



## **Outsourcing of Tasks and Outsourcing of Assets: Combining Perspectives from Engineering Design and Organization Economics**

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Mari Sako

Said Business School, University of Oxford

[Mari.sako@sbs.ox.ac.uk](mailto:Mari.sako@sbs.ox.ac.uk)

Susan Helper

Case Western Reserve University

[Susan.helper@case.edu](mailto:Susan.helper@case.edu)



# Outline:

## 2 perspectives on the division of labor

- What does outsourcing mean?
  - Organization economics perspective
  - Engineering design perspective
  - Combining the two perspectives
- Empirical evidence
  - Automotive supplier parks (<http://imvp.mit.edu/>)
  - Outsourcing and offshoring of business services ([www.aimresearch.org](http://www.aimresearch.org))
  - Engineering design offshoring
- Conclusions

# What does outsourcing mean?

- Organization Economics (Baker, Gibbons and Murphy 2002)
  - Outsourcing = disintegration of asset ownership
  - the right to direct how tasks are performed using those assets is also transferred with asset outsourcing
- Engineering Design (Baldwin and Clark 2003)
  - Outsourcing = reallocation of tasks from one unit to another, regardless of the ownership of those units
  - Modular product architecture makes outsourcing easier
- Asset outsourcing DOES NOT EQUAL task outsourcing

# Organization Economics Perspective (Baker, Gibbons, Murphy 2002)

- Assume non-contractible elements in contracts
- Use asset integration decision as an instrument in the service of the parties' relational contracts

		Asset Ownership Pattern	
		Integrated	Not integrated
Governance Mode	Relational	Relational employment	Relational outsourcing
	Spot	Spot employment	Spot outsourcing

- Dis-integrate if:
  - Supplier can be incentivized via a bonus
  - Possibility of enhancing alternative use value of asset is low
- Integrate if:
  - Supplier cannot be incentivized via a bonus
  - Possibility of enhancing alternative use value is great

# Engineering Design Perspective: Design (or Task) Structure Matrix

- Complex systems can be decomposed into components or tasks
- Partitioning or clustering to simplify the nature of interactions → modularization reduces interdependencies between..
- B&C: transfers become transactions when they are standardized, countable, compensatable

	1	2	3	4	5	6	7	8	9
1	1								
2		2							
3		X	3						
4	X	X		4					
5	X	X		X	5				
6		X				6	X		
7			X	X	X		7	X	X
8			X	X			X	8	
9						X			9

See [www.dsmweb.org](http://www.dsmweb.org) and Baldwin and Clark (2003).



# Injecting Organization Economics into Engineering Design (ED) Perspective

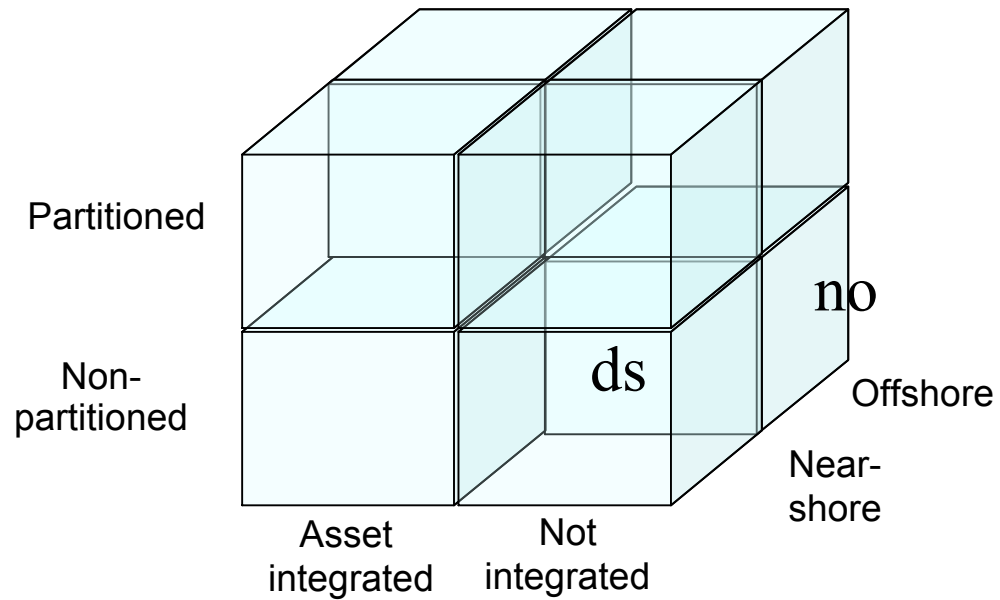
- **ED assumes all types of information (x) is perfect**
  - But information is not always perfect
  - Not all know-how exchange is explicit and task-oriented
- **ED assumes no incentive incompatibility problem (i.e. everyone works towards the same goal)**
  - But principal-agent problem is likely due to importance of non-contractible effort and multi-tasking possibilities → need to rely on relational contracts
  - Asset ownership affects incentives of suppliers
- **ED assumes that location does not matter**
  - But proximity (co-location) improves visibility (i.e. lowers costs of monitoring and verification)
  - Proximity enables inter-dependent/ non-partitioned/non-clustered tasks to be carried out

# Typology of Outsourcing: Combining BGM (2002) and B&C (2003)

		Asset Ownership Pattern	
		Integrated	Not integrated
Task Structure	Partitioned (clustered)		Outsourcing
	Not partitioned (clustered)	In-sourcing	

**BGM = Baker, Gibbons and Murphy; B&C = Baldwin and Clark**

# Proximity added





# Typology of Outsourcing: Combining BGM (2002) and B&C (2003)

		Asset Ownership Pattern	
		Integrated	Not integrated
Task Structure	Partitioned (clustered)	<b>Auto supplier parks</b> <b>Shared Services Centres</b>	Outsourcing
	Not partitioned (clustered)	In-sourcing	<b>automotive</b> <b>Engineering design offshoring</b>

BGM = Baker, Gibbons and Murphy; B&C = Baldwin and Clark

# Empirical Evidence

# 1. Business Service Outsourcing: Examples of major HR Outsourcing Deals

## P&G – IBM Global Services

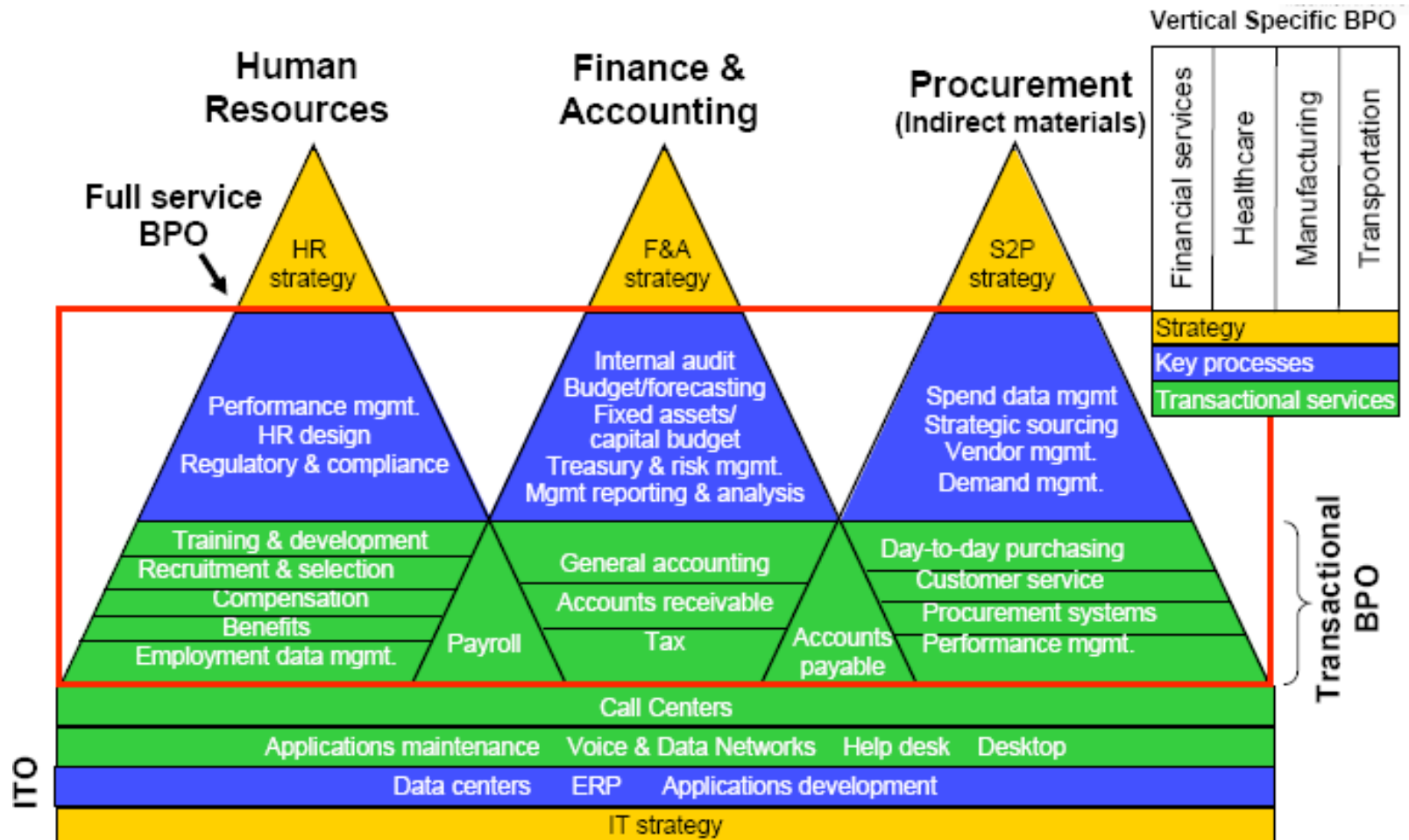
- Signed in 2003
- 10 year contract
- \$400 million in value
- 98,000 employees in over 80 countries
- P&G sold 3 internal SSCs (shared services centers) in Puerto Rico, Manila, and Newcastle

## Unilever – Accenture HR Services

- Signed in 2006
- 7 year contract
- £1 billion in value
- 200,000 employees in 100 countries
- Some internal SSCs (e.g. Peoplelink in the UK), but straight to outsourcing in many regions and countries

- **Why do some firms create in-house SSCs first before outsourcing?**
- **Why do some SSCs remain in-house?**

# Key processes are more inter-dependent and difficult to cluster in HR than in F&A

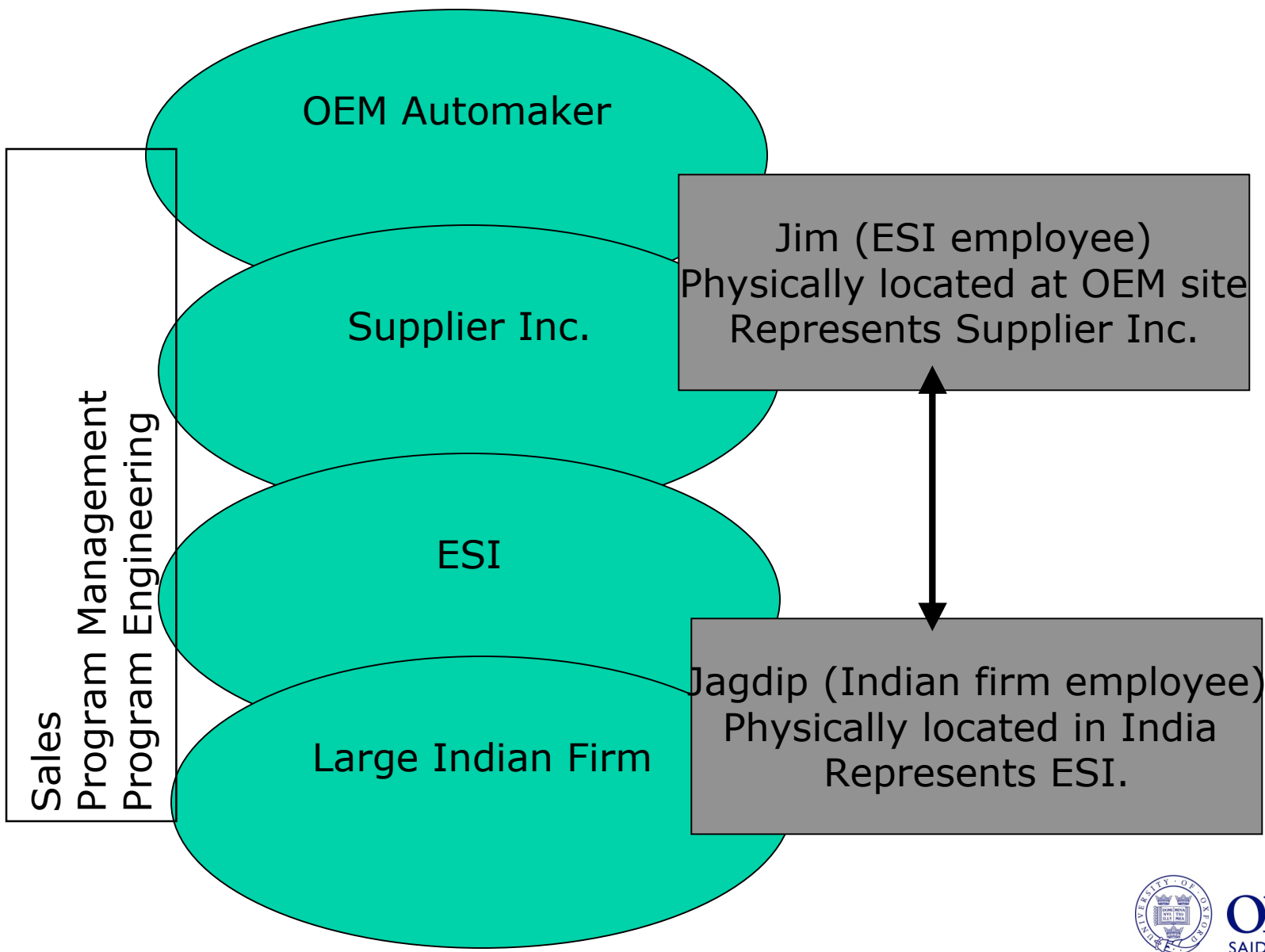


# Outsourcing of Business Services: Insight from Combined Theoretical Perspective

- Unbundling of corporate functions has led to the creation of shared services centres (SSCs), in some cases as a step towards outsourcing, in other cases to be retained in-house.
- **Asset ownership affects supplier incentives**
  - Offshore outsourcing is better if suppliers can be motivated by a bonus to exert effort to provide good quality service
  - Captive offshoring is better if the user does not lose much from supplier performance due to lack of incentive payments
- **Tasks are not easily clustered nor partitioned in a corporate function**
  - In-house SSCs as a transition phase to cluster or partition tasks
- **Proximity matters**
  - Solves principal agent problems
  - Enables some non-partitioned or non-clustered tasks to be outsourced

## 2. Automotive engineering and design

- In the US, a sequential process
- We focus on stages of design and engineering
  - Engineers create parts with requisite functionality (strength, heat tolerance, etc.)
  - Designers draw these parts using CAD (computer-aided design) software
    - Note: by design, we mean “working on CAD work station”, not “styling” or “concept generation”
  - Division of labor not unlike 1980s manager/secretary



# Window

	SME 1	SME 2	SMD	FW 1	FW 2	FW 3	PL	GE	GD 1	GD 2	GD 3
Sheet Metal Engineer 1											
Sheet Metal Engineer 2	↑↓↑↓										
Sheet Metal Designer	↑↓↑↓	↑↓↑↓									
Factory Worker 1											
Factory Worker 2				↑↓							
Factory Worker 3				↑↓	↑↓						
Glass Project Leader											
Glass Engineer							↑↓↑↓				
Glass Designer 1	↑↓			↑↓			↑↓↑↓	↑↓↑↓			
Glass Designer 2							↓	↓	↑↓↑↓		
Non-Auto Designer										↑↓	



# Windshield

	SME 1	SME 2	SMD	FW 1	FW 2	FW 3	PL	GE	GD 1	GD 2	GD 3
Sheet Metal Engineer 1											
Sheet Metal Engineer 2	↑↓↑↓										
Sheet Metal Designer	↑↓↑↓	↑↓↑↓									
Factory Worker 1											
Factory Worker 2				↑↓							
Factory Worker 3				↑↓	↑↓						
Project Leader											
Glass Engineer	↑↓	↑↓					↑↓↑↓				
Glass Designer 1	↑↓↑↓	↑↓↑↓	↑↓↑↓	↑↓			↑↓↑↓	↑↓↑↓			
Glass Designer 2											
Non-Auto Designer											

# The Japanese Case

- Japanese automakers and their suppliers emphasize understanding of context: employees need to understand not just their own job, but the context within which they do their job
  - Indian designer makes mistake because not continually reminded of the function of his design
- Japanese OEMs have highly complex interfaces between CAD work and engineering
  - CAD work is done by junior engineers and by specialists in same room as senior engineers
  - Frequently there is simultaneous work on several stages & multiple feedback loops
  - Japanese may offshore design and production of a whole component
- More proximity and less arm's-length governance lead to more complex component interfaces

# Japan Windshield

	SME 1	SME 2	SMD	FW 1	FW 2	FW 3	PL	GE	GD 1	GD 2	GD 3
Sheet Metal Engineer 1											
Sheet Metal Engineer 2	↑↓↑↓	↑↓↑↓									
Sheet Metal Designer	↑↓↑↓	↑↓↑↓	↑↓↑↓								
Factory Worker 1		↑↓↑↓	↑↓↑↓								
Factory Worker 2				↑↓↑↓							
Factory Worker 3				↑↓↑↓	↑↓↑↓						
Project Leader											
Glass Engineer	↑↓↑↓	↑↓↑↓	↑↓↑↓	↑↓↑↓	↑↓	↑↓	↑↓↑↓	↑↓↑↓			
Glass Designer 1	↑↓↑↓	↑↓↑↓	↑↓↑↓	↑↓↑↓	↑↓	↑↓	↑↓↑↓	↑↓↑↓	↑↓↑↓		
Glass Designer 2	↑↓	↑↓	↑↓				↑↓	↑↓↑↓			
Non-Auto Designer											

# Conclusions

- Economists should know more about task structure
  - Ownership alone does not determine who talks with whom
- Engineers should know more about asset ownership
  - Incentives affect the quantity and quality of info transfer
- DSM is not technically determined
  - Accounting easier to outsource than HR due to great effort made at standardization to stabilize arm's length financial markets
  - US automakers have easier time with offshoring pieces of design process because of previous sequential product design process
- Proximity is functional equivalent of ownership
  - Helps create identity and redundancy