

From the Structure of the Value Chain to the Strategic Dynamics of Industry Architectures

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A very personal and biased guided tour on the causes and consequences of the division of labour

- How does the structure of sectors evolve? And why should we care?
 - How do we even *get* the chance of asking the “make-vs-buy” question?
 - How and why do firms shape their institutional environment?
 - What are the implications of these changing patterns at the level of sectors?
- The nature and impact of *industry architectures* (JKA, *RP*, 2006)
 - Distinct patterns of organizing and dividing labour as the bone of contention
 - Understand how this shapes strategic prospects & revisit scope prescriptions
 - Identify dynamics we sorely need to study and understand
- How can firm boundary design affect the firm itself? (time permitting)
 - Shift to the study of the *manifold boundaries of one organization*



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How does the structure of sectors evolve? And- why should we care?

- What is a sector, really?
 - What we measure might mask the real changes – or the real story
 - Factoid: Sectors concentrate. Yet firms shrink. How does this add up?
- Changes in vertical structure account for industry patterns
 - EDS does as much banking as bulge-bracket banks
 - And patterns of shakeout differ in different parts of the value chain
- Don't take institutional environment as given, and new insights emerge
 - New empirical investigation, to explain important phenomena
 - And an opportunity to develop *new* theory, esp on capabilities & evolution

Putting this in context: What we know, what we don't

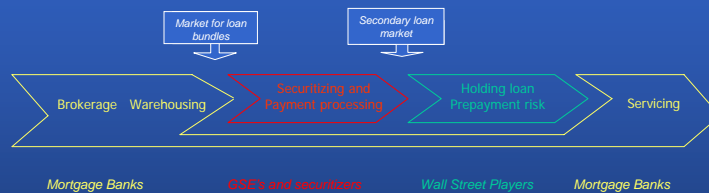
- In the good'ol days, we looked at TCE/NIE (for scope), RBV (for resources), industry evolution (for entry, exit, technology aggregate patterns)
 - And then we started adding TC and RBV (*SMJ's* w L Hitt, S Winter)
 - But this made us miss the *systemic* aspect of industry evolution (*OS*)
- We now start seeing scope changes endogenously -- and changes a sector
 - Vertical dis-integration (or re-integration) changes a sector's structure
 - And as sectors change, capabilities & competitive dynamics change, too!
- Need to understand *sector-level structures...*
 - ...what causes their emergence, evolution and what are their implications
 - Dis-integration, out-sourcing, and sector re-definition

Empirical example: From integration to dis-integration (*AMJ*, 2005)

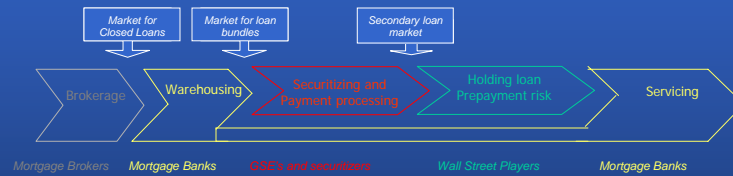
The way it used to be: Mortgage Banking Value Chain, c. 1970



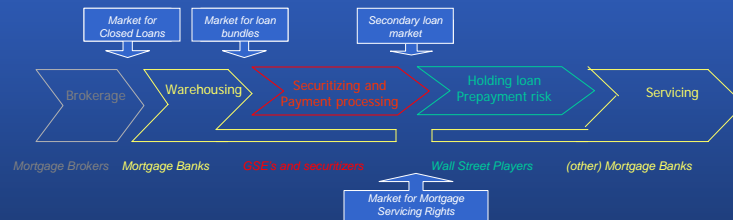
The first transformation, 1972-1980: Securitization and the Rise of Mortgage Banks

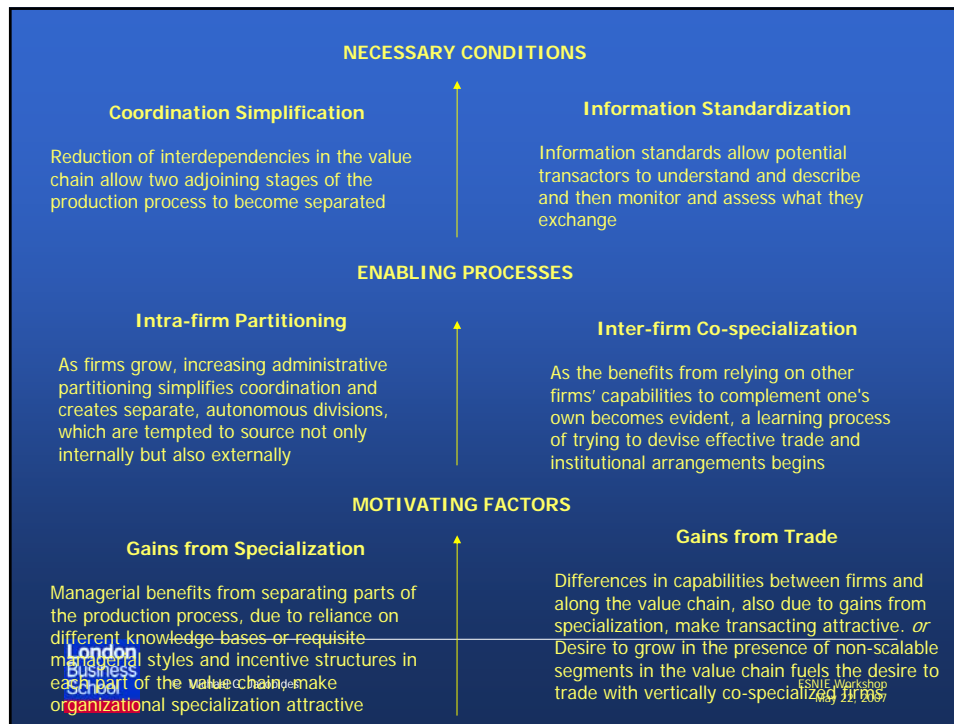


The Second Transformation (1982-1988): Unbundling and Market for Mortgage Brokers



The Third Transformation (1989-1993): Unbundling and Market for Servicing Rights

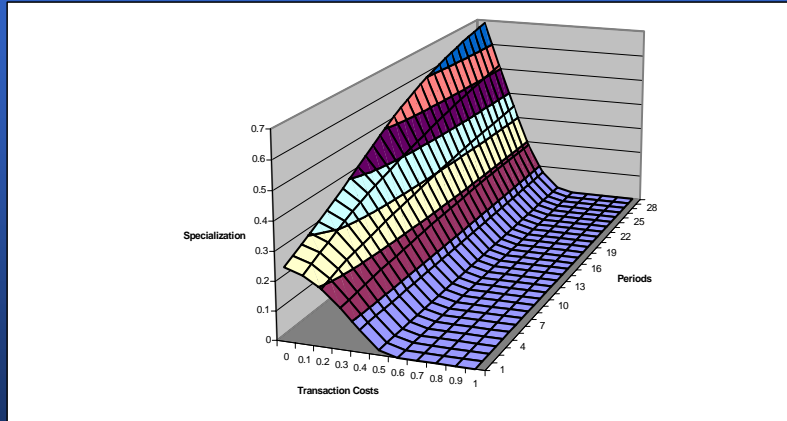




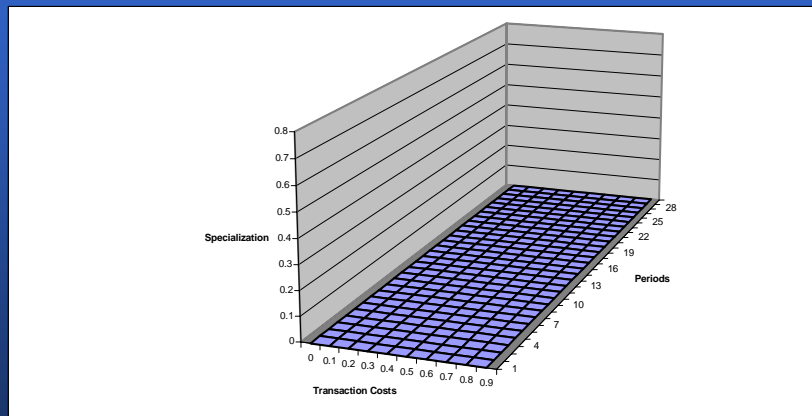
From the field to theory: A formal model (OS, 2007)

- Industry with two segments; multiple firms; heterogeneous capabilities
 - Basic dependent variable: *Aggregate vertical specialization over time*
 - Competitive structure: Undifferentiated products
 - What we consider: Different scenarios with different capability distributions
- ICT and related TC exist: per valorem *net* tax, varied to consider its impact
 - Model's key insights: How changing this "dial" interacts with other factors...
 - Vary scale, learning curves, endogenous re-investment in capabilities
 - Tries to take up where Grossman & Helpman (*QJE*, 2002) left us
- Marshallian structure: Fixed short-term in capacities; dynamic updates
 - Explain co-evolutionary dynamics in a clear way
 - Build market for resources, and for intermediate and final goods...
 - ...which then enables us to track *implications of vertical break-up*

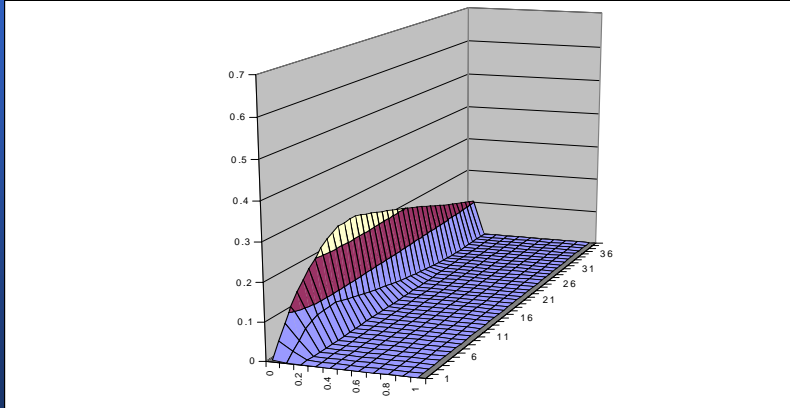
Evolution of Integration, with Varying Transaction Costs and A-Symmetrical Capability Distribution (gains exist!)



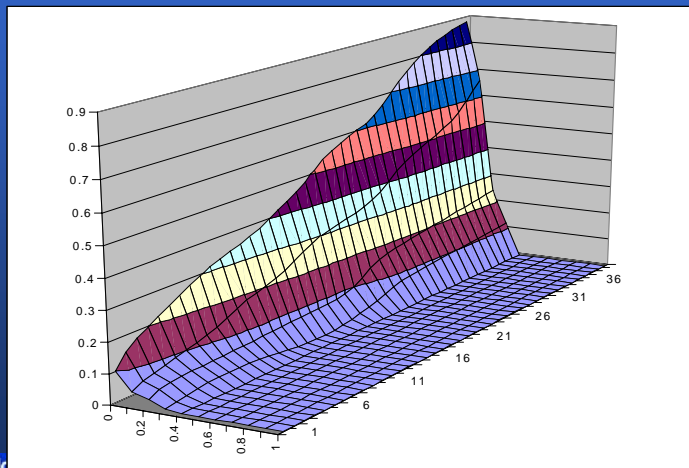
Evolution of Integration, with Varying Transaction Costs and Symmetrical Capability Distribution



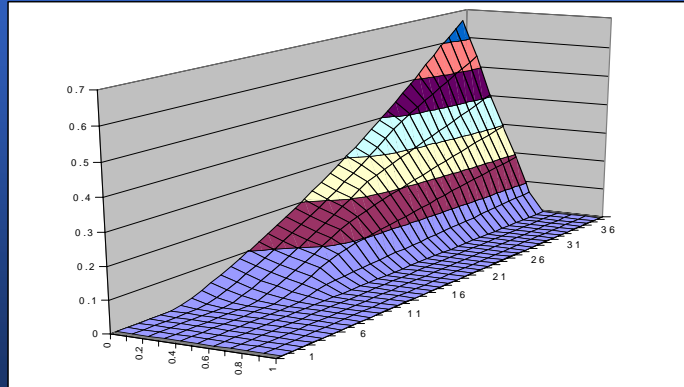
Symmetrical Capability Distribution and expansion caps only in one segment



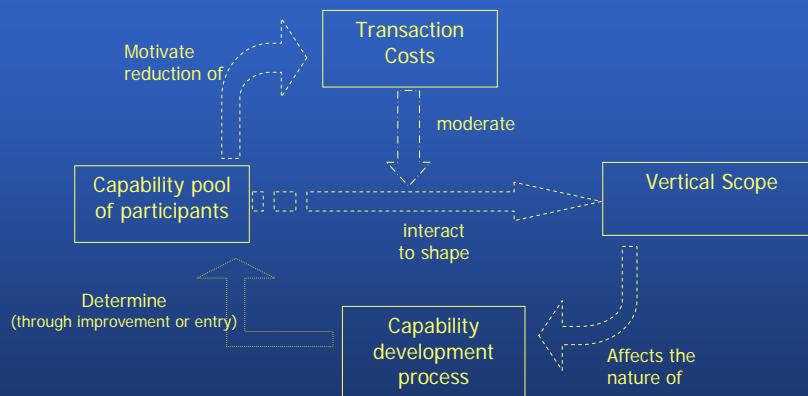
From Ricardo to Bruce Henderson: Specialization as a Result of Learning Curves (zero corr.)



New results: Why industries start off / keep integrated
 high demand, even *with* a-symmetrical capability correlation

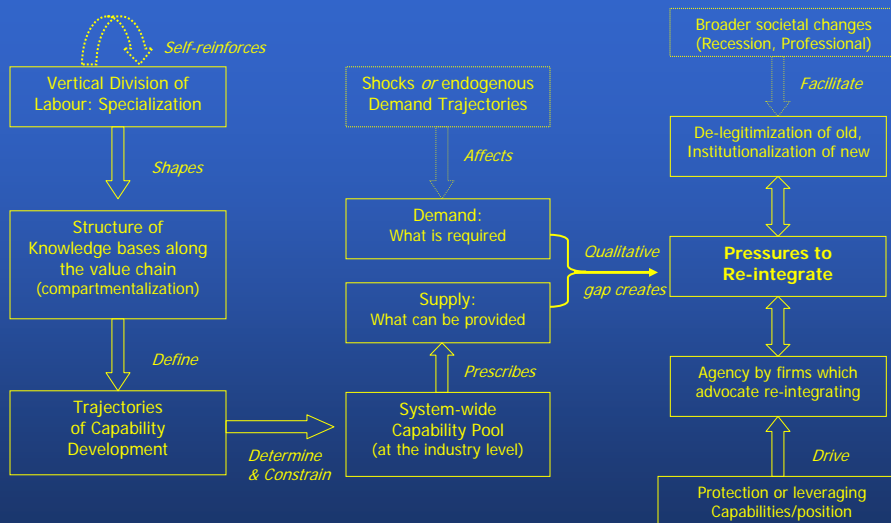


The bigger picture (MGJ & Sid Winter, *SMJ*, 2005):
 The Co-Evolution of Transaction Costs & Capabilities



From dis-integration to *strategic re-integration* (and how scope shapes capabilities)

- The world, though, does *not* move simply towards dis-integration
 - Evans & Wurster not proven quite right
- Sectors do not only have secular drifts- they re-integrate
 - And to understand how, we need to focus on the dynamics
- Re-integration comes about when new processes & technologies call for it
 - Swatch and the need to “sort it out”
- But either way, *dis-integration carries the seeds of its own demise*
 - To understand how, we need to look at knowledge trajectories & capabilities
 - Example: Construction Study (Cacciaori & Jacobides, 2005, *Org Studies*)



On the causes and consequences of the division of labour

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The role of *industry architectures* and competitive advantage

- Each sector consists of a set of co-specialized entities
 - Which is path dependent at the level of sectors *and* countries
 - The *way labour is divided is the result of a crucial strategic struggle*
- We need to understand *how* these architectures come up and change
 - And consider what are their implications – e.g., for globalization (MDE, 2006)
 - To see if you can expand, see how your own architecture compares to others
- Firms strategize *in terms of shaping the rules of the game*
 - *Who does what* and *who takes what* – templates to organize...
 - Which are adhered to as firms try to collaborate and compete

Industry Architectures and Architectural Advantage (Jacobides, Knudsen and Augier, 2006, *Research Policy*)

- Shift from the dyadic relationship to *industry architectures*
 - Division of profit and division of labour *at the industry level*
- De-compose co-specialization into *complementarity* and *mobility*
 - Two separate dimensions, not always correlated
- Provide a framework of how to build *architectural advantage*
 - Help increase mobility while maintaining complementarity: Control w/o owning
- Revisit the prescriptions on how to decide scope
 - Substitute “flow charts” to encompass dynamics and asset appreciation

From dyadic relationships to industry architectures

- Labour in a sector can be divided in many different ways
 - Way to organize and divide labour *and profit* path-dependent

[there exists] extensive variation in the configuration of [the structure of the building sectors' value chain]. Construction business systems have evolved over very long periods, and display well-rooted rigidities, with the balance between the actors in the system hard fought and hard won... [A careful comparative international analysis shows] the different modes and directions of evolution across Europe. It is also noticeable that, with the exception of The Netherlands, the principal forces for change are generated domestically and neither by directives from the European Commission, nor international competition in construction services.

(Winch, 2000)

Industry architecture, and architects around Europe

"Although architecte, architect, arkitekt, architetto, and Architekt appear to mean the same thing, they do so only in a limited sense. All are designers of buildings, and all share a common root in the Greek *architekton*, but the historical evolution of the contracting systems means that their social meanings are very diverse, and that even their functional meanings are not coextensive. The French *architecte* has a much more constrained and limited role in the construction process than the British *architect*; the German *Architekt* has a state-derived role in obtaining building permits which the British counterpart does not, and so on. In the case of some actors such as the German *Prufstatiker*, the British quantity surveyor, and the French *bureau de controle*, there is simply no close comparator in other systems."

(Winch, 2000)

Why does the Port Wine trade look so unlike Bordeaux?

- In Port, we buy Sanderman, Croft, Taylors...
 - *Merchant houses* that guarantee quality and make money
- For Bordeaux, we (you) buy Chateau Laffitte, Margaux, Petrus...
 - With famous *estate owners and growers* making the profits
- Why is there a *different* player in the value chain making money?
 - Sure, different players for different niches- but *why them?*
- What can we learn from the history of wine trading?
 - 19th Century skirmishes illustrate 21st Century dynamics

From Claret and Port to PC's, smart cards and health care

- Battle to shape the structure of the value chain, creating "strongholds"
 - As sociologists analyzing "Global Value Chains" have shown
 - Gereffi, Sturgeon, Humphry; see Gibbon & Ponte on agribusiness
- In shaping prospects of position in chain, *information assurance* key
 - Since it will affect entry and mobility, as we'll see
 - From cocoa to PC's and their components; firm and sector struggles
- Recent work testifies to importance of value chain layout
 - Who standardizes whom? Standards as a strategic weapon
 - Entrepreneurs can do this too! (Santos & Eisenhardt)

How the division of labour affects the division of profit

- Not one, but many different, often partly overlapping architectures around
 - Each is a different way to divide and organize labour (Iansiti & Levien)
 - Which wins depends on capabilities, incentives, n externalities (Eisenmann et al)
- Battles *within* an architecture and *between* architectures
 - With the arbiters being other firms (voluntary acceptance of architecture)
 - Or customers (assurance) or, often, the government (statutes / regulation)
- Evidence emerging on efforts to shape a sector
 - Health care (Scott et al, Gartland); Construction (J&C); Mobiles (Leijponen)
 - High-tech manufacturing (Santos, Eisenhardt); Smart Cards (M'Chirgui)

Industry Architectures and Architectural Advantage (JKA, 2006)

- Shift from the dyadic relationship to *industry architectures*
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 - Two separate dimensions, not always correlated

With Teece (1986) in the background...

Decomposing co-specialization: Complementarity vs. Mobility

- Complementarity: A *dyad-level construct*
 - Ability to yield superior returns in a given combination
- Mobility: A *population-level construct*
 - Extent to which *any dyad can be changed with another*
- Correlation between the two is *not* perfect
 - But this becomes clear only when we look at the *population*
- How the two constructs interact characterizes value dynamics
 - Competitive interaction meets ecological approaches

From Architecture to Tools to Shape it: Decomposing Co-specialization

Mobility of Complementary Asset

| | | | |
|---|----|---|--|
| Complementarity (in use or production) | Hi | Teecian Cospecialization | "Controlled" complementarity "Rule without Assets" (e.g., Intel and MSFT) |
| | Lo | Bilateral dependence w/o complementarities (e.g. local providers) | Fungible, mobile asset (no strategic interaction) |
| | | Lo | Hi |

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Building *Architectural Advantage*

- Goal: Manage the *industry architecture* to your advantage
 - Early in an innovation / industry's life, when things are fluid, or in junctures
 - Use standards, ensure collaborations, participate in the sectors' layout
- Ensure *mobility while maintaining co-specialization*
 - From "multiple sourcing" to standard setting
 - Important *regardless* of IR protection – IR *not* sufficient
- Become the "bottleneck" in the sector
 - MSFT and Intel strategies in PC; Fannie Mae & Freddie Mac in Mortgages
 - Architectural battles as key determinant of appropriating value

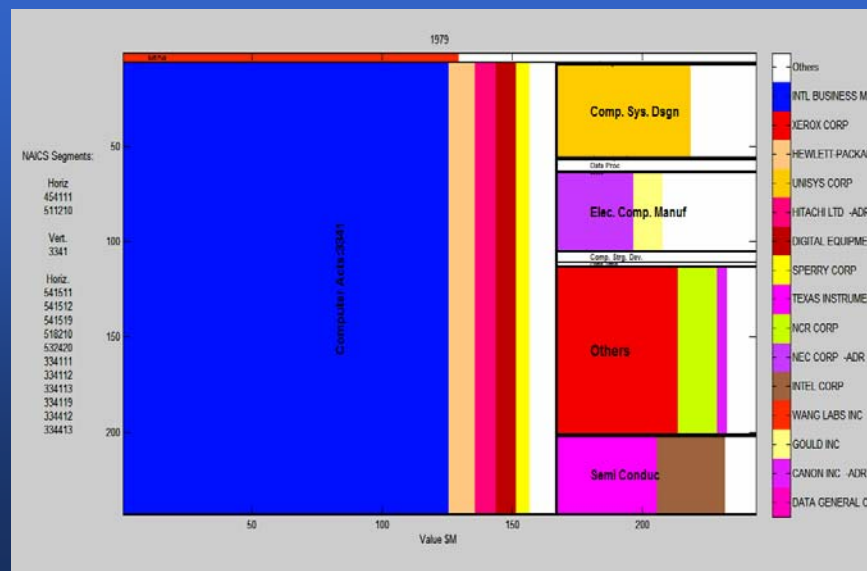
Revisiting and extending conventional wisdom

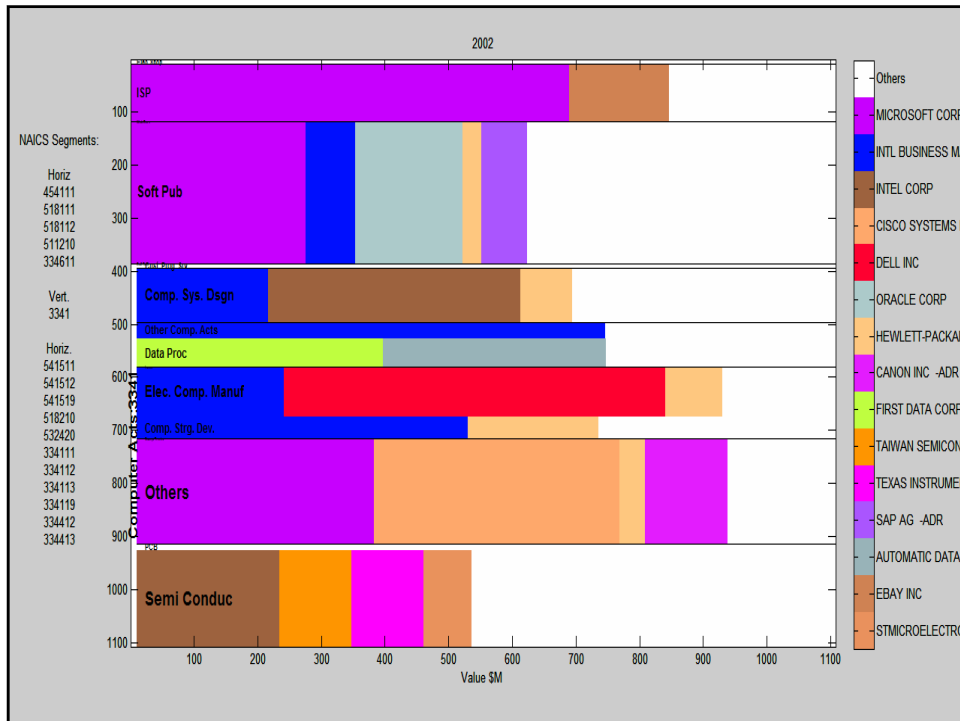
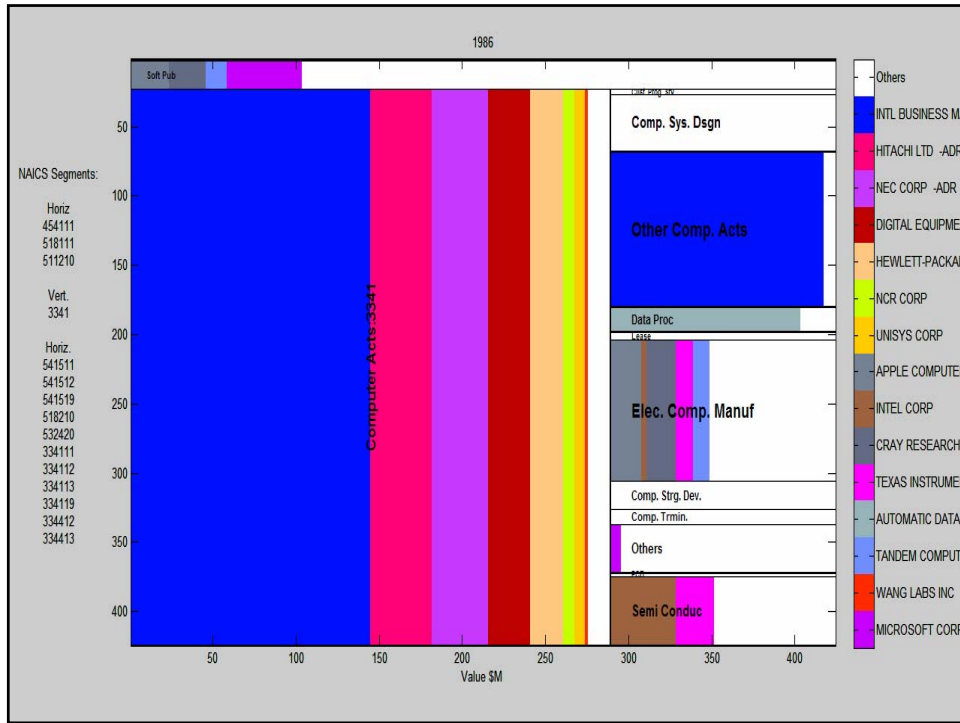
- IPR *neither necessary nor sufficient to guarantee "fair share"*
 - IPR says "some" price will be paid. Not *which* price!
 - Combining value chain dynamics (eg Anton & Yao) & conditions underlying value capture (Lippman & Rumelt; Bradenburger & Stuart)
- Dependencies not symmetrical - and we need to understand how
 - The PC tragedy: Opening Pandora's box
 - Role of different structures (cf. ESC, Sutton, 1991) in vertical segments
- Notion of "bottleneck" as driver of potential benefits
 - Pedigree going to Rosenberg (1969) and beyond: Role of architecture
 - Baldwin & Clark (1997); Ferguson / Morris (1993); Iansiti & Levien (2004)

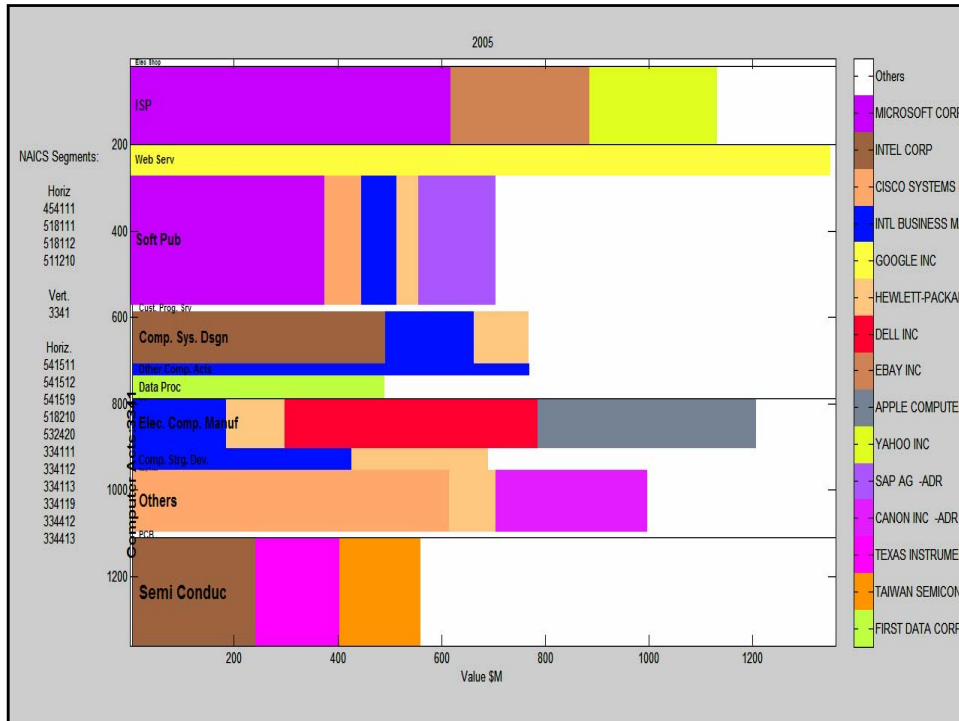
Promising directions:
Studies of competition *for* and *within* architectures

- Modeling drivers and implications of firms choosing their scope
 - E.g., Baldwin & Clark (2006) on footprint advantage
- Studying role of actors shaping their industries
 - E.g., Santos, Eisenhardt, Ozcan, Gartland,...
- Focusing on how profits migrate between different segments
 - Need for empirics and analytics; qualitative *and* quantitative
- A concrete example: Studying patterns of profit / value migration
 - As it relates to value chain evolution in different segments

Example of a sector as it evolves: PC's layer maps over time
(jointly with Carliss Baldwin & Reza Dizajji, 2007)





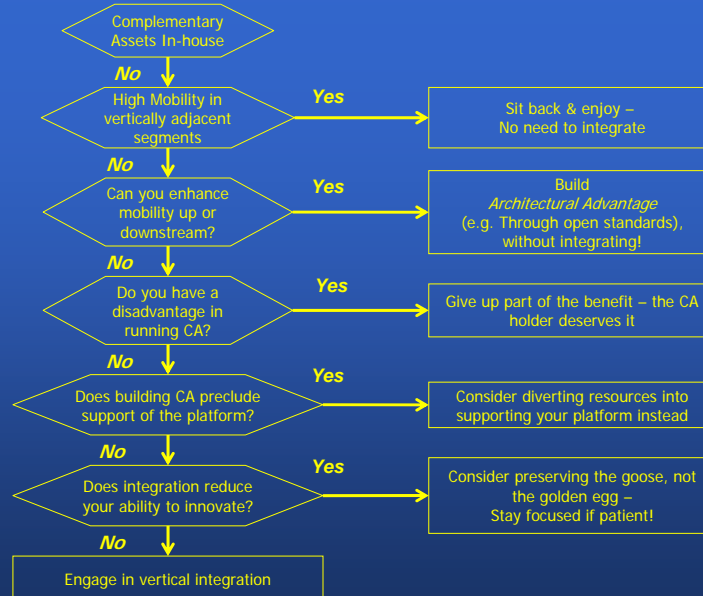


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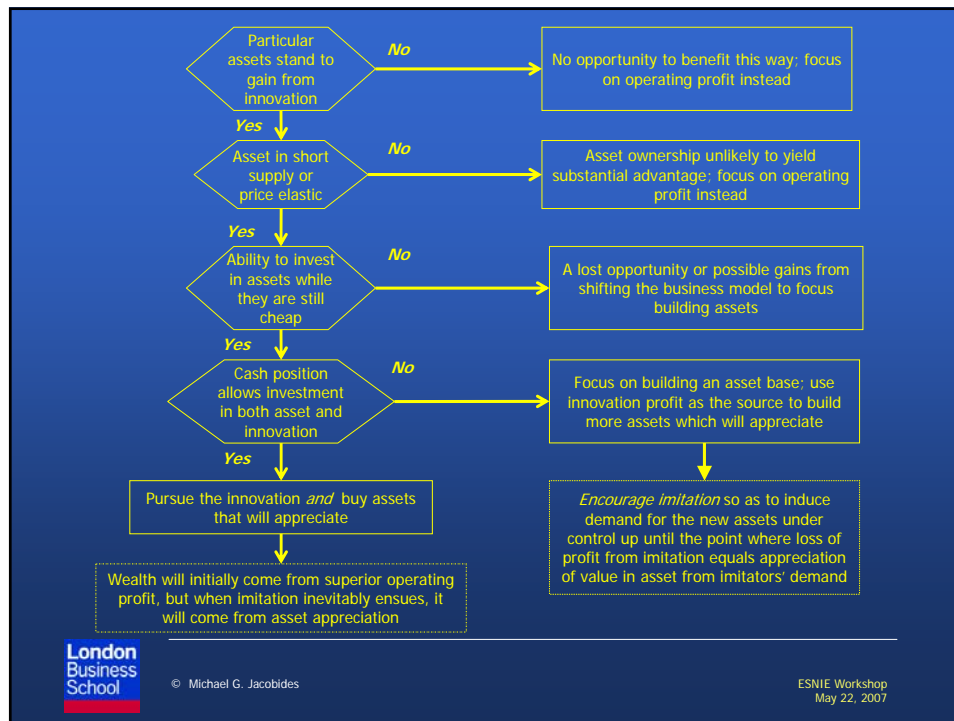
Practical implications: Changing the game – if you can!

- Either gain architectural advantage *within the architecture*...
 - Also ensuring your own “favorite candidate” can win (Gawer & Cusamano)
- ...or try to change the nature of the sector
 - In undefined territory, *expanding the scope* may work
 - Enveloping (Eisenmann et al) to capitalize on your advantage
- Constant efforts to re-shape “what it takes” in different segments
 - Keep the segment you want – where you benefit the most
 - While opening the rest to the forces of competition
 - RealNetworks and music distribution; iPod vs Pays4Sure in music download



From Value Appropriation to Value Creation: The Role of Appreciating Assets (J & W, 06)

- Focus in Teece and the literature: Keep imitators out
 - Simple story: If IPR sufficient, stay focused, imitators can't touch you
 - But logic flawed: This is no guarantee; *and*, other ways to profit, too!
- Innovation *can change the relative prices of assets involved*
 - So rather than benefiting from profits, benefit from *asset appreciation*
 - Cf. Jacobides & Winter's (2006) analysis of hip restaurants & hip locales
- Take-away: You may be better off losing profits while increasing wealth
 - Imitation may lead to high returns on assets that are intensively used
 - So stop focusing on "isolating mechanisms", think about wealth creation!



The Fordlandia Saga - Henry Ford's biggest failure (or, how history illustrates our framework)



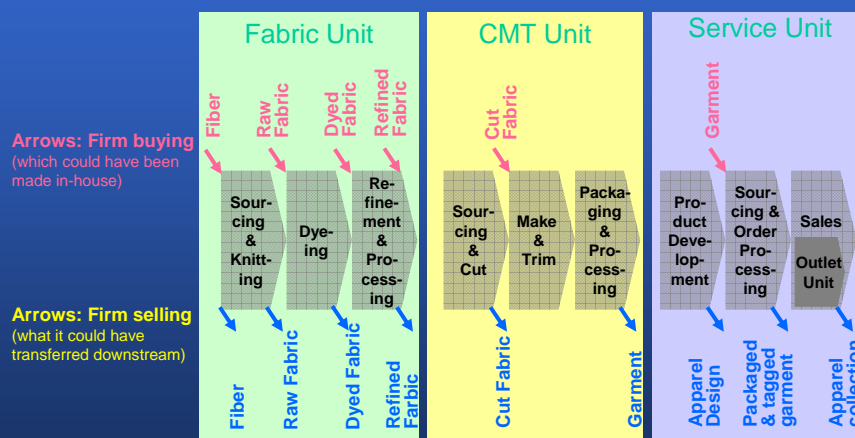
Implications: Shaping Boundaries in a Dynamic World

- Focus on Industry Architectures and Architectural fights
 - Consider previously unexplored but critical issues shaping industries
 - Explain why such architectures come about, when we can change them
- Identify ways to *build architectural advantage*
 - Increase mobility while maintaining complementarity (MSFT, Fannie Mae)
 - Disentangle these two *distinct* elements of co-specialization: new theory
- Shift from isolating mechanisms to wealth creation and asset change
 - Fundamental change of focus and mindset – new set of prescriptions
 - Further opportunities explored through the Samuelson-Stolper Theorem

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From the Industry to the Firm and its manifold boundaries: Vertical Permeability and Dynamic Benefits (J&B, *OS*, 2006)



The Organizational Benefits of Permeable Vertical Architectures

- Operational Efficiency and Effectiveness
 - Efficiency: Benchmarking; monitoring; resulting incentives
 - Effectiveness: Capacity and capability matching
- Strategic Capabilities and Propensity to Innovate
 - Partial integration sustains systemic adaptation (a la ZARA)
 - Partial use of the market prompts open innovation: Avoid NIH syndrome
- Use of the Market Benchmark supports Corporate Resource Allocation
 - Transparency improves inter-divisional relations, reduces politicking
 - Capacity utilization a benchmark for resource / capital allocation

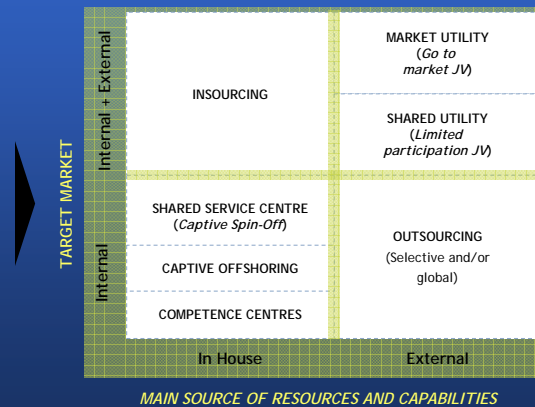
The Strategic Rationale of Flexible scope

Fending off commoditization through boundary design (sequel, 2007)

- Opening up leads to increased responsiveness
 - Ability to supply and fill demand; Ability to provide focused needs
 - Responsiveness a valued attribute with strategic benefits
- Opening up while providing customized packages: de-commoditization
 - Regenerating tired markets; building or enhancing dependencies
 - Gradual shift to services, focusing on *uniqueness of markets* (cf. White)
- Means to open up: *Architectural* IT leading to new forms
 - Not an issue of EDI and connection, but ERP and Org Design
 - Changing organizational “process and grammar” shapes boundaries

And this is not just the case in Fashion Inc:
Recall EDS's latest Gospel, which picks up on recent trends

Choice of an operating and sourcing model based on internal and external capabilities



Coda:

On the causes and implications of the division of labour

- Understand how value chains and strategic dynamics evolve
 - *Adding new levels of analysis that explain much of what matters*
- Provide a map and data to explain how profit and value migrates
 - And show how changes in structure relate to changes in value
- Study how firms try to change their industry architecture
 - *New field of inquiry* that has much to offer
- Consider how firm and industry structure combine to affect prospects
 - Promise on looking at the role of firms as they span sectors and markets
 - What we took for granted may be the most interesting area of study

...and some of the papers I drew on:

- M.G. Jacobides, 2007, "A Model of how Transaction Costs, Capabilities and Limits to Growth Drive Vertical Scope", *Organization Science*, forthcoming
- M.G. Jacobides & S.G. Winter, 2007, "Entrepreneurship and Firm Boundaries: The Theory of A Firm", *Journal of Management Studies*, forthcoming
- M.G. Jacobides, 2007. "Playing Football in a Soccer Field: Value Chain and Structure, Institutional Modularity, and Success in Foreign Expansion" *Managerial and Decision Economics*, forthcoming
- M.G. Jacobides, T. Knudsen & M. Augier, 2006. "Benefiting from Innovation: Value Creation, Value Appropriation and the Role of Industry Architectures", *Research Policy*, 35: 1200-1221.
- M.G. Jacobides & S. Billinger, 2006. "Designing the Boundaries of the Firm: From "Make, Buy or Ally" to the Dynamic Benefits of Vertical Architecture", *Organization Science*, 17 (2): 249-261
- M.G. Jacobides, 2006. "The Architecture and Design of Organizational Capabilities", *Industrial and Corporate Change*, 15 (1): 151-171
- M.G. Jacobides & L.M. Hitt, 2005. "Losing Sight of the Forest for the Trees? Productive Capabilities and Gains from Trade as Drivers of Vertical Scope", *Strategic Management Journal*, 26 (13): 1209-1227
- E. Cacciatori & M.G. Jacobides, 2005. "The Dynamic Limits of Specialization: Vertical Integration Reconsidered", *Organization Studies*, 26 (12): 1851-1883
- M.G. Jacobides, 2005. "Industry Change through Vertical Dis-integration: How and Why Markets Emerged in Mortgage Banking", *Academy of Management Journal*, 48 (3): 465-498
- M.G. Jacobides & S.G. Winter, 2005. "The Co-evolution of Capability and Transaction Costs: Explaining the Institutional Structure of Production", *Strategic Management Journal*, 26 (5): 395-413

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