Learning from Others? Decision Rights, Strategic Communication, and Reputational Concerns

Otto H. Swank and Bauke Visser

Erasmus School of Economics and Tinbergen Institute

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Introduction

At different locations, agents address similar problems in different ways.
Wish:

- Identify best practice
- Ensure its diffusion

This raises (at least) two problems:

- Information dispersed $\longrightarrow$ communication needed
- Reputational concerns $\longrightarrow$ identification with 'own' practice; conservatism, distortion

Design learning process
In practice: designing successful learning process difficult

Difficulties

1. Learning from own past experience
   - Inertia $\rightarrow$ reputational concerns
   - Thaler 1980; Kanodia et al. 1989, Prendergast and Stole 1996
2. Learning from experience of others
   - Willingness to share experience?
   - Use cheap talk literature (Crawford and Sobel 1982)

Example 1: Medical Sector

Delivery medical interventions varies widely from place to place.

- Concern
- Scope for learning

Expert consensus panels
Vested interests, status concerns, social pressure $\longrightarrow$ 'process loss':

- Poor info exchange
- Low adoption rates best practices

Important dimension: Centralization vs Decentralization (freedom) - standards, guidelines, options

Example 2: European Union

Learning from other states/Improving national practices

- Centralization
- Legislation
- Formal sanctions

- Decentralization
- Open Method of Coordination
- Naming and shaming / peer pressure

Policy makers care about prestige, status, not the truth
$\longrightarrow$ OMC 'process loss':

- Poor info exchange,
- Little adoption best practices

Reputational Concerns

- Ability to identify the better technology
- Perception of this ability in objective function

Perception of ability of decision maker

1. Locally determined: based on decisions taken at his site
2. Globally determined: based on decisions taken at all sites

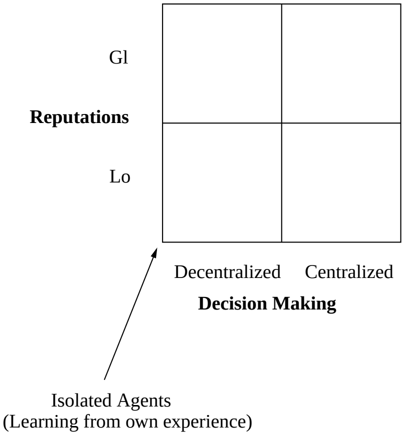
Goal of the Paper

Understand effect of

- decision rights
- determination of reputation

on

- quality of info exchange
- degree of conservatism
- overall quality of technology adoption (welfare)



Important lessons

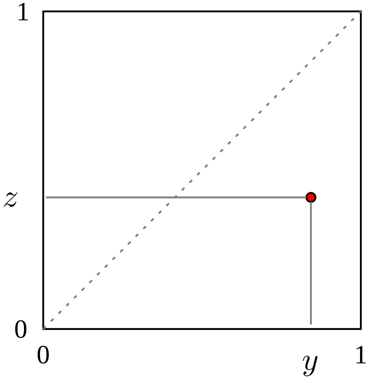
- Decentralized decision-making: more information may lead to worse decisions
- Global comparisons possible: centralized dec-making outperforms decentralized dec-making.

Model of isolated agent

- Two periods, t
- Possible technologies $X_t \in \{Y, Z\}$
- Use of X_t creates payoff. Random variable $\tilde{X}$.
- x: realized payoff value of action X_t, independent of t
- y and z iid, F cdf, continuously diff and increasing on $[0, 1]$

What does Nature determine?

1. Values $(y, z) \in [0,1]^2$
2. Ability level $\theta \in \{\underline{\theta}, \bar{\theta}\}$
   $\pi = \Pr\left(\theta = \bar{\theta}\right) \in (0,1)$
3. Signal
   $s = s(\theta, y, z) \in \{s^Y, s^Z\}$
   Agent's ability $\rightarrow$ accuracy of signal
   - $\theta = \bar{\theta}$ and $y > z \rightarrow s^Y$;
   - $\theta = \bar{\theta}$ and $z > y \rightarrow s^Z$;
   - $\theta = \underline{\theta}$: s^Y with prob 1/2; s^Z with prob 1/2



Timing

- Nature determines (y, z) and θ
- $t = 1$: creating history
  1. Agent receives s
  2. Agent chooses X_1
  3. Agent learns x_1
- $t = 2$: continue or switch?
  1. Agent chooses $X_2 : d(s, x_1) \in \{Y, Z\}$
  2. Agent learns x_2

Objective function etc.

1. Objective function (per period)

$$U(X_t = X) = x + \lambda \Pr(\theta = \bar{\theta} | \Omega_t), \lambda > 0$$

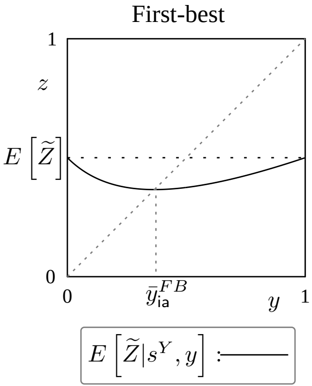
   Define $\hat{\pi}(\Omega_t) := \Pr(\theta = \bar{\theta} | \Omega_t)$

2. Information market $= \Omega_t$
   - Market observes technology adoption, *not* value of technology
   - $\Omega_1 = \{X_1\}$
   - $\Omega_2 = \{X_1, X_2\}$
3. Common prior on ability: $\pi = \Pr(\theta = \bar{\theta})$
4. First-best behaviour = behaviour that maximizes expected value of technologies:

   $t = 1$: follow signal

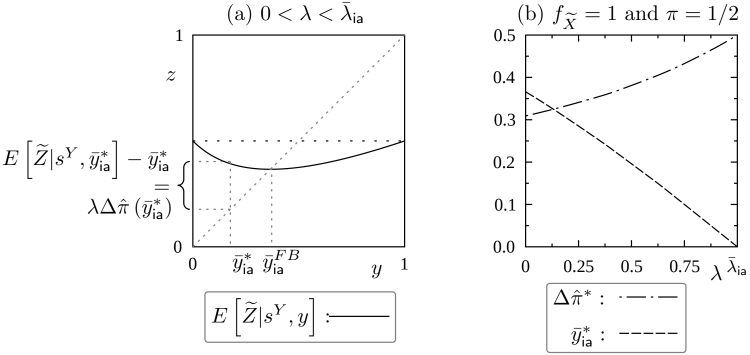
   $t = 2$: see next slide

First-best behaviour in t=2



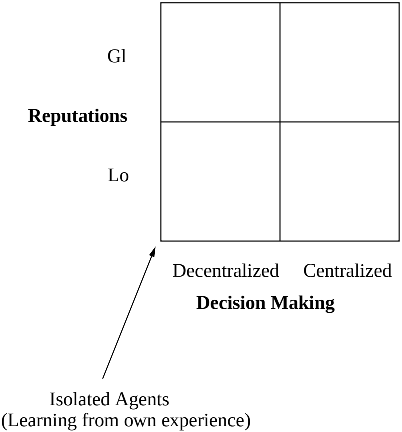
- If $y < \bar{y}_{\text{ia}}^{FB}$, then switch to Z;
- If $y \geq \bar{y}_{\text{ia}}^{FB}$, then continue Y.
- Thus: $\hat{\pi}\left(Y, Y; \bar{y}_{\text{ia}}^{FB}\right) - \hat{\pi}\left(Y, Z; \bar{y}_{\text{ia}}^{FB}\right) > 0$

Equilibrium behaviour - graphically



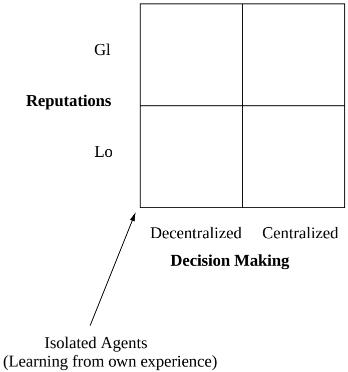
$$\lambda\left[\hat{\pi}\left(Y, Y; \bar{y}^*_{\text{ia}}\right) - \hat{\pi}\left(Y, Z; \bar{y}^*_{\text{ia}}\right)\right] = E\left[\tilde{Z}|s^Y, \bar{y}^*_{\text{ia}}\right] - \bar{y}^*_{\text{ia}}.$$

Add learning from others & communication



- Add second site and agent
  site 1: s^Y
  site 2: $s^X \in \{s^Y, s^Z\}$
- value x independent of site
- $t = 1$: history
- $t = 2$: communication before decision-making
- NB: what is known when communicating
- Center does not care about reputation

Add learning from others & communication



First-best behaviour in $t = 2$:

1. truthful revelation
2. choose the better technology
   $\left(s^Y, s^Y\right) : y \lessgtr E\left[\tilde{Z} | s^Y, s^Y, y\right]$
   $\left(s^Y, s^Z\right) : y \lessgtr z$

Effect on reputations:

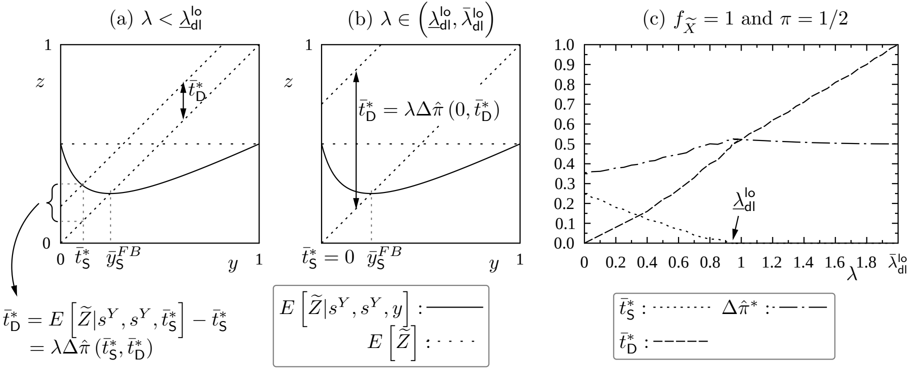
1. Local: $\hat{\pi}_1\left(Y, Y\right) > \hat{\pi}_1\left(Y, Z\right)$
2. Global:
   $\hat{\pi}_1\left(YY, YY\right) > \hat{\pi}_1\left(YY, ZZ\right)$
   $\hat{\pi}_1\left(YZ, YY\right) > \hat{\pi}_1\left(YZ, ZZ\right)$

Decentralized decision-making

1. Local reputations
   Reputation *unaffected* by technology other agent adopts
   $\longrightarrow$ truthful revelation eq communication strategy
   $\longrightarrow$ decision-making distorted
2. Global reputations
   Reputation *affected* by technology other agent adopts
   $\longrightarrow$ Convince other agent to switch to “your” technology
   $\longrightarrow$ eq communication strategy $=$ pooling stategy
   $\longrightarrow$ decision-making distorted

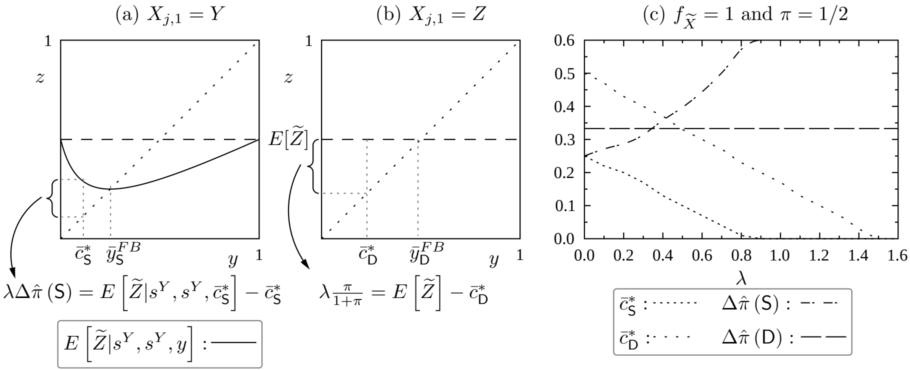
Less information $\Longrightarrow$ worse decision on technology adopted in $t = 2$?

Decentralized decision-making, local reputations



Decentralized decision-making, global reputations

- Reputation affected by technology other agent adopts
  $\longrightarrow$ Convince other agent to switch to "your" technology



Welfare Comparisons

- Decision-makers: what info do they have? What use do they make of it?
- Reputations: local / global? Info infered from decision-makers' actions?

$$W_{\mathrm{p}}(\lambda, \pi) = \frac{V_{\mathrm{p}}^{*}(\lambda, \pi) - V_{\min}(\pi)}{V_{\max} - V_{\min}(\pi)} * 100\%.$$

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- $V_{\text{p}}^{*}(\lambda, \pi)$ = *ex ante* expected value of technology used at site, $t = 2$, given equilibrium behaviour

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- $V_{\mathrm{p}}^{*}(\lambda, \pi)$ = *ex ante* expected value of technology used at site, $t = 2$, given equilibrium behaviour
- $V_{\min}(\pi) = \pi E\left[\tilde{Y} | y > z\right] + (1 - \pi) E\left[\tilde{Y}\right]$: *ex ante* expected value of technology used in $t = 1$

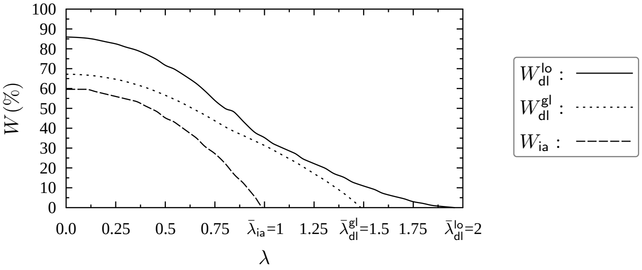
Welfare Comparisons

- Decision-makers: what info do they have? What use do they make of it?
- Reputations: local / global? Info infered from decision-makers' actions?

$$W_p(\lambda, \pi) = \frac{V_p^*(\lambda, \pi) - V_{min}(\pi)}{V_{max} - V_{min}(\pi)} * 100\%.$$

- $V_p^*(\lambda, \pi)$ = *ex ante* expected value of technology used at site, $t = 2$, given equilibrium behaviour
- $V_{min}(\pi) = \pi E\left[\tilde{Y}|y > z\right] + (1-\pi) E\left[\tilde{Y}\right]$: *ex ante* expected value of technology used in $t = 1$
- $V_{max} = E\left[\tilde{Y}|y > z\right]$: theoretical maximum value

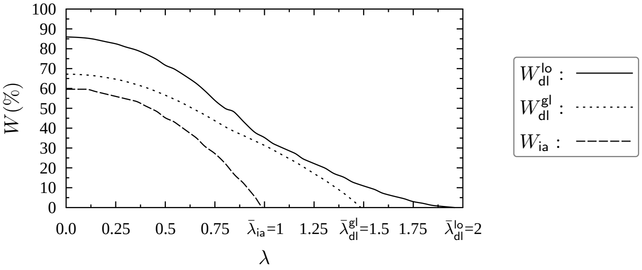
Welfare - decentralized decision-making



Graph for uniform distribution and $\pi = 1/2$.

1. For uniform distribution holds for all $\pi \in (0, 1)$
2. λ low
3. λ high: role of $1 \lesseqgtr E\left[\tilde{Z}\right](1 + \pi)$
4. See **Proposition 5** for details

Welfare - decentralized decision-making



Role of $1 \lessgtr E\left[\tilde{Z}\right](1+\pi)$
s^Y, s^Z

- Local reputations
- Info: y and z
- Rep gap when not responding to info: $\pi - 0$

- Global reputations
- Info: y and $E\left[Z\right]$
- Rep gap when not responding to info: $\frac{\pi}{1+\pi} - 0$

Centralized decision-making

- Agents lose decision-making power

Lemma

Under centralized decision-making, an equilibrium in which agents truthfully reveal their private information does not exist.

Sketch: Suppose $\left(s^Y, s^Z\right)$. Then, $m_1(y) = y + \varepsilon$; if effective, hardly costly, but jump in reputation
In case of $\left(s^Y, s^Z\right)$:

- Communication strategy = partition strategy
- Centralization of decision-making power leads to:
  (local reputations): *less* information transmitted
  (global reputations): *more* information transmitted

Centralized decision-making: equilibrium behaviour, 1

Proposition 4 [Centralized decision-making] Decision strategy Center:

$$d_C(I_C) = \begin{cases} Y, Y & \text{if } X_{21} = Y \quad \text{and } E\left[\tilde{Y}|m_{\min}\right] \geq E\left[\tilde{Z}|m_{\min}\right] \\ Z, Z & \text{if } X_{21} = Y \quad \text{and } E\left[\tilde{Y}|m_{\min}\right] < E\left[\tilde{Z}|m_{\min}\right] \\ Y, Y & \text{if } X_{21} = Z \quad \text{and } E\left[\tilde{Y}|m_1\right] > E\left[\tilde{Z}|m_2\right] \\ Y, Y & \text{if } X_{21} = Z \quad \text{and } E\left[\tilde{Y}|m_1\right] = E\left[\tilde{Z}|m_2\right] \text{ and coin} = Y \\ Z, Z & \text{otherwise,} \end{cases}$$

Centralized decision-making: equilibrium behaviour, 2

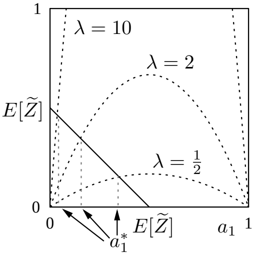
Proposition 4 [Centralized decision-making] Communication strategy:

1. Same technologies: collusive strategy (both: "value is low" ($y < \bar{y}_S$) or "value is high" ($y > \bar{y}_S$))
   Agents' interests coincide, differ from those of Center
2. Diff technologies: partition strategy - coarse communication: $0 = a_0 < a_1 < \cdots < a_N = 1$

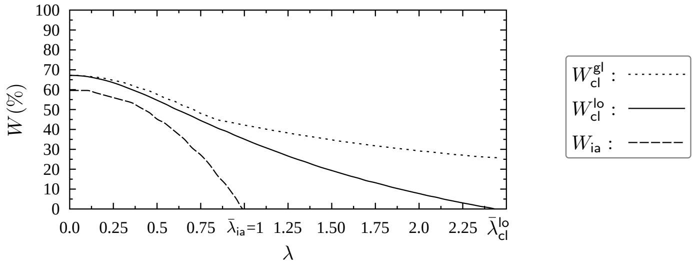
- Local reputations: For λ "high," no meaningful communication
- Global reputations: For *any* finite λ, meaningful communication

Centralized decision-making, global reputations

- Global reputations: For *any* finite λ, meaningful communication
- Below: 2 partitions at most



Welfare - centralized decision-making



In graph, centralized dec-making with only 2 partitions ($f_{\tilde{X}} = 1$ and $\pi = 1/2$)

1. For uniform distribution and for all (λ, π), $W_{ia}(\lambda, \pi) < W^{gl}_{cl}(\lambda, \pi), W^{lo}_{cl}(\lambda, \pi)$.
2. λ high $W_{ia}(\lambda, \pi) < W^{lo}_{cl}(\lambda, \pi) < W^{gl}_{cl}(\lambda, \pi)$.
3. See **Proposition 6** for details

Does Centralization Improve Welfare?

Proposition 7 [Local reputations] Suppose

$$\frac{1}{E\left[\tilde{Z}\right]} > \frac{\left(3+\pi^2\right)\left(1+\pi\right)}{4\pi}.$$

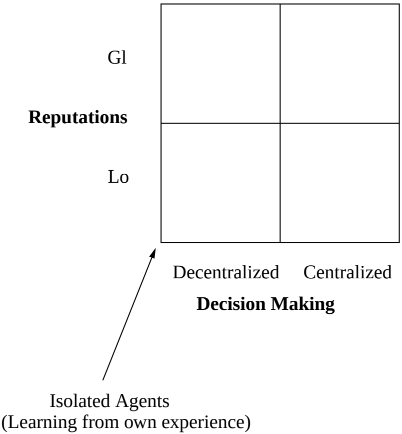
Then there exists a $\lambda_6 < \bar{\lambda}_{\text{cl}}^{\text{lo}}$ such that welfare $W\left(\lambda, \pi\right)$ is higher with *decentralized decision-making* than with *centralized decision-making* for all $\lambda > \lambda_6$.

(Note uniform distribution)

Proposition 8 [Global reputations] For any f_X, π, and λ, welfare $W\left(\lambda, \pi\right)$ is higher with *centralized decision-making* than with *decentralized decision-making*.

Learning from Others?

- Learning from others $\longrightarrow$ communication
- Communication strategic $\longrightarrow$ value creation not automatic
- Decision rights: decentral / central
- Reputations: local or global



Related Literature, 1

- **Cheap talk, decentralization/centralization**: Alonso et al. (2008), Rantakari (2008): wish to coordinate divisions v adaptation to local circumstances
  Here: neither coordination, nor adaptation; but learning, resistance to change, persuasion due to reputational concerns
- **Learning in the presence of reputational concerns**: Prendergast and Stole (1996): explain overreaction to new information and conversatism in a single model of learning from own experience
  Here: focus on conservatism; besides learning from own experience, also learning from others; strategic communication; informational basis of perception of ability varies

Related Literature, 2

- **Transparency and reputational concerns**: Milbourn et al. (2001), Suurmond et al. (2004): outcome transparency; Prat (2005): action/outcome transparency; Levy (2007) and Visser and Swank (2007, 2009): group behaviour
  Here: transparency: effect on communication depends on assignment of decision-rights.
- **Cheap talk**: Crawford and Sobel (1982) etc.: difference in alignment exogenous
  Here: difference is endogenous, $\lambda\hat{\pi}(\cdot)$;
- **Reputational cheap talk**: Scharfstein and Stein (1990), Ottaviani and Sørensen (2001, 2006): single-agent or sequential cheap talk; Visser and Swank (2007): group deliberation + voting. All: talk about single variable
  Here: Talk about possibly different variables

Related Literature, 3

- **Policy Diffusion**: Oates (1999); Volden et al. (2008). Compare "isolated states" with learning-from-others.
  Here: Different learning processes; communication; role markets.
- **Social Learning**: (i) Bandit problems with common values, Bolton and Harris (1999) and Keller et al. (2005): true value observed, although strategic environment; (ii) Informational herding, Banerjee (1992), Bikhchandani et al. (1992), Lones and Sörensen (2000). No value observed, although non-strategic environment: In (i) and (ii), communication not a decision variable. But: Çelen et al. (2008).
  Here: quality of communication decision variable; conservatism / inertia / distortion endogenous.