The Organization of Decisions within Firms

workshop

Institutional and Organizational Economic Academy
Cargèse , May 2016

Magda Dobrajska,
Assistant professor
Copenhagen Business School,
Department of Strategic Management and Globalization
md.smg@cbs.dk

My research interests

- Organizational design
- Decision-making in firms
- Delegation of decision-making
- The boundaries of the firm

Decision making in firms

- Why is the organization of decisions within firms important?
- How does the organizational structure of decision-making within a firm affect organizational performance?
- How do firms adapt their decision-making structures?

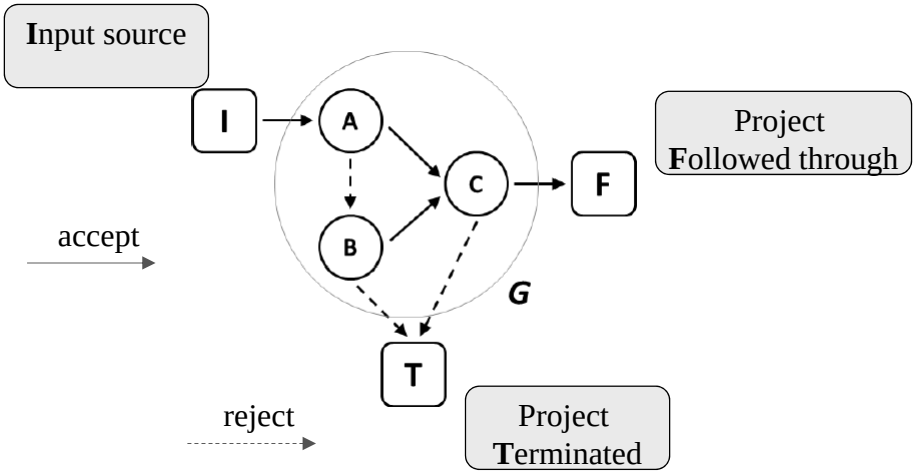
- Theoretical foundations
- Empirical approaches
- Discussion

Theoretical foundations

- **Organization theory**
- **Behavioral theory of the firm** (March & Simon; Cyert and March)
  - Bounded rationality
  - "what happens to information as it is processed through the organization? What predictable screening biases are there in an organization? "
    Cyert and March 1963, p.2:
  - Individuals as building blocks of organizational structures
- **Carnegie tradition:** understanding of organizational structure as :
  'the pattern of communications and relations among a group of human beings, including the processes for making and implementing decisions' (Simon, 1947/1997: 18–19).
- Organizational structure as a "forgotten pillar" of the Carnegie school
  (Gavetti, Levinthal, Ocasio, 2007)

Information processing perspective Organizational structure defines how information flows and is aggregated inside organizations (building on Chandler 1962, Barnard 1938; Sah & Stiglitz; Marschak & Radner 1972, Radner 1992, Garicano 2000)

Decision (evaluation) structures



(Sah & Stiglitz 1986; Christensen & Knudsen 2010, 2013)

Decision structures matter

- Can we add another employee somewhere in the decision process to increase economic performance?
- Can we add or eliminate a channel of communication to raise the quality of decisions?
- What level of skill is worth paying for when we hire a decision maker?
- Is its good idea to push decision makers beyond their current capacity if doing so increases their error rate by five percent?
- Where does the injection of inexperienced decision makers hurt the least?

(Chrsitensen & Knudsen, 2013)

Decision structures matter

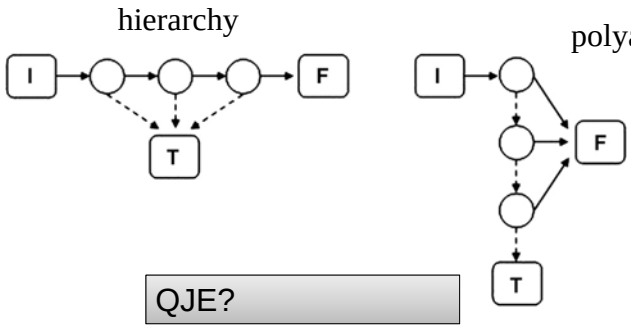
Copenhagen Business School
HANDELSHØJSKOLEN

Decision structures:

- The genuinely organizational aspect of organizational decision making
- The composition of decision structures can easily be adapted to influence decision quality
- Organizational designers / managers can improve decision making processes and structure
- Relevant for any kind of organization: social, for profit, political, academic, economic

Evaluation structures

Copenhagen Business School
HANDELSHØJSKOLEN



QJE?

accept

reject

Sah & Stiglitz 1968,
Christensen & Knudsen 2010

Hierarchy: unanimity required

- 2 decision makers
- Each with 50% chance of approving a project
- 100 projects

- **Unanimity**: both decision makers **MUST agree to accept** (otherwise, project rejected)
- # projects approved on average:
- = 100 x 0.5 x 0.5 = 25

- → hierarchy approves 25 /100 projects

Polyarchy: decentralization

- 2 decision makers
- Each with 50% chance of approving a project
- 100 projects

- **Approval of 1 decision maker is sufficient** to accept a project (otherwise, project rejected)
- Each project is accepted unless both decision makers reject it
- # projects approved on average:
- = 100 – 25 = 75

- → Polyarchy approves 75 /100 projects

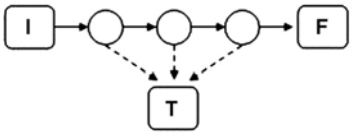
1st prediction of Sah & Stiglitz

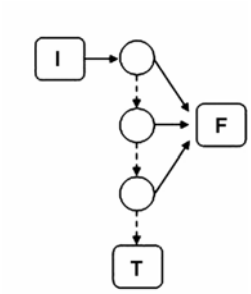
Copenhagen Business School
HANDELSHØJSKOLEN

1) If the number of decision makers on the committee is fixed, then, on average, lowering the consensus level leads to *more approved projects*

Polyarchy: 75/100

Hierarchy : 25/100



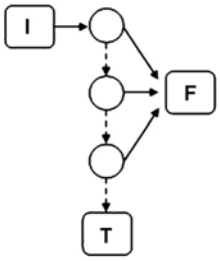


Evaluation structures and Type I and type II errors

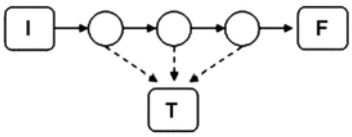
Copenhagen Business School
HANDELSHØJSKOLEN

- Type I error: of rejecting a superior alternative
  - **Omission** error
- Type II error: of accepting an inferior alternative
  - **Commission** error

polyarchy



hierarchy



Decision structure and error proclivity

Copenhagen Business School
HANDELSHØJSKOLEN

- 50 out of 100 projects are good
- 2-member committee. Each decision maker has equal probability of accepting or rejecting a good or bad project
- 25% chance of accepting a good project, accepting a bad project, rejecting a good project, or rejecting a bad project

Probability of accepting bad project:

- **Hierarchy** (unanimous committee) :
  100 projects x 0.25 x 0.25 = 6.25 commission errors
- **Polyarchy** (one person's acceptance is sufficient) :
  100 projects x 0.25 + (1-0,25)x0.25 = 43.75 commission errors

Probability of rejecting good project:

Hierarchy: 43.75 omission errors (at least one member rejects)

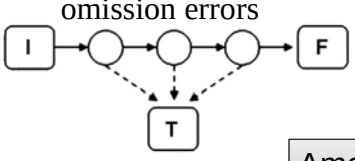
Polyarchy: 6.25 omission errors (both members reject)

Evaluation structures and Type I and type II errors

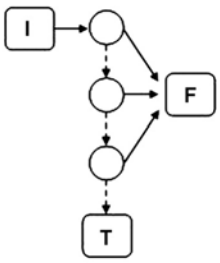
Copenhagen Business School
HANDELSHØJSKOLEN

- Type I error: of rejecting a superior alternative
  - **Omission** error
- Type II error: of accepting an inferior alternative
  - **Commission** error

Hierarchy: commit omission errors



Polyarchy: commit commission errors



American Economic Review? QJE?

Key predictions of Sah & Stiglitz

Copenhagen Business School
HANDELSHØJSKOLEN

lowering the consensus level →

- (1) more approved projects,
- (2) fewer omission errors,
- (3) more commission errors.

Decision contexts

Copenhagen Business School
HANDELSHØJSKOLEN

- When is reduction of omission errors important?
    - Innovation labs
    - Recruiting a brilliant academic
- When is reduction of commission errors critical?
    - High reliability organizations : nuclear power plants
    - Emergency rooms
- When is omission error costlier than commission error?

Quick sum up

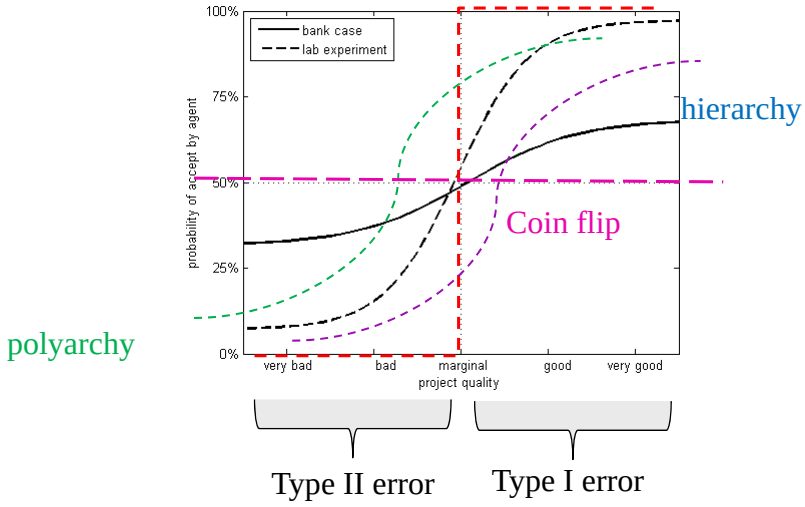
- Hierarchies reduce type II (commission) errors
- Hierarchies commit type I (omission) errors

- Polyarchies reduce type I errors
- Polyarchies commit type II errors

- The higher the consensus level , the fewer projects will be accepted (Sah & Stiglitz)

Does it matter? Error rates are correlated with costs and benefits.

Screening functions: judgement abilities



Agents and their imperfect judgement abilities

Copenhagen Business School
HANDELSHØJSKOLEN

- **The task environment is noisy** – uncertain outcome of the project
- **The agent is noisy** –behavior is not consistent.
  - When agent= team
  - Weak or strong mental form, mood, sunny days

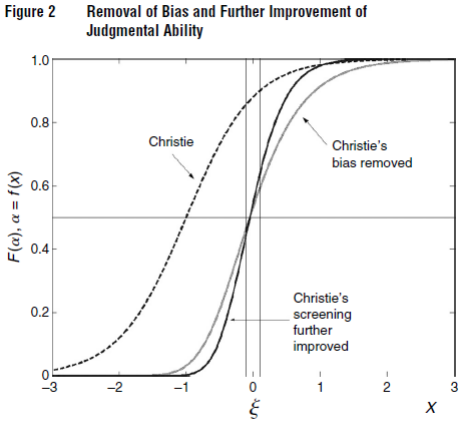
- **The agent is biased** – a deviation from symmetric screening around the point of zero project value; particular alternatives are favored by the agent over equally valid alternatives.
  - Motivational problems
  - Misaligned incentives
  - Internal to the organization

Poor Judgement Ability: the agent's zone of uncertainty exceeds the system's tolerance for error.
  - Judgement ability may be low even in absence of bias

Unbiased structure composed of a hierarchy of biased (optimistic) managers

Copenhagen Business School
HANDELSHØJSKOLEN

Christie is an optimist!



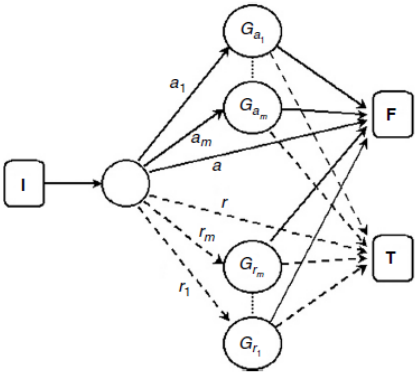
By a self-dual structure of unbiased memebrs

Or by a HIERARCHY of 5 optimists!

Details in: Christensen, M., & Knudsen, T. 2010. Design of Decision-Making Organizations. ***Management Science***, 56(1): 71–89.

How to repair an evaluation structure?

Copenhagen Business School
HANDELSHØJSKOLEN



See:
Christensen, M., & Knudsen, T. 2010. Design of Decision-Making Organizations. ***Management Science***, 56(1): 71–89.

Empirical test 1: ***The bank***

Christensen & Knudsen, 2010

Copenhagen Business School
HANDELSHØJSKOLEN

MANAGEMENT SCIENCE
Vol. 56, No. 1, January 2010, pp. 71–89
ISSN 0025-1909 | EISSN 1526-5501 | 10 | 5601 | 0071

informs
DOI 10.1287/mnsc.1090.1096

Design of Decision-Making Organizations

Michael Christensen, Thorbjørn Knudsen
Strategic Organization Design Unit, Department of Marketing and Management, University of Southern Denmark, DK-5230 Odense M, Denmark {moga@magnicomp.dk, tok@sam.sdu.dk}

Empirical test 1: ***The bank***

Christensen & Knudsen, 2010

Copenhagen Business School
HANDELSHØJSKOLEN

Typical credit application: $1 million

Decision structure; Credit evaluator can:

- Reject
- Approve
- Consult with peer
- Refer upwards

- Performance measure: number of defaults, frequency of losses
- Error rate for the bank: 0.5%
- The bank's objective: to minimize the incidence of Type I and Type II errors subject to the constraints of the number of available evaluators and their ability

Judgement ability and bias

Copenhagen Business School
HANDELSHØJSKOLEN

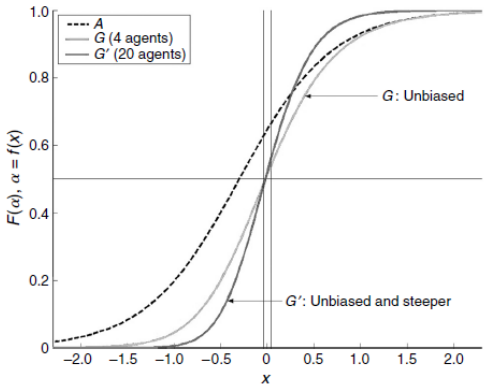
- *Judgement* bias
  - an optimist
  - "healthy" Conservative bias: exclude some good applications

- *Poor Judgement Ability*:
  - Judgement ability may be low even in absence of bias

  - **Research design:**
- Screening functions extracted from 40 randomly selected credit evaluators
  - Fake credit applications of known quality based on 12 indicators commonly used by the bank

Fixing the structure:
Unbiased structure composed of a hierarchy of biased (optimistic) managers

Figure 6 Repairing a Biased Screening Function



A- a biased, optimistic evaluator

Step1: remove initial bias:
G: a structure of biased evaluators: two-member polyarchy in which the last agent accepts to another two-member polyarchy

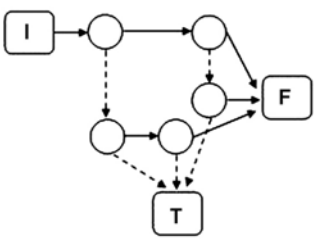
Step 2: reduce zone of uncertainty:
G' : steepened screening function due to self- dual structure (20! Agents)

Details in: Christensen, M., & Knudsen, T. 2010. Design of Decision-Making Organizations. ***Management Science***, 56(1): 71–89.

How to repair an evaluation structure

Optimistic evaluations are checked by a hierarchy; pessimistic evaluations are checked by a polyarchy

Self-dual hybrid



accept

reject

Christensen & Knudsen 2010

Empirical test 2:
Csaszar, 2012

Strategic Management Journal
Strat. Mgmt. J., **33**: 611–632 (2012)
Published online EarlyView in Wiley Online Library (wileyonlinelibrary.com) DOI: 10.1002/smj.1969
Received 15 January 2010; Final revision received 10 June 2011

ORGANIZATIONAL STRUCTURE AS A DETERMINANT OF PERFORMANCE: EVIDENCE FROM MUTUAL FUNDS

FELIPE A. CSASZAR*
Stephen M. Ross School of Business, University of Michigan, Ann Arbor, Michigan, U.S.A.

First large sample test of the theory of Sah & Stieglitz!

Hypotheses

H1: Decentralized organizations accept more projects than centralized organizations.

H2: Decentralized organizations make fewer omission errors than centralized organizations.

H3: Decentralized organizations make more commission errors than centralized organizations.

Research design

- 150,000 stock-picking decisions
- 609 mutual funds

- **Independent variables**: organizational design:
  - Individual, decentralized, centralized
  - From management descriptions by industry analysts

- **Dependent variables** :
  - number of approved projects
  - omission and commission errors:
    - Investments: asset buy/ don't buy decisions
    - Ex post return on each asset

Appreciate the empirical challenge…

all of the following must be observed:
(1) organizations making decisions about projects,
(2) The organizational structure of each organization.
(3) a measure of the quality of each project decided upon,
(4) the decision that each organization made with respect to every project it faced – including decisions NOT TO act

Organization of decisions

- C : consensus level
- N : number of committee members
- N=3 , C=1, or 3/1 : one out of three -> decision approved
- N=2, C=2 , or 2/2 : two out of two
- 3/3 : either a 3-level hierarchy, or a 3 –member consensus committee

- Dependent variables: dummies
- Individual (1/1) , decentralized (N/1) , centralized (N/N) (omitted cat.)

Structure (N/C)	Excerpts from Morningstar's mutual fund description
1/1	'Ron Baron has been at the helm since the fund's inception... He's the driving force behind this portfolio... buys companies he thinks can...' (BPTRX)
2/1	'Managers Scott Glasser and Peter Hable each run 50 percent of the portfolio...' (CSGWX)
3/1	'Three management firms select 10 stocks apiece for this fund's portfolio.' (SFVAX)
5/1	'(The fund) divvies up assets among five subadvisors, and each picks eight to 15 stocks according to his own investing style.' (MSSFX)
2/2	'Teresa McRoberts and Patrick Kelly became comanagers of this fund in late September 2004... They don't pay too much attention to traditional valuation metrics such as...' (ACAAX)
7/7	'All investment decisions are vetted by the entire seven-person team... Management populates the fund with 30–50 stocks...' (CBMDX)

DV

- **H1: # of accepted projects :** Log of stocks bought per quarter
- **H2: Omission errors**: when a fund failed to buy an asset that turned out to have a good performance
- **H3: Commission errors**: asset whose ex-post performance fell below a given benchmark

Data required:

- A list of assets that the fund *did* and *did not* buy
- Performance of assets

- Asset performance below / above the average return of the assets in the fund's investment universe at time t.
- Investment universe for each fund
- A measure adjusted for portfolio size, universe size and a number of bad stocks in the investment universe
- (hypergeometric distribution; bootstrapped to account for error size)

Control variables

- Risk profile of the fund
- Parent size (log)
- Fund size (log)
- Investment category dummies

Number of stocks bought (# projects accepted)

Table 3. Results of regression analysis of number of stocks bought

	Dependent variable: log(#stocks bought)				
	A1	A2	A3	A4	A5
Decentralized (structure N/1)	0.647*** (0.141)	0.630*** (0.138)	0.582*** (0.167)	0.580*** (0.169)	0.544*** (0.162)
Individual (structure 1/1)	0.119 (0.100)	0.091 (0.100)	0.041 (0.090)	0.041 (0.090)	0.047 (0.091)
Beta		0.848*** (0.236)	0.880*** (0.245)	0.883*** (0.253)	0.419+ (0.250)
log(*ParentSize*)			0.187** (0.060)	0.186** (0.062)	0.210*** (0.060)
log(*FundSize*)				0.003 (0.027)	0.013 (0.025)
Category effects (joint test)					***
Constant	2.215*** (0.097)	1.259*** (0.273)	0.851** (0.325)	0.832* (0.399)	0.982* (0.414)
Observations	6090	6090	6090	6090	6090
Adjusted R2	0.030	0.090	0.137	0.135	0.213

Note: Robust standard errors between parentheses.
+ p < 0.10, *p < 0.05, **p < 0.01, ***p < 0.001 (two-tailed tests).

omission errors

Copenhagen Business School
HANDELSHØJSKOLEN

Table 5. Results of regression analysis of omission error

	Dependent variable: omission error				
	B1	B2	B3	B4	B5
Decentralized (structure *N*/1)	−0.162*	−0.162*	−0.150*	−0.172*	−0.161*
	(0.077)	(0.077)	(0.069)	(0.074)	(0.078)
Individual (structure 1/1)	−0.054	−0.054	−0.042	−0.044	−0.043
	(0.046)	(0.046)	(0.046)	(0.046)	(0.047)
Beta		0.019	0.011	0.037	0.034
		(0.071)	(0.071)	(0.071)	(0.078)
log(*ParentSize*)			−0.047**	−0.062***	−0.064***
			(0.016)	(0.017)	(0.018)
log(*FundSize*)				0.033**	0.035**
				(0.012)	(0.013)
Category effects (joint test)					not sig.
Constant	−0.119**	−0.140	−0.039	−0.235+	−0.217+
	(0.039)	(0.089)	(0.100)	(0.127)	(0.130)
Observations	6090	6090	6090	6090	6090
Adjusted R^2	0.005	0.004	0.014	0.024	0.022

commission errors

Copenhagen Business School
HANDELSHØJSKOLEN

Table 6. Results of regression analysis of commission error

	Dependent variable: commission error				
	C1	C2	C3	C4	C5
Decentralized (structure *N*/1)	0.184**	0.183**	0.177*	0.164*	0.146*
	(0.068)	(0.067)	(0.071)	(0.075)	(0.073)
Individual (structure 1/1)	0.054	0.051	0.045	0.044	0.045
	(0.044)	(0.044)	(0.042)	(0.041)	(0.041)
Beta		0.079	0.083	0.098	0.082
		(0.079)	(0.080)	(0.088)	(0.103)
log(*ParentSize*)			0.023	0.014	0.014
			(0.019)	(0.018)	(0.018)
log(*FundSize*)				0.019	0.018
				(0.014)	(0.014)
Category effects (joint test)					not sig.
Constant	0.097**	0.008	−0.042	−0.156	−0.183
	(0.033)	(0.103)	(0.118)	(0.178)	(0.207)
Observations	6090	6090	6090	6090	6090
Adjusted R^2	0.008	0.008	0.010	0.012	0.013

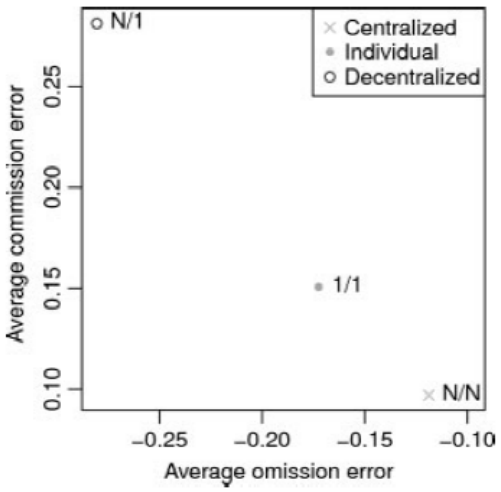


Figure 1. Average (centroids) omission and commission errors of the three organizational structures

Copenhagen Business School
HANDELSHØJSKOLEN

Discussion: Decision making processes

Copenhagen Business School
HANDELSHØJSKOLEN

- Sequential decision making in hierarchies and polyarchies
- Relative degrees of hierarchies and polyarchies; various number of actors in decision structure: Christensen & Knudsen, 2010
- Voting, Other simultaneous decision processes, committees:
  Ben-Yashar & Nitzan 1997; Li et al. 2001; Sah & Stiglitz 1988)
- Hierarchies ~ committees with a high consensus level
- Other mechanisms influence decision-making processes:
  Group think, biases, herding, power, politics

Take-aways

If **omission error** is costlier for an organization: choose a polyarchy (N/1)

- R&D lab in an industry with first mover advantage
- "The real sin is if we miss something" (Bill Gates about Microsoft R&D)
- "miss the moment [in a high tech firm such as Intel] and you start to decline (Andy Grove)

If **commission error** is costlier: choose hierarchy /centralized structure (N/N)

- juries avoid convicting the innocent
- IT department concerned with not leaking sensitive data
- Rather stable environments: in Procter & Gamble new product proposals are reviewed over 40 times before reaching CEO

Some conclusions

- A parsimonious mechanism to explain how individual choices are aggregated by an organizational architecture into macro behaviors : organization-level performance

- Implications for decision outcomes
- For organizational design
- Implications of centralization and decentralization
- For how organizations can pursue exploration and exploitation

Your research ideas about decision structures?

How else can we measure decision structures?

- Delegation: formal vs. real decision authority (Aghion &Tirole 1997; Dobrajska, Billinger & Karim 2015)
- Vertical and horizontal span of decision structures (Dobrajska, Billinger, Becker, working paper)

Copenhagen Business School
HANDELSHØJSKOLEN

Vertical and horizontal adaptation of decision structures in strategic decision making

Magdalena Dobrajska
Copenhagen Business School
Stephan Billinger
University of Southern Denmark
Markus C. Becker
University of Southern Denmark

Working paper

Decision structures

Copenhagen Business School
HANDELSHØJSKOLEN

- Decision making is at the heart of what managers do
- Decision-making involves several organizational members
  - Limited attention (Harris & Raviv, 2002; Wernerfelt, 2007; Gavetti, 2000)
  - Coordination needs (Cyert & March, 1963; Thompson, 1967),
  - Distributed exert knowledge (Dessein, 2002; Jensen & Meckling, 1992)
  - Implementation of top-down decisions (Floyd and Woolridge 1992)
- We don't know much about such decisions are made
- Context: Strategic type of decisions: firm boundary decisions

Decision structures matter…

- Decision structures affect decision outcomes:
  - proclivity to make commission and omission errors
    (Sah & Stiglitz, 1986; Knudsen & Levinthal, 2007; Csaszar, 2012)
  - Suboptimal firm boundary choices
    (Bidwell 2010)
  - Affect organizational responsiveness
    (Bloom et al. 2010; Mendelson, 2000)
  - Room for strategizing, exercising power by middle managers
    (Floyd & Woolridge 1992, Rivkin & Siggelkow, 2003),
- Decision structures:
  - The genuinely organizational aspect of organizational decision making
  - The composition of decision structures can easily be adapted to influence decision quality

Decision structures - motivation

Empirical facts

- Decisions in firms are made by multiple people
- Decision structures shape how different people are involved in the decision: authority and knowledge resources; information flows
- Decision-making in firms involves delegation (Aghion & Tirole 1997, Jensen & Meckling 1876, 1992)
- Top and middle managers; making and implementation of strategic decisions (Floyd & Woolridge 1992)

Research question

How do organizations adapt the composition of their decision structures?

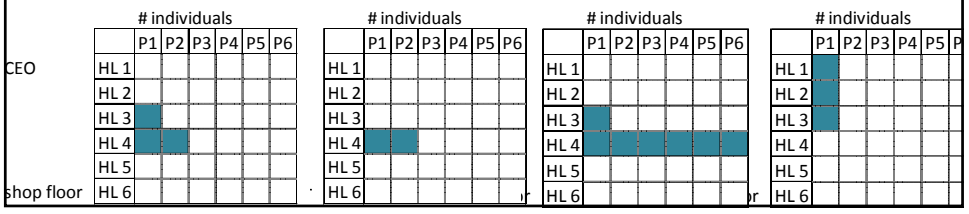
What is the role of decision-specific characteristics and contextual factors?

- decision importance
- complexity
- Routine
- Senior management vs. middle management

Structural components of decision structures

***Vertical span**:* the difference between the highest and lowest of hierarchy levels of involved decision making

- Colocation of authority and decision-specific knowledge (Jensen & Meckling, 1992, Hayek 1947)
- Delegation and decentralization (Collins, Ryan, & Matusik, 1999; Rivkin & Siggelkow, 2003; Colombo & Delmastro, 2004; Bloom et al., 2010)
- Escalation, management by exception (Garicano & Wu, 2012; Sloan, 1924)
- Formal and real decision authority (Aghion & Tirole, 1997), informal authority (Baker, Gibbons & Murphy, 1999)



Structural components of decision structures (2)

Copenhagen Business School
HANDELSHØJSKOLEN

***Horizontal span**:* the number of organizational members at the same hierarchical level that are included in a decision structure

- Sharing the burden of responsibility by seeking the advice of others (Harvey & Fischer, 1997; Yaniv, 2004; JAS)
- Error prevention and improvement of decision accuracy

  (Sniezek et al., 2004; Bonaccio & Dalal, 2006)

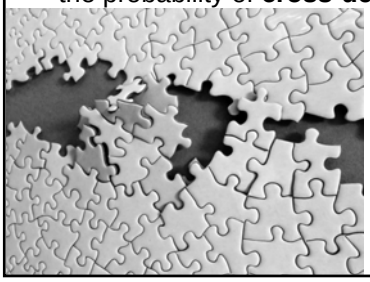
- *Cross-departmental coordination*
  - numerous alternatives and diverse perspectives

  (Bonaccio & Dalal, 2006; Gigone & Hastie, 1993; Heath & Gonzalez, 1995; Schotter, 2003; Stewart, 2001)
  - facilitate lateral communication (Papadakis et al 1998)
- *Knowledge redundancies*
  - redundant monitoring device (Roberts et al., 1994)
  - improve decision makers' confidence (Budescu & Rantilla, 2000)

decision importance and complexity

Copenhagen Business School
HANDELSHØJSKOLEN

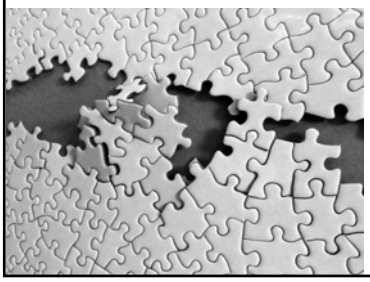
- H1a: The *importance* and *complexity* of a strategic decision are **positively** associated with the **vertical span** of decision structure
- H1b: The *importance* and complexity of a strategic decision are **positively** associated with the **horizontal span** of decision structure
- H1c: The **importance** of a strategic decision is positively associated with the **probability of redundant knowledge** in the decision structure
- H1d: The **complexity** of a strategic decision is positively associated with the probability of **cross-departmental coordination** in the decision



predictions

Decision importance and complexity

- The *importance* of a strategic decision is **positively** associated with the **vertical span, horizontal span, probability of redundant knowledge** of decision structure
- The *complexity* of a strategic decision is **positively** associated with the **vertical span, horizontal span, probability cross-departmental coordination in** decision structure



Routine decision

Routine decision in strategic decision making is **negatively** associated with the **vertical span,**

horizontal span,

probability of redundant knowledge,

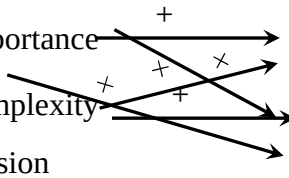
probability cross-departmental coordination in decision structure

Senior vs. middle management

H3. Strategic decisions that are delegated to middle management involve different decision structures than strategic decisions made by senior decision makers

Hypotheses

Copenhagen Business School
HANDELSHØJSKOLEN



Decision importance

Decision complexity

Routine decision

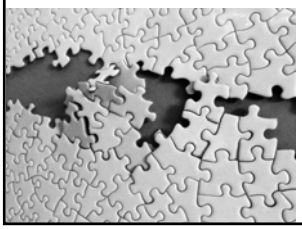
CEO proximity

Vertical span

Horizontal span

Redundant knowledge

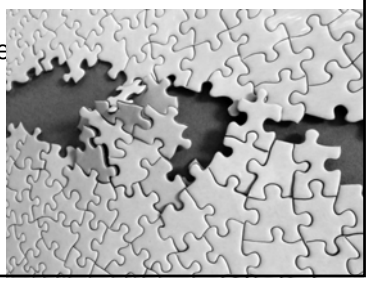
Cross- departmental cooridination



Decision-specific characteristics: decision complexity

Copenhagen Business School
HANDELSHØJSKOLEN

- More knowledge and information processing required to deal with complexity
  (Galbraith, 1974, Tushman & Nadler, 1978)
- Using advisors decreases decision complexity
  (Bonaccio & Dalal, 2006, Brehmer & Hagafors, 1986)
- Comprehensive decision process: multiple alternatives and decision criteria
  (Forbes 2007, Frederickson & Mitchell, 1984)
- Diversity of points of view, breadth of expertise
  Frederickson & Mitchell, 1984, Miller, 2008)
- Exchange of tacit and specific knowledge through direct interaction
  (Grant 1996)



Decision-specific characteristics: routine decisions

- **A routine decision**: "*one that was fairly stable over time and one for which the rules and procedures are well established*." Duncan (1974: 711)
  → organizations develop rules and standards for dealing with repeat decisions
  (e.g. March et al., 2000; Nelson & Winter, 1982)

- **a non-routine decision "***was classified as novel, not well structured or well defined, and one that was never really the same over a period of time*"
  (Duncan, 1974: 711)
  → require problemistic search and information processing

Research design

- The firm:
  - manufactures wind turbines and installs wind farms, Fortune 50
  - present in several stages of the industry's value chain
  - firm boundaries decisions 2001-2010:
- Multi-method research design (Edmondson & MacManus, 2007, Eisenhardt 1989): analysis of **qualitative** data and **regression** analysis

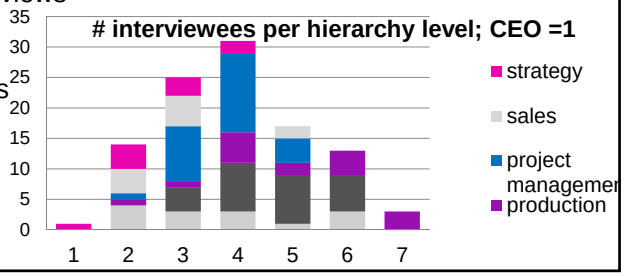
Data

Copenhagen Business School
HANDELSHØJSKOLEN

Dataset:

- N=234 firm boundary decisions 2001-2010
- Production schedules, sales orders, purchase & production orders reports; headcount overviews

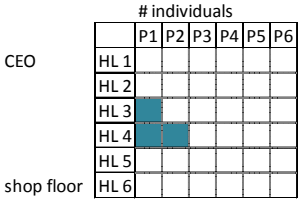
- Unit of analysis: Firm boundary decision and a corresponding decision structure: **active involvement of organizational members in decision making**
- 104 semi-structured interviews
- Organizational charts
- Site visits over 20 months

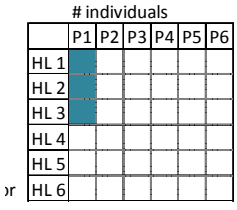


Dependent variables: dimensions of decision structures

Copenhagen Business School
HANDELSHØJSKOLEN

- ***Hierarchical span*:** the difference between the highest and lowest hierarchical levels of involved decision makers (0-2)
- ***Expertise span:*** the number of same-level decision makers (0-2)





What does participation in decision-making mean?

Responsibility charting technique defines modes of participation in decisions:

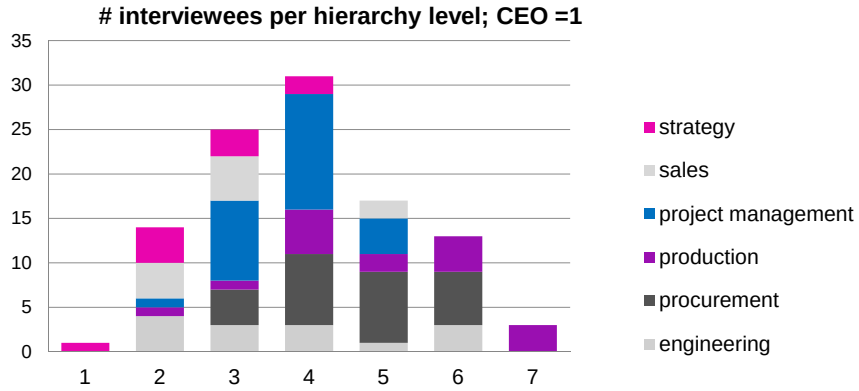
- executing
- contributing
- being responsible

} Active participation

- being informed

Actual decision making; not a formal organizational design and allocation of decision rights

Overview of interviews



Participation- example

Copenhagen Business School
HANDELSHØJSKOLEN

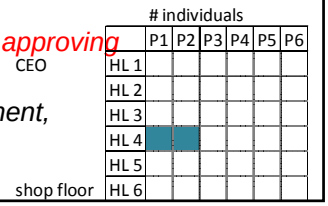
Active fulfillment of roles :

- *Executing* role (Project manager HL4) ***is actively involved***
- *Contributing role (Site manager, HL4)* ***is actively involved***
- *Responsible person (Head of PM)* ***is NOT actively involved***

Interviewee: We hired local labor to help us out. Decision making in that respect was between myself (HL4) and the site manager (HL4). We agreed that we needed certain things, and we went out to local companies that supply labor and we got that workforce to help us. I was the manager for that project.

Interviewer: Was a higher-level manager involved in approving that decision?

Interviewee: For my projects? No. (Project Management, hierarchical level 4)



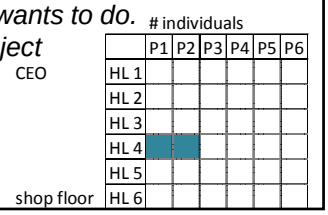
Participation- example (3)

Copenhagen Business School
HANDELSHØJSKOLEN

Active fulfillment of roles :

- *Executing* role (Project manager HL4) ***is actively involved***
- *Contributing role* (global resource pool representative, HL4) ***is actively involved***

"It is a project manager (PM) (HL4) [who decides about the extent of outsourcing in his wind-farm project], but (…) he will be given very strong advice by the global resource pool representative for his project (HL4) regarding the resources that are available to him. (…). In each case, it would be a joint decision between the PM and he will discuss with the global resource pool coordinator how many resources are available for him to do what he wants to do. That will therefore ultimately affect his decision."(Project management, hierarchical level 4)



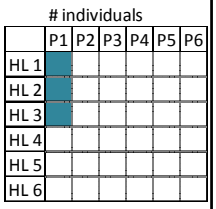
Participation- example

Copenhagen Business School
HANDELSHØJSKOLEN

Active fulfillment of roles :

- R*esponsible person (CEO)* ***is actively involved***
- *Executing* roles (Sales manager HL3 + HL2) ***are actively involved***

"[Letting the customer perform turbine installation tasks] was managed and pushed by the regional division: myself (HL3) and the head of the region (HL2), and accepted eventually by the organization and the headquarters. (…) CEO (HL1), through the process, obviously had ultimate approval of what we did, so he was integrally involved in the decision." (Sales, HL 3)



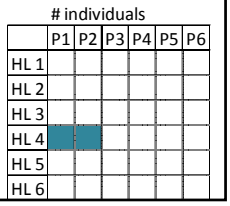
Participation - example (2)

Copenhagen Business School
HANDELSHØJSKOLEN

Active fulfillment of roles:

- R*esponsible* person **is NOT actively involved**
- Sales team: **active** fulfillment of *executing* and *contributing* roles

"We have 'standard' scope that is approved, where generally [customer installation] and full scope [installation provided by Viento] is approved in advance, so (…) you kind of do a 'blank' approval as long as it is a standard project, standard country, standard size, standard customers; then it is up to the sales team (HL4) whether it is [customer installation] or full scope. (…) We allow the individual sales managers to make that determination" (Sales, HL 2)



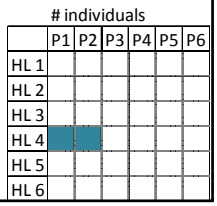
Participation - example (3)

Copenhagen Business School
HANDELSHØJSKOLEN

Active fulfillment of roles:

- *Executing: project manager (PM) ,* ***is actively involved***
- *Contributing:* resource coordinator ***is actively involved***
- R*esponsible person* ***is NOT actively involved***

"It is a PM (HL4) [who decides about the extent of outsourcing in his wind farm project], but (…) he will be given very strong advice by the global resource pool representative to his project (HL4) regarding what resources are available to him. (…). In each case it would be a joint decision between PM and he will discuss with the global resource pool coordinator how many resources are available for him to do what he wants to do, and that will therefore ultimately affect his decision."(Project management, HL 4)



Dependent variables

Copenhagen Business School
HANDELSHØJSKOLEN

- **Vertical span**
- **Horizontal span**

  → **bivariate ordered probit**

- **Cross-departmental coordination**: coded 1 when *at least two of functional departments*, which were represented at the hierarchy level at which we measure expertise span
- **Knowledge redundancies**: coded 1 when there are at least two *same-level persons with the same expertise background involved*

  → **bivariate probit**

Measures

- ***decision importance*** – ln of estimated total Euro value of the transaction which is the object of the decision
- ***decision complexity*** - the number of decision criteria used by decision makers
- ***routine decision*** **-** 0-3 scale whether a decision regarding this boundary choice has been taken before within in the firm, taken before in the same market segment, and whether the same combination of decision criteria has been considered before
- **CEO proximity**: has the highest value when the CEO participates in decision making, and the lowest when decisions at taken at the shop floor

Controls

- **Escalation**: coded 1 when a decision in the current time period involves a person from a higher hierarchy level compared to a prior related decision
- **Delegation** is coded 1 when decision structure includes additional lower hierarchy level(s) compared to a prior related decision
- **CEO proximity**: has the highest value when the CEO participates in decision making, and the lowest when decisions at taken at the shop floor
- **Overseas subsidiary**
- **Category of activity**: Upstream (production and engineering), construction (planning phase), installation (sales phase)
- **Year dummies, market growth, headcount**

A controlling and monitoring mechanism

Copenhagen Business School
HANDELSHØJSKOLEN

"The entire [firm] is run according to a principle called "**the four eyes principle**". This simply means that a safety function has been installed in the decision-making process. The reason is that two people know more than one, and so two pairs of eyes are able to spot a mistake better than one pair. […]. Before you make a big decision, you better review it and discuss it with others. […] […] nothing secret or magic: Just common sense applied in a big company." (CTO, hierarchy level 2)

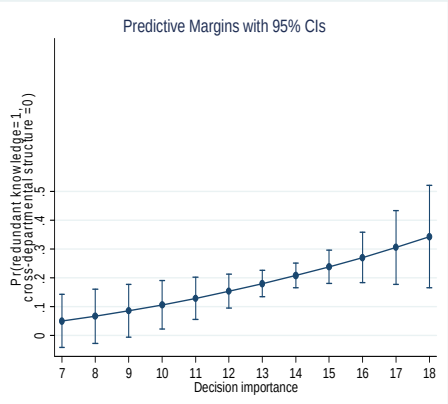
- Why do they have the "four-eyes principle?
- No rules regarding WHOM to involve: a colleague or the boss?

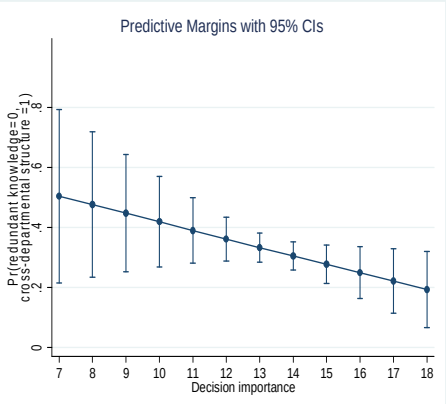
Copenhagen Business School
HANDELSHØJSKOLEN

	VERTICAL SPAN		HORIZONTAL SPAN	
	1a	2a	1b	2b
Decision importance		0.151		0.206***
		(0.107)		(0.061)
Decision complexity		0.235**		0.443**
		(0.089)		(0.141)
Routine decision		-0.462***		0.297+
		(0.115)		(0.152)
CEO proximity		1.517***		0.244+
		(0.349)		(0.136)
Formal decision rights	0.473*	0.605*	-0.050	0.443
	(0.205)	(0.248)	(0.265)	(0.343)
Overseas subsidiary	1.072***	0.784***	0.479*	-0.136
	(0.197)	(0.199)	(0.241)	(0.275)
Upstream	0.563*	2.500**	-1.902***	-1.072*
	(0.251)	(0.937)	(0.361)	(0.463)
	(0.291)	(0.476)	(0.340)	(0.419)
Year				
Constant, athrho	0.430***	0.511***	0.430***	0.511***
	(0.114)	(0.135)	(0.114)	(0.135)
Constant cut 1	0.894**	8.735***	-1.304***	4.329***
	(0.277)	(1.919)	(0.319)	(1.263)
Constant cut 2	2.056***	11.849***	0.557*	6.456***

	REDUNDANT KNOWLEDGE		CROSS-DEPARTMENTAL COORDINATION	
	1a	2a	1b	2b
Decision importance		0.271*		-0.097
		(0.109)		(0.108)
Decision complexity		0.048		0.684***
		(0.133)		(0.157)
Routine decision		-0.254		-0.608***
		(0.166)		(0.174)
CEO proximity		0.162		0.731**
		(0.244)		(0.227)
Formal decision rights	0.357	0.662	-0.745**	-1.078***
	(0.365)	(0.416)	(0.241)	(0.327)
upstream	2.169***	2.625**	0.386	0.601
	(0.532)	(0.858)	(0.478)	(1.134)
Overseas subsidiary	2.397***	2.194***	-0.889**	-1.748***
	(0.295)	(0.347)	(0.288)	(0.493)
Constant	-0.465	-5.358*	-0.771+	-2.985
	(0.567)	(2.382)	(0.459)	(2.051)
athrho	-0.404*	-1.165	-0.404*	-1.165
	(0.175)	(0.827)	(0.175)	(0.827)
Observations	203	203	203	203
Model chi-square	139.0	168.8	139.0	168.8
df	18	24	18	24
Log likelihood	-122.3	-102.1	-122.3	-102.1
N	203	203	203	203

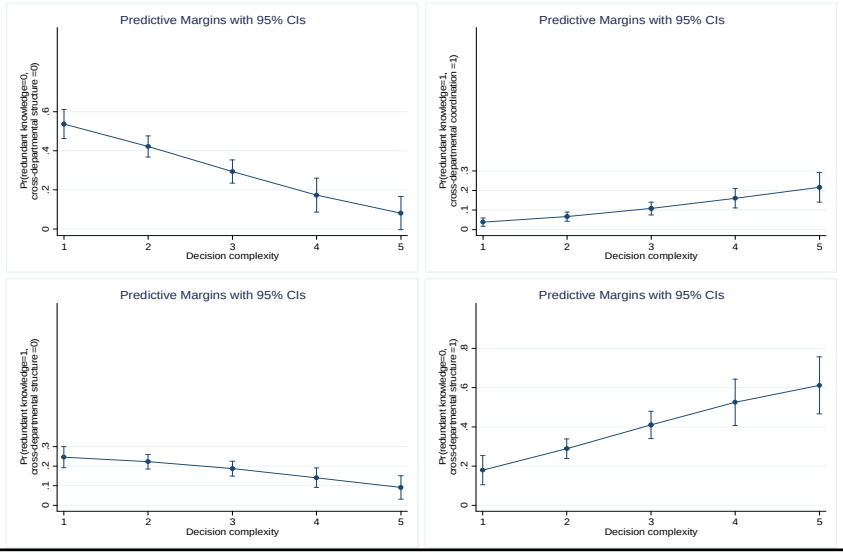
Decision importance redundant knowledge, cross-dept. coord.





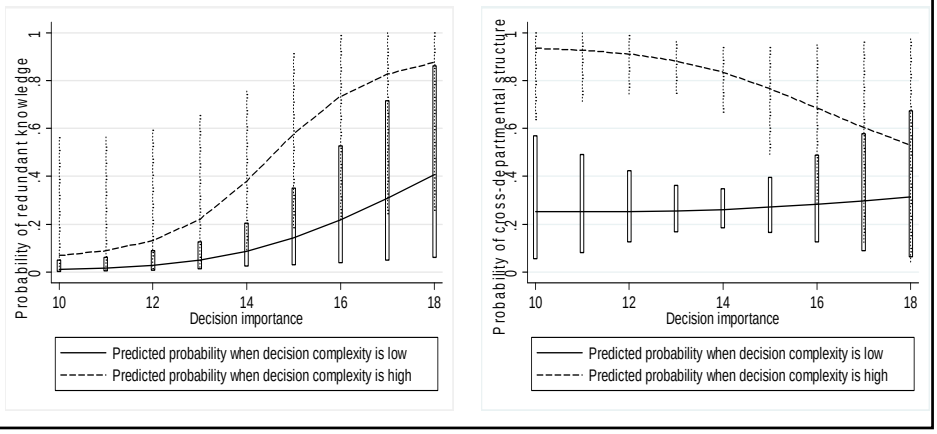
Complex decisions; redundant knowledge, cross-dept. coord.

Copenhagen Business School
HANDELSHØJSKOLEN

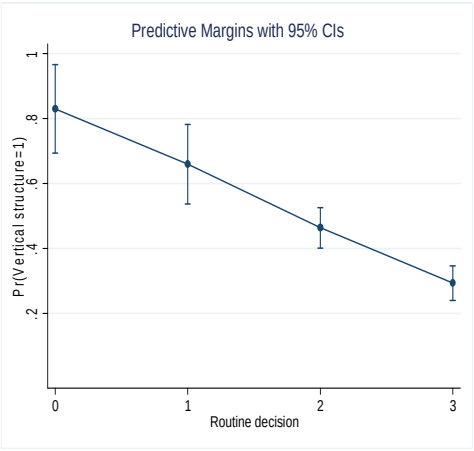


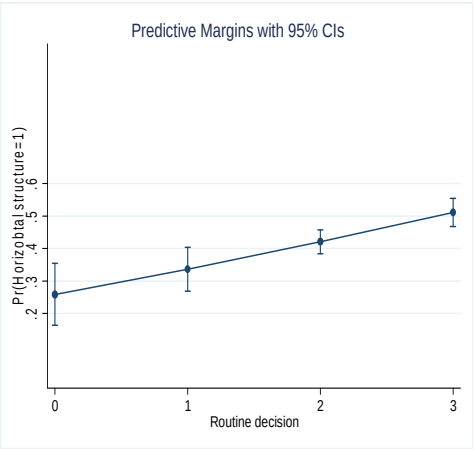
Complex x important decisions; redundant knowledge, cross-dept. coord.

Copenhagen Business School
HANDELSHØJSKOLEN

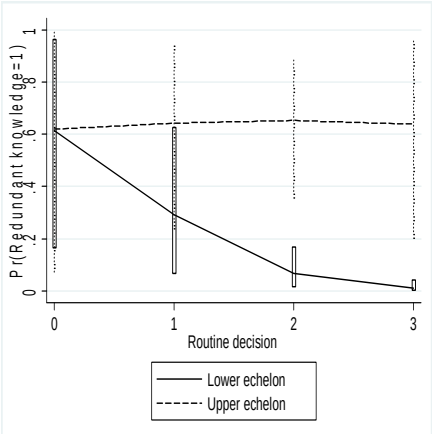


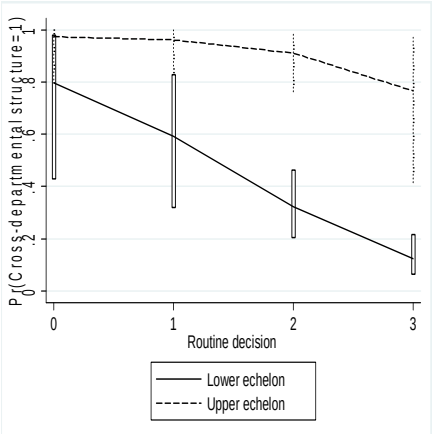
Routine decision





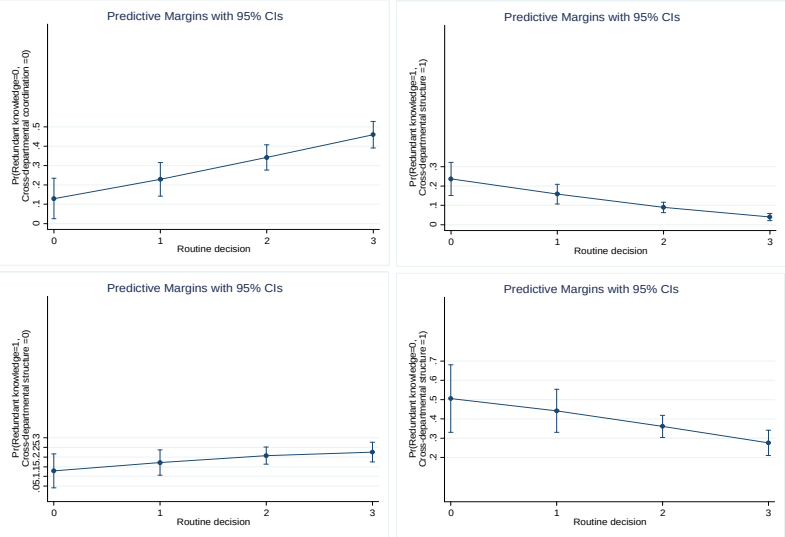
Routine decision x CEO proximity; Redundant knowledge, cross-dept. coord.





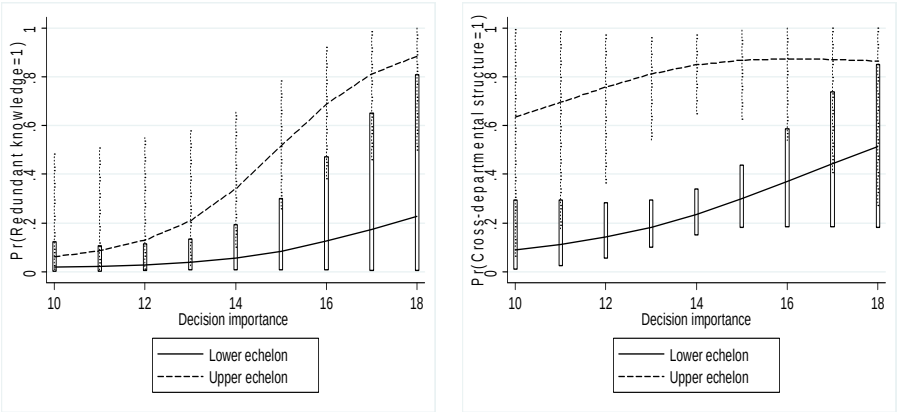
Routine, redundant knowledge, cross-dept coordination

Copenhagen Business School
HANDELSHØJSKOLEN



Decision importance x CEO proximity

Copenhagen Business School
HANDELSHØJSKOLEN



Contribution

- Theories of organizational decision making (March, 1994; Heath & Sitkin, 1991
- Contribution to the literature
- on **decision structures** (Sah & Stiglitz, 1986; Christensen & Knudsen, 2010; Bidwell, 2010, 2012): we study origins of empirically observable decision structures
- on **decision processes** (Papadakis et al, 1998; Elbanna &Child, 2007)
- on **delegation** (Colombo & Delmastro, 2004; Bloom et al., 2010,2012)
  - we complement it with demonstration of micro-level mechanisms
  - We explain the horizontal dimension to the delegation literature
- on delegation and **the agency problem** (Jensen & Meckling, 1992; Foss & Laursen, 2005, Vazquez, 2004)
- divergence between **formal and real authority** (Aghion & Tirole, 1997.
- **microfoundations** of behavior in organizations (Argote & Greve 2007; Gavetti et al. 2012; Foss, 2011)

Conclusion

- <u>Substitutive adaptation mechanisms:</u>
  - vertical span is replaced with horizontal span as decisions become routinized
  - Redundant knowledge and cross-departmental coordination substitute each other
- Novel empirical observation:
  - Delegation (reduction of hierarchy span) is compensated by increased expertise span
  - The effect of routine on decision structure
- Forces behind the substitution effect:
  - knowledge *integration* and knowledge *redundancies* in function of comprehensiveness, interdepartmental knowledge integration and error prevention;

Limitations

- Whether this adaptation leads to an effective outcome remains unclear
- Generalizability: large firms with at least three hierarchy levels; problem-solving tasks

Potential extensions

- Which theories would produce contradicting predictions?
- Potential settings for testing the effect of decision structures on decision outcomes / performance?