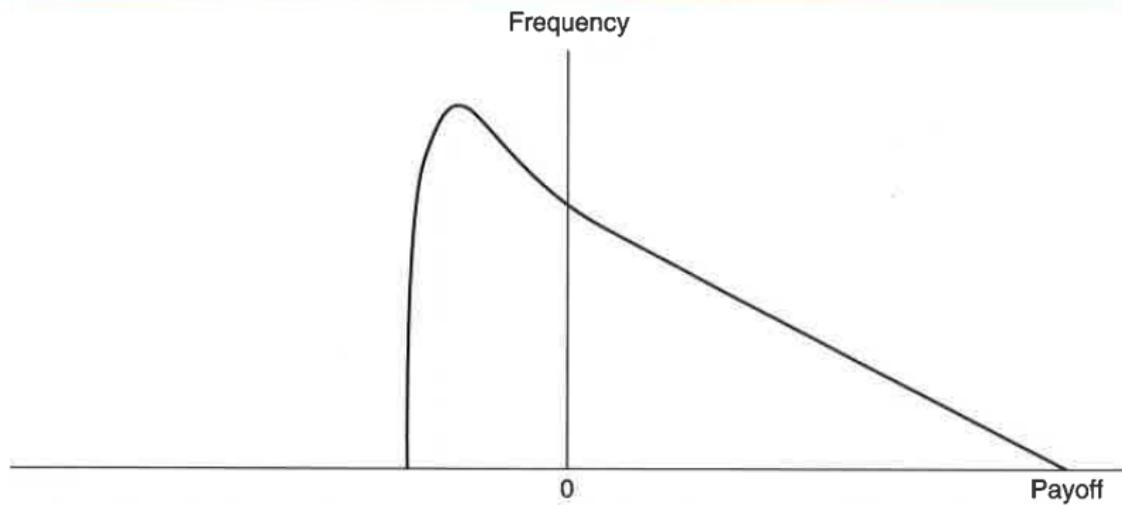
FIGURE 5.5
SMALL UPSIDE, LARGE DOWNSIDE



Minimize false positive errors \implies hierarchical structure

Authority structure depends on expected payoffs

FIGURE 5.6
LARGE UPSIDE, SMALL DOWNSIDE



Minimize false negative errors \implies flat structure

Questions?