Resource Redeployment and the Pursuit of the New Best Use: Economic Logic and Organizational Challenges

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IOEA 2025, Corsica
5/15/25

Agenda

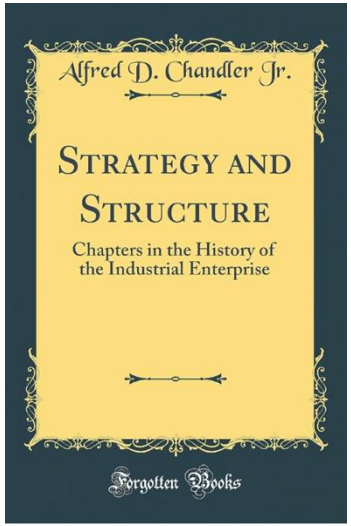
- Resource Redeployment and the Pursuit of the New Best Use: Economic Logic and Organizational Challenges
  - A Pipes and Prisms Framework (PPF)
- Strategic Management Journal (SMJ) Special Issue (2025): Resource Allocation and Strategic Management
  - Guest Editors: Catherine Maritan and Brian Wu
- Future Research Opportunities: resource allocation in the context of:
  - Hyperscaling and hyperspecialzation of digital firms
  - Global value chain climbing by emerging market firms

A Pipes and Prisms Framework (PPF)

- Levinthal, D., and Wu, B. 2025. Resource Redeployment and the Pursuit of the New Best Use: Economic Logic and Organizational Challenges. *Strategy Science*. 10(1): 32-47.
- Wu, B., Wan, W. and Levinthal, D. 2014. Complementary Assets as Pipes and Prisms: Innovation Incentives and Trajectory Choices. *Strategic Management Journal*, 35(9): 1257–1278.
- Levinthal, D. and Wu, B. 2010. Opportunity Costs and Non-scale Free Capabilities: Profit Maximization, Corporate Scope, and Profit Margins. *Strategic Management Journal*, 31(7): 780-801.

What is strategy?

"Strategy is the determination of the basic long-term goals of an enterprise, and the adoption of courses of action and the allocation of resources necessary for carrying out these goals (p. 13)."



Strategy and Structure (Chandler, 1962)

What are resources/capabilities (that strategy research focuses on)?

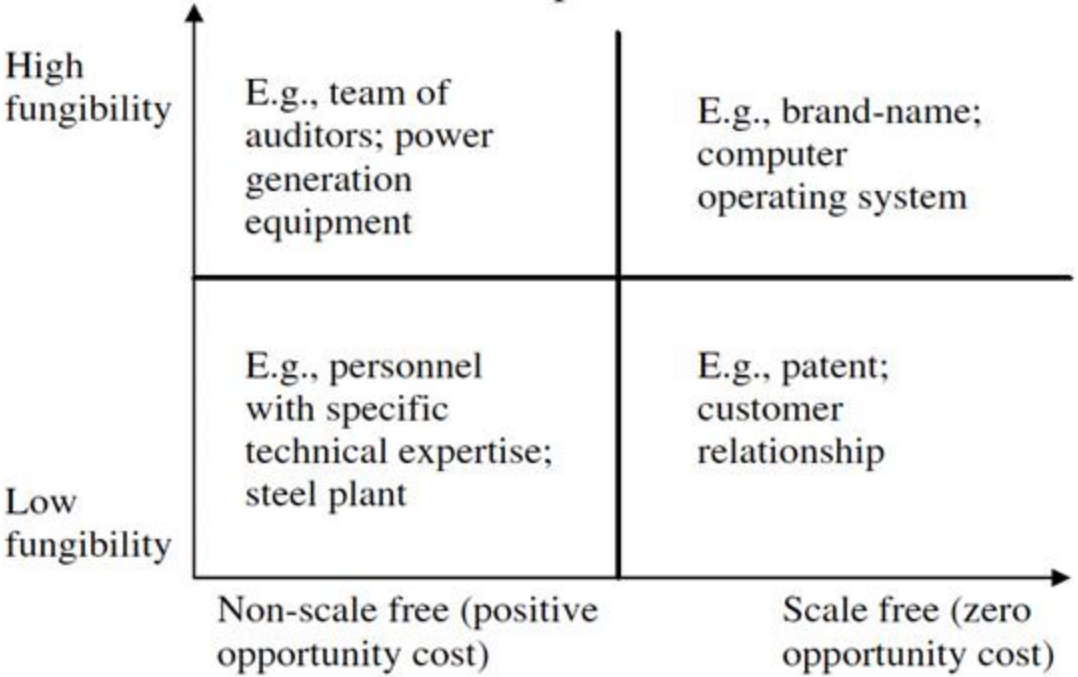
"A firm is more than an administrative unit; it is also a collection of productive resources the disposal of which between different uses and over time is determined by administrative decision." (Penrose, 1959: 24) [Also see Nelson and Winter (1982), Teece (1982), Wernerfelt (1984), Prahalad and Hamel (1990), and Barney (1991)]

- Patent
- Brand
- Data and algorithm
- Data centers
- AI engineering team at OpenAI and DeepSeek
- …

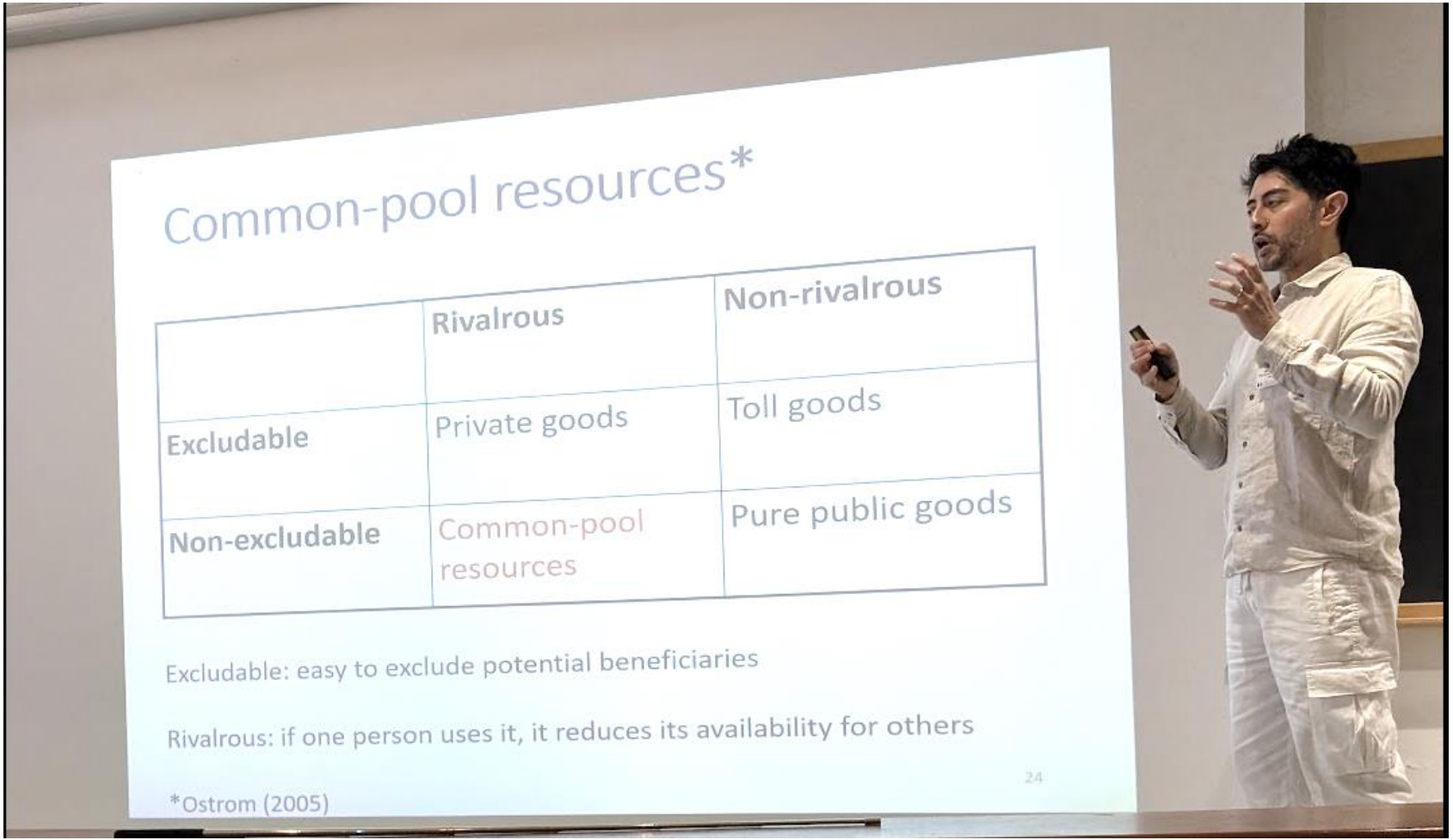
How are they different from financial resources ($) as in finance research?

What types of resources need to be reallocated or redeployed, and why?

Table 1. Dimensions of capabilities



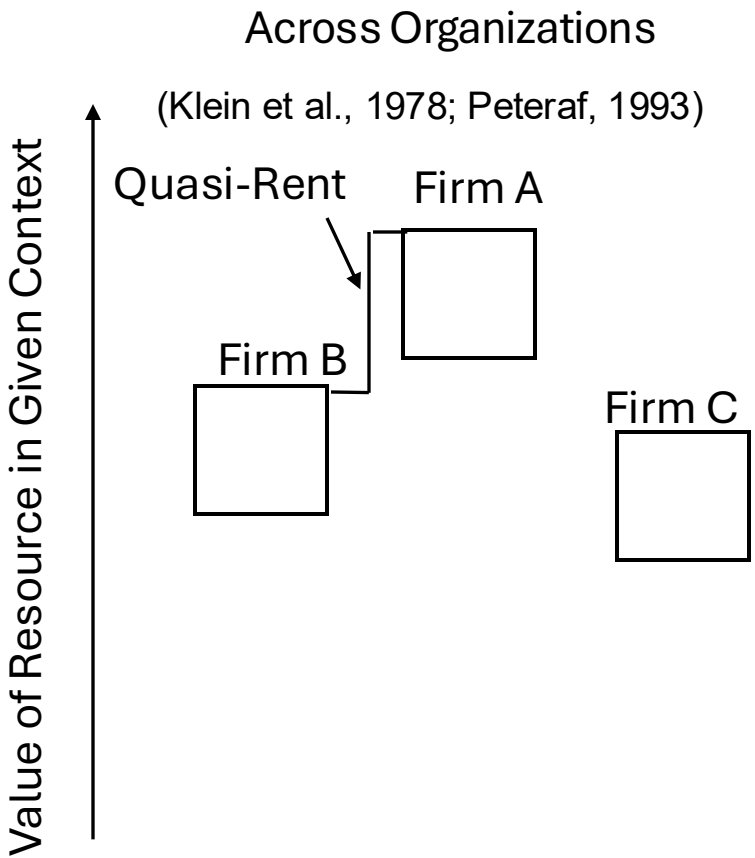
(Levinthal and Wu, 2010)

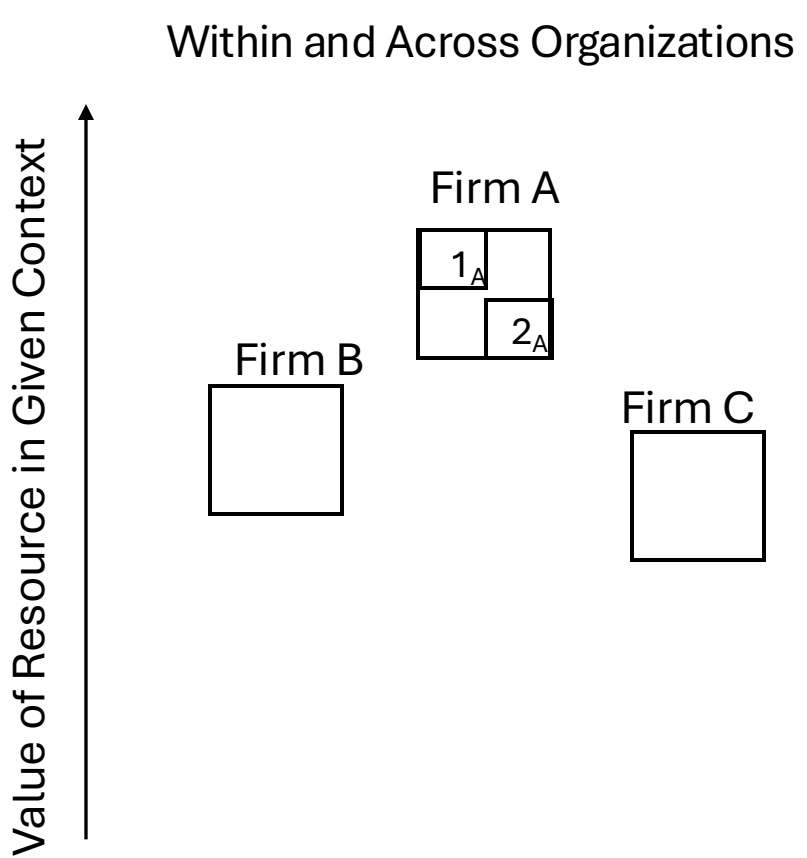

Common-pool resources*
Rivalrous
Non-rivalrous
Excludable
Private goods
Toll goods
Non-excludable
Common-pool resources
Pure public goods
Excludable: easy to exclude potential beneficiaries
Rivalrous: if one person uses it, it reduces its availability for others
*Ostrom (2005)
24

What is opportunity cost?

- The construct of opportunity cost is a basic idea that addresses the question of resource use and allocation:
  - what is the best alternative use of a resource foregone by its use in the current or proposed application (Samuelson and Nordhaus, 2010).
- Prior work focuses on the external logic of opportunity cost
  - The finance literature defines the opportunity cost of financial resources as "the expected return that investors can achieve in financial markets at the same level of risk (Brealey, et al. 2019, 10)." (CAPM)
  - The economics and strategy literature defines the opportunity cost of firm-specific resources as the value to these resources' second highest bidder outside the firm (Klein et al., 1978; Peteraf, 1993).
- Our focus is on the internal logic of opportunity cost (Levinthal and Wu, 2022)
  - The next best use within the firm boundary, with the next best use determined as a function of the firm's other initiatives and how these initiatives are organized.

Ecology of Opportunities





Two distinct mechanisms by which firm boundaries impact the redeployment of resources within and across these boundaries: Cost vs Value.

- R_A : value created from the use of resource R in original domain A.
- Changing economic circumstances (e.g., tech change)->possible redeployment to new domain B
- Value created from the redeployment of resource in domain B is:
  - R_{BI}, with the "I" indicating internal redeployment (within the same firm)
  - R_{BE}, with the "E" denoting external redeployment (to a different firm)

AC_I : internal adjustment cost,

AC_E : external adjustment cost,

TC: transaction cost associated with external allocation of the resource (Teece, 1982).

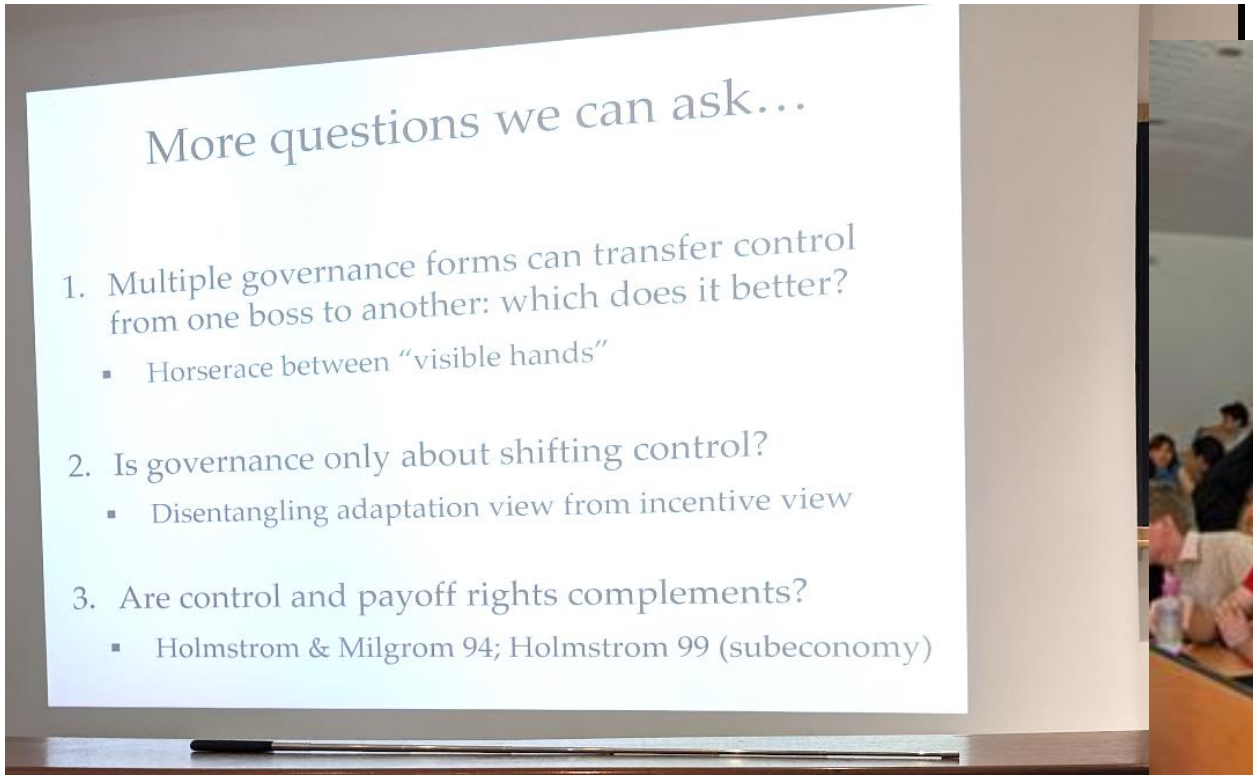
The decision calculus would be as follows:

If $R_A > \text{Max}\{R_{BI} - AC_I,\ R_{BE} - AC_E - TC\}$ then no redeployment

If $R_{BI} - AC_I > \text{Max}\{R_A, R_{BE} - AC_E - TC\}$ then redeploy internally

If $R_{BE} - AC_E - TC > \text{Max}\{R_A, R_{BI} - AC_I\}$ then redeploy externally

For work on (minimizing) transaction cost and adjustment cost, see Giorgio's lecture



Here we focus on (maximizing) value creation from resources. When $R_{BI} > R_{BE}$?

- Value created from the redeployment of resource in domain B is:
  - R_{BI} , with the "I" indicating internal redeployment (within the same firm)
  - R_{BE} , with the "E" denoting external redeployment (to a different firm)
- The presence of firm-specific inter-dependence or complementarities among the firm's resources and capabilities
  - E.g., organizational codes (Arrow, 1974), routines (Nelson and Winter, 1982), transactive memory (Argote and Ren, 2012), and complementary assets (Teece, 1986; Argyres and Zenger, 2012)
- Yet, these very properties (firm-specific interdependence or complementarities) that make redeploying resources within the firm attractive also complicates the assessment of the "new best use" of the resource.
  - Otherwise, allocation to a new best use reduces to a straightforward problem

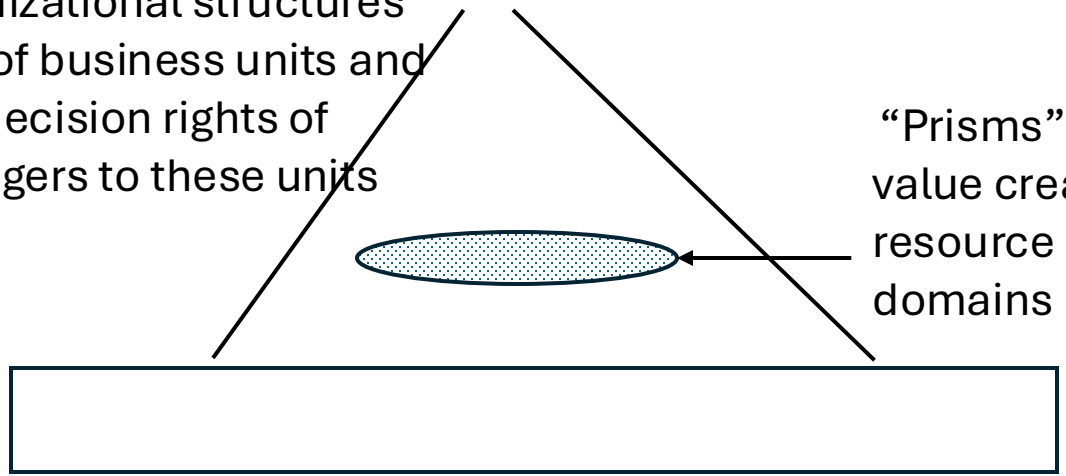
The dynamic consideration of opportunity cost

- The dynamic consideration of opportunity cost is reflected by the shadow price (Dantzig and Thapa, 1997):
  - The difference in value of developing the firm's resources to relax one constraint or another
- Dynamic costs vs. dynamic capabilities.
  - A dynamic capability is associated with the capacity to move through the state space of firm capabilities (Winter, 2003).
  - In contrast, the dynamic consideration of opportunity cost does not reflect a distinct ability to shift the firm's capability in a particular manner, but rather reflects the economic incentive to do so.
- What are the gradients that the firm should climb?
  - An opportunity cost logic can provide a framework to inform the trajectory of capability development.
  - E.g., the bottleneck component of the interdependent micro-computer ecosystem that constrains firm performance drives firms' allocation of R&D investment effort (Ethiraj, 2008).

Pipes and Prisms of Resource Redeployment

Range of Managerial Decision Rights

"Pipes": organizational structures and grouping of business units and allocation of decision rights of specific managers to these units



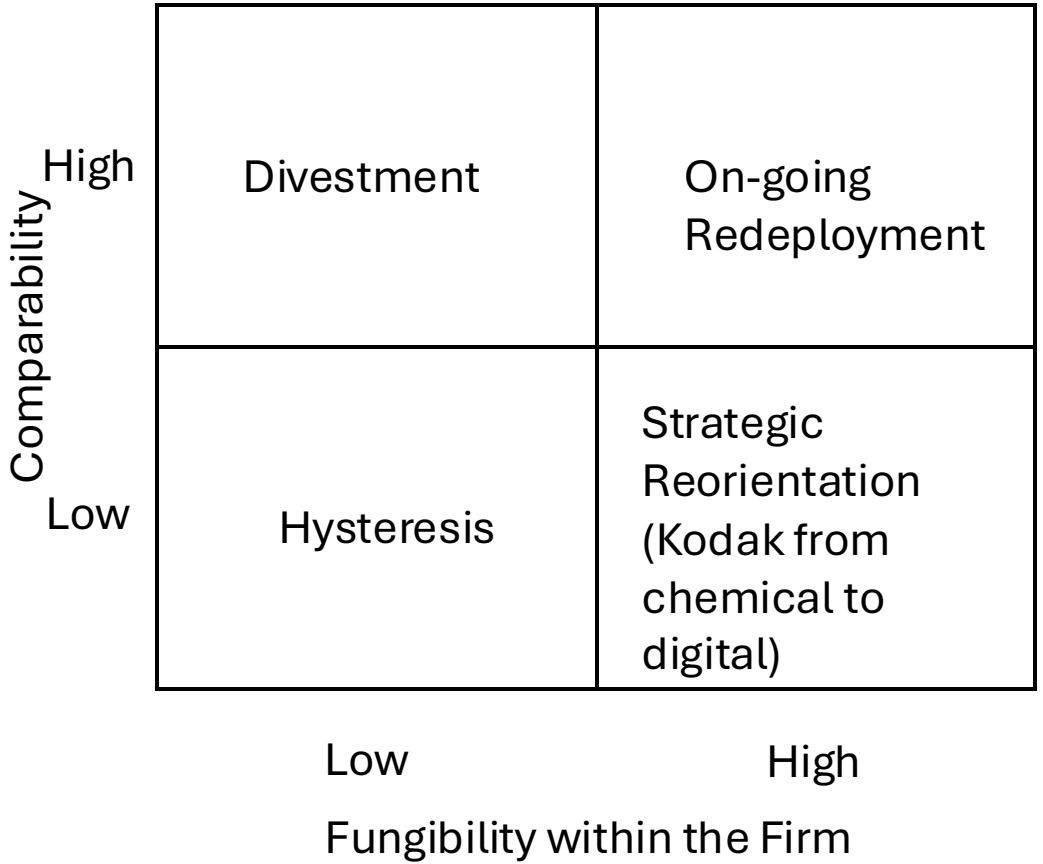
"Prisms": the various metrics of value creation that may make resource use across different domains more or less comparable

Fungibility: Range of Applications (latent opportunities of resource redeployment)

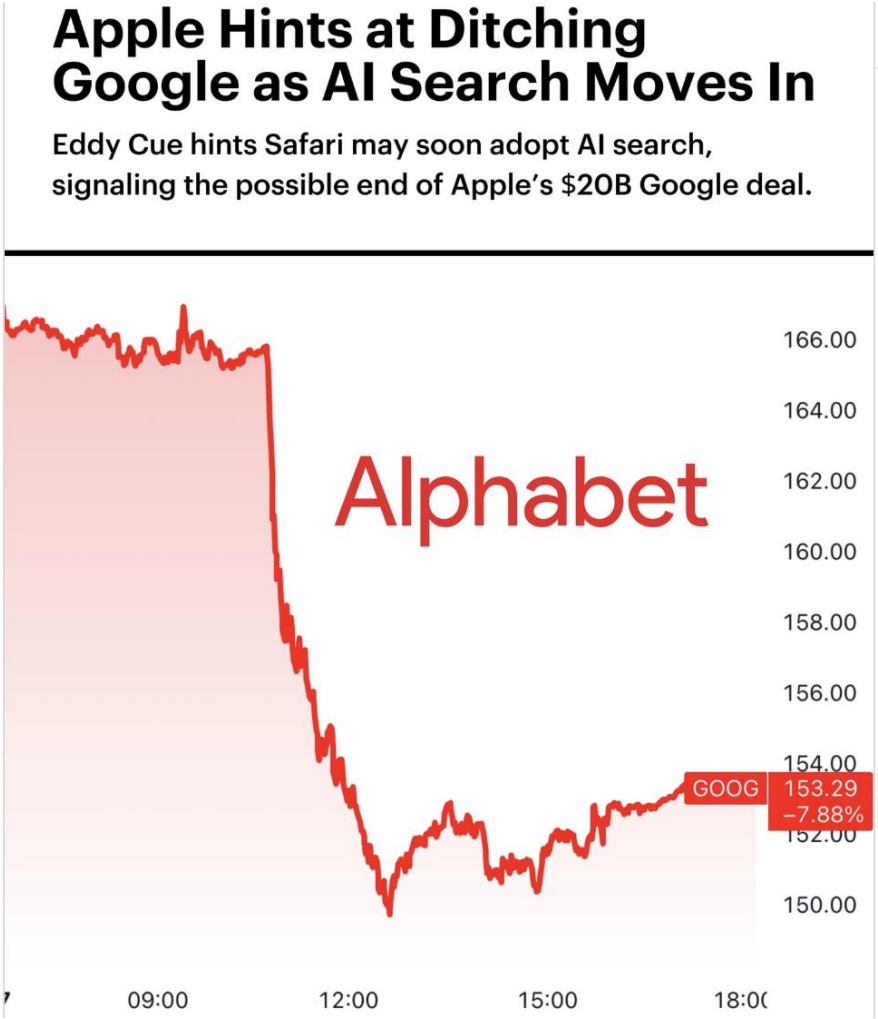
Implications of Degree of Fungibility and Comparability for Redeployability

Comparability -- the ease with which firms can use a variety of operating metrics to compare alternative businesses.

- If comparability is high, firms can use a variety of operating metrics to compare the use of a resource in alternative businesses.
- Rank business units as in a "tournament" (Lazear and Rosen, 1981)

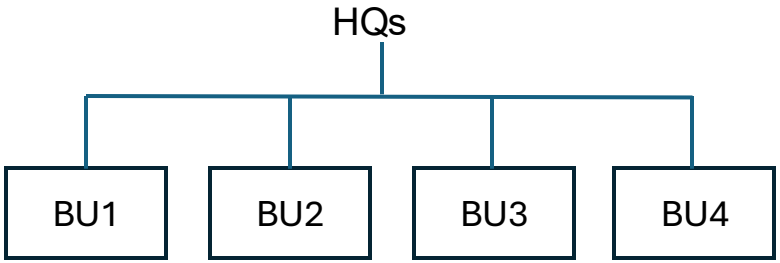


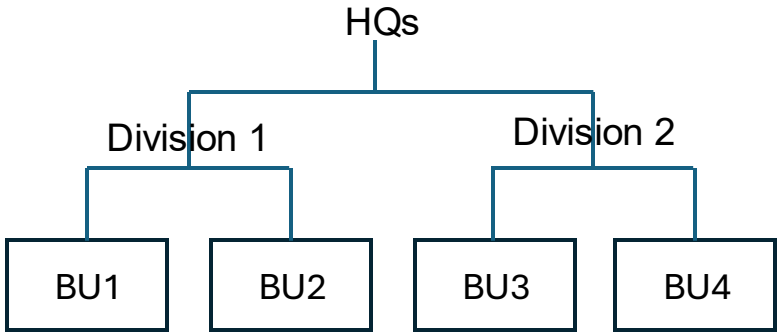
- Google trailing behind Microsoft in generative AI might not be attributed to Google's lack of technological capabilities — considering Google invented the Transformer algorithm that underlies the development of neural networks for generative AI (Vaswani et al, 2017).
- Rather, it may be due to the alignment of performance metrics in the business model for generative AI being more attuned to Microsoft's existing productivity-focused business than Google's search/ad-oriented business.



Implications for organization design and corporate scope

- Organization structure (e.g., M form, or simple hierarchy) changes the opportunity costs that different actors in the organization face.
- Alternative partitions affect the opportunity costs that different actors face, and a given division manager will tend to think about opportunity cost as it relates to the initiatives under their authority.
    - E.g., a decentralized firm (few lines of business per executive with resource authority) would, other things being equal, be more likely to further diversify than a more centralized firm (more lines of business per executive with resource authority).





Implications for organization design and innovation

- A separate unit may be needed for new, particularly “disruptive” new initiatives.
  - Otherwise, with imperfect modularization, the opportunity cost logic might cause the new initiative to be deprived of resources.
  - This argument contrasts with Christensen and Bower (1996) invoking of resource dependence theory and Gilbert (2005) of threat rigidity

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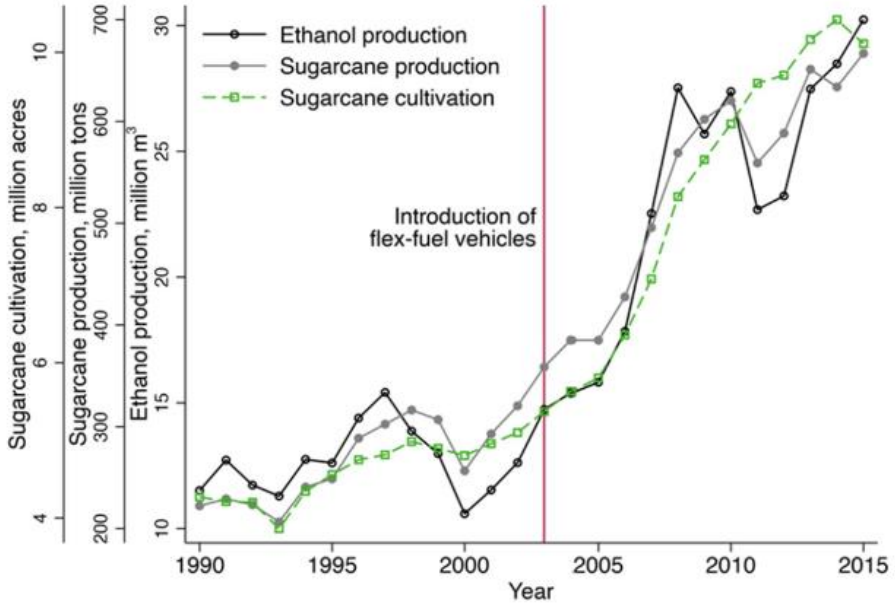
Strategic Management Journal (SMJ) Special Issue articles (2025): Resource Allocation and Strategic Management (Guest Editors: Catherine Maritan and Brian Wu)

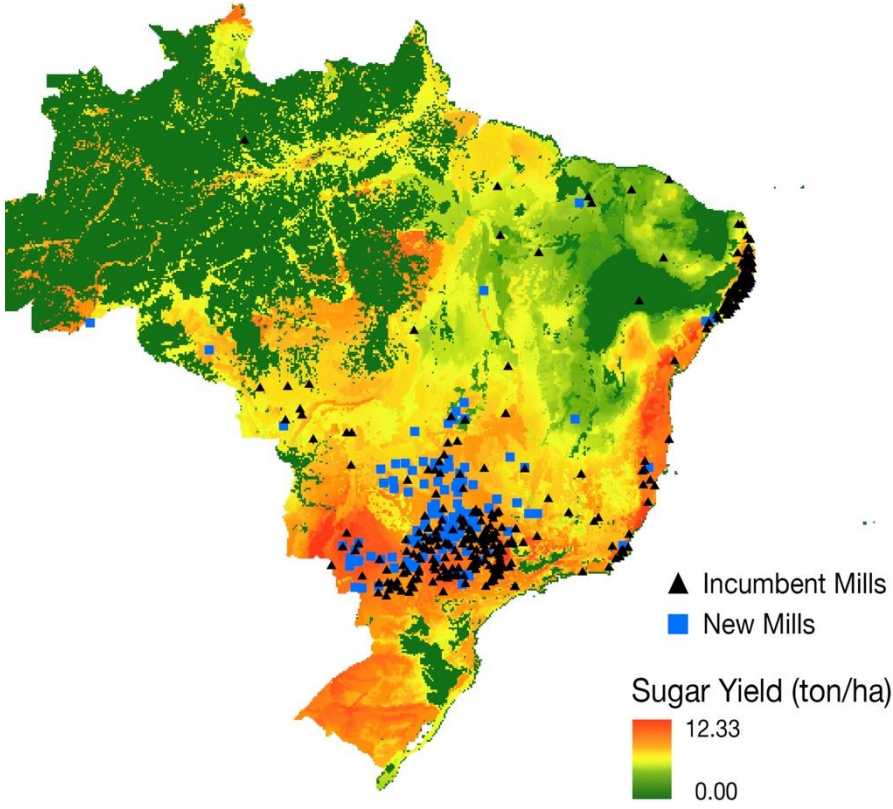
- Burgelman, R. A., & Aaltonen, P. (2025). Fading corporate survival prospects: Impact of co-selection bias in resource allocation on strategic intent.
- Cattani, G., Mastrogiorgio, M., & Carignani, G. (2025). Resource reallocation across successive systemic innovations: How Rolls-Royce shaped the evolution of the turbojet, turboprop, and turbofan.
- Chauvin, J., Inoue, C., & Poliquin, C. (2025). Resource redeployment as an entry advantage in resource-poor settings.
- Devarakonda, S. V., Goossen, M. C., & Mulotte, L. (2025). The allocation of resource control within the corporate structure: Evidence from post-acquisition patent reassignments.
- Kim, K., Guler, I., & Karim, S. (2025). Who gets redeployed? Inventor characteristics and resource redeployment decisions.
- Tandon, V., Nandkumar, A., Mogra, R., & Srikanth, K. (2025). Balancing allocative and dynamic efficiency with redundant R&D allocation: The role of organizational proximity and centralization.
- Yamaguchi, S., Braguinsky, S., Okazaki, T., & Yuki, T. (2025). Resource allocation and growth strategies in a multi-plant firm: Kanegafuchi Spinners in the early 20th century.

Chauvin, J., Inoue, C., & Poliquin, C. (2025). Resource redeployment as an entry advantage in resource-poor settings. Strategic Management Journal

- “Firms entering underdeveloped regions often struggle to obtain inputs needed for production, such as skilled labor. We propose that incumbent firms expanding into such regions can overcome resource scarcity by redeploying resources from their existing units.
- Redeployment allows firms to move resources—such as skilled workers—from markets where resources are relatively abundant to markets where they are scarce.
- We show that such factor market “arbitrage” is most valuable when firms operate across markets with large differences in resource scarcity and when production is sensitive to worker skill and to complementarities between inputs.”

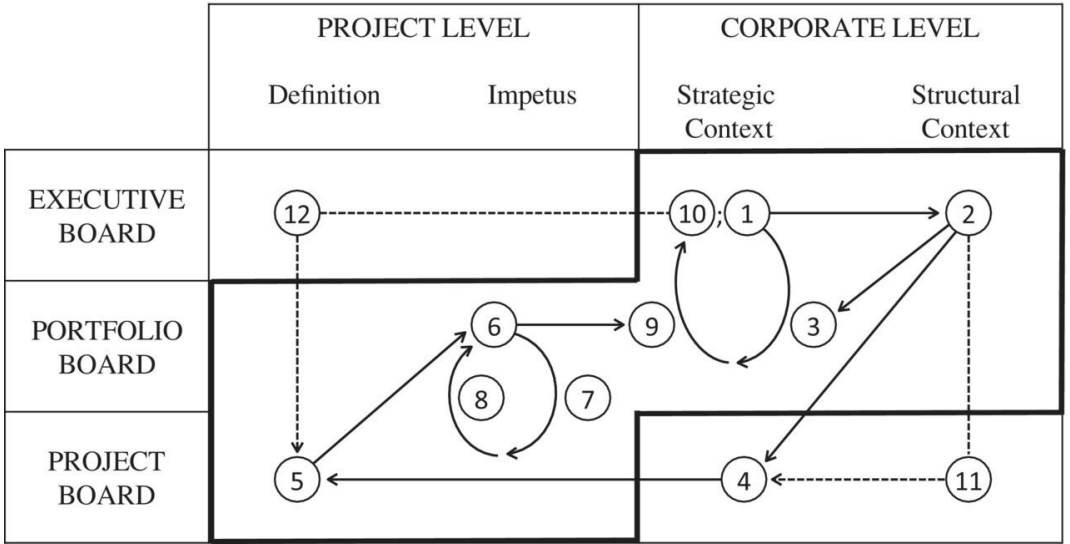
Chauvin, J., Inoue, C., & Poliquin, C. (2025). Resource redeployment as an entry advantage in resource-poor settings. Strategic Management Journal





Burgelman, R. A., & Aaltonen, P. (2025). Fading corporate survival prospects: Impact of co-selection bias in resource allocation on strategic intent. Strategic Management Journal

- “Our field study of new business development in a German-based global pharmaceutical company reveals that the emergence of co-selection bias in project-level state-gate resource allocation engendered a corporate-level innovation portfolio imbalance.”



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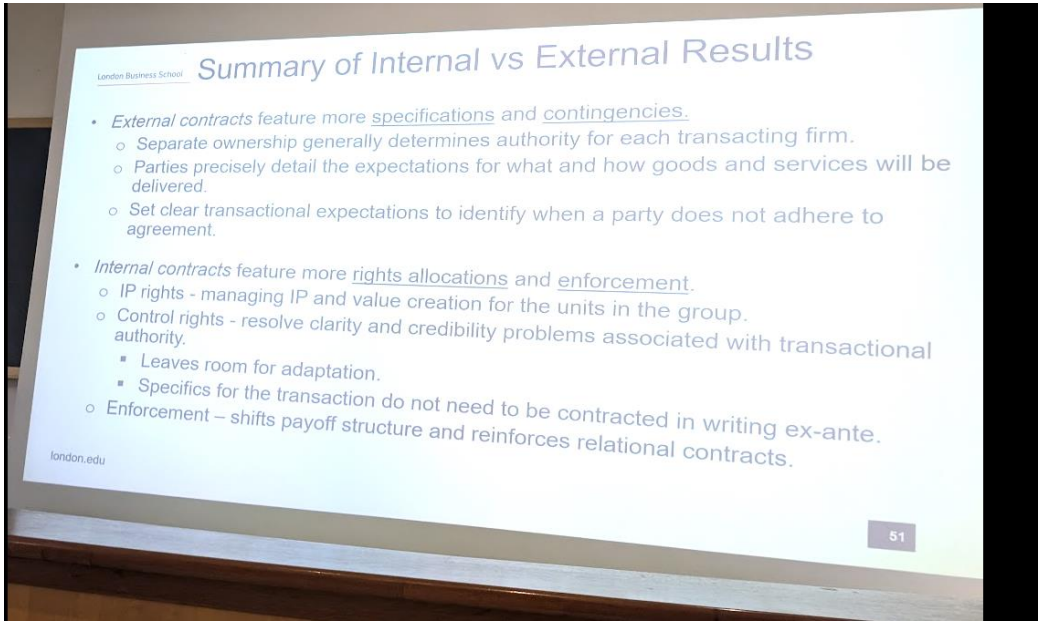

Devarakonda, S. V., Goossen, M. C., & Mulotte, L. (2025). The allocation of resource control within the corporate structure: Evidence from post-acquisition patent reassignments.

- “This study explores the decision to centralize control over technological resources. We posit that opportunity costs arising from the firm's administrative structure impact this choice.
- These opportunity costs stem from differences in identifying and evaluating opportunity sets between the unit level (decentralized) and headquarters level (centralized).
- We propose that a resource's versatility increases the opportunity costs associated with decentralized control, thereby raising the likelihood of its control being centralized.
- Using a sample of patents acquired through corporate acquisitions in the medical device industry, we find that patents with greater technological and product-market versatility are more likely to be reassigned to the central level.”

Tandon, V., Nandkumar, A., Mogra, R., & Srikanth, K. (2025). Balancing allocative and dynamic efficiency with redundant R&D allocation: The role of organizational proximity and centralization.

- “In technology-intensive industries, multiunit firms often employ redundant allocation of R&D resources, that is, the parallel deployment of scientists and equipment in different units towards realizing the same business objective.
- Although common, there is little managerial guidance on how this practice impacts firms' R&D outcomes, and how organizational characteristics influence this relationship.
- An analysis of large pharmaceutical firms reveals that redundant allocation of R&D resources across units increases wastage but also stimulates competing units to create innovations with high firm-specific value.
- Organizationally proximate units are less likely to have their redundant projects terminated, while creating more high-value-innovations.”

Kim, K., Guler, I., & Karim, S. (2025). Who gets redeployed? Inventor characteristics and resource redeployment decisions.

- “Managers move resources between business units to respond to profitability shocks, but which specific resources do they move?
- Examining the inter-unit transfers (redeployments) of inventors between business units following the unexpected profitability disparity between ethylene-based business units and others in the US petrochemical industry, we find that generalist inventors are more likely to be redeployed, while brokers in the collaboration network (inventors who connect others) are less likely to be redeployed.”

Cattani, G., Mastrogiorgio, M., & Carignani, G. (2025). Resource reallocation across successive systemic innovations: How Rolls-Royce shaped the evolution of the turbojet, turboprop, and turbofan.

> *A historically grounded evolutionary perspective: The model builds on Woese's (2002, 2004) model of (cell) evolution that explicitly incorporates horizontal transfer of genes—alongside vertical inheritance—as a key mechanism driving evolution in biology.*

- By delving into the technological aspects of aeroengine development and exploring why Rolls-Royce had the capabilities to successfully integrate key functional modules (“genes”) across various modular levels, we clarify the relationship between technology and organization that underlies resource reallocation.
- A functional module embodies not only the knowledge required to replicate a specific technological component (e.g., a compressor or a turbine), but also the specialized human capital, tools, machines, testing and production facilities, and engineering culture that enable a firm to design, prototype, manufacture, and integrate functional modules into a new architecture

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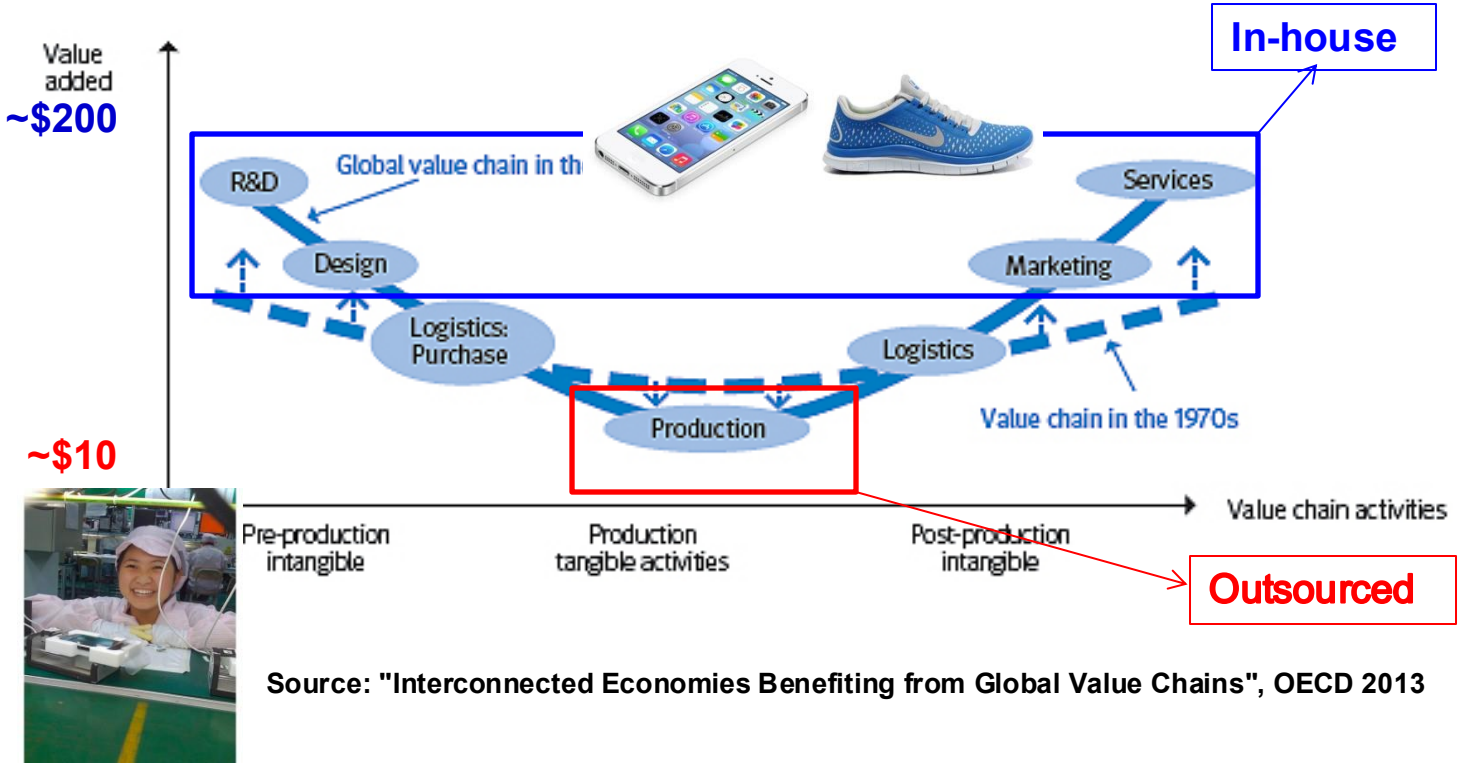
The smiling curve: Global value chain climbing by emerging market firms

(Wan, Z. and Wu, B. 2017. When Suppliers Climb the Value Chain: A Theory of Value Distribution in Vertical Relationships. *Management Science*. 63(2): 477-496)



Source: "Interconnected Economies Benefiting from Global Value Chains", OECD 2013

Yamaguchi, S., Braguinsky, S., Okazaki, T., & Yuki, T. (2025). Resource allocation and growth strategies in a multi-plant firm: Kanegafuchi Spinners in the early 20th century.

- “We use Kanebo's internal records to trace plant-level appointments of middle managers and engineers in charge of plant operations from 1898 to 1918.
- Company records also detail plant-level allocation of skilled blue-collar workers trained at Kanebo's vocational school launched in 1906.
- We complement these internal records with external sources: notably, alumni registries of Imperial Universities and Technical Colleges.”

	Phase I (1890s–1905)
	“Buy” growth strategy
Number of plants	2 original plants + 8 acquired plants
Industry landscape	• Large-scale entry, then shakeout; some firms already starting product upgrading and diversification
Competitive strategy and product type	• Cost-leadership • Simple, homogeneous yarns
Resource acquisition to implement strategy	• Acquisitions of mismanaged firms • Hiring managers using Muto's and Mitsui network • Hiring university-educated managers but few educated engineers
Resource (re-) allocation to implement strategy	• Allocating better managers to priority plants (largest ones and newly acquired ones that needed efficiency improvement)

Today — plans and goals

- **Leaders, managers and management**
  1. Part I: Setting the scene
  2. Part II: Managers (and leaders)
  3. Part III: Management
  4. Part IV: Managers **AND** management

- Key takeaways
  - Very broad **overview** of concepts
  - Learn about a set of **basic management practices** that apply across sectors
  - Learn about a **methodology** and set of measurement tools **you can use**

- **Resources**
  1. Reading list (slightly leaning to public sector) https://tinyurl.com/dscur-readinglist

TABLE 9 Kanebo's changing strategic management priorities and resource allocation.

	Phase I (1890s–1905)	Phase II (1906–1910)	Phase III (1911–1918)
	"Buy" growth strategy	**"Build" growth strategy**	**Balanced strategy—"buy" and "build"**
Number of plants	2 original plants + 8 acquired plants	10 existing plants + 1 newly built plant	11 existing plants + 5 acquired plants
Industry landscape	• Large-scale entry, then shakeout; some firms already starting product upgrading and diversification	• Emergence of industry-dominant "center of gravity" firms with diversified product portfolios	• Continued consolidation of the industry but also new entry by diversified firms trigged by WWI boom
Competitive strategy and product type	• Cost-leadership • Simple, homogeneous yarns	• Product upgrading and diversification in a few pioneering plants ○ Upgrading to high-count and processed yarns ○ Downstream diversification into textiles production	• Simultaneously pursuing cost-leadership and product differentiation strategies • Expanding output scale of high-count yarns and horizontal product differentiation
Resource acquisition to implement strategy	• Acquisitions of mismanaged firms • Hiring managers using Muto's and Mitsui network • Hiring university-educated managers but few educated engineers	• Capital investment for product upgrading and diversification • Purchasing high-end machines and looms • Internal vocational training school for blue-collar workers • Large-scale hiring of university- and technical-college educated engineers	• Acquisitions of diversified cotton spinning firms • Capital investment in more high-end machines and looms as well as in expanding low-end machine capacity • Internal vocational training school for blue-collar workers
Resource (re-) allocation to implement strategy	• Allocating better managers to priority plants (largest ones and newly acquired ones that needed efficiency improvement)	• Allocating educated managers and skilled engineers/workers to plants conducting product differentiation (three-way complementarity)	• Reallocating educated managers and engineers with experience of product differentiation in pioneering plants to newly acquired plants and more plants tasked with product differentiation

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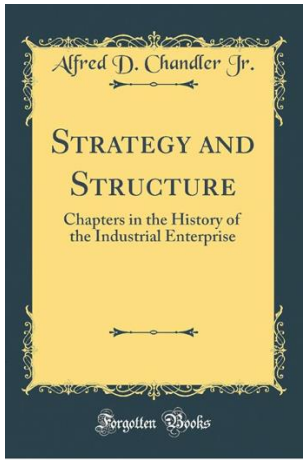


Strategy and Structure (Chandler, 1962)

Giustiziero, G., Kretschmer, T., Somaya, D. and Wu, B. 2023. Hyperspecialization and Hyperscaling: A Resource-Based Theory of the Digital Firm. Strategic Management Journal 44(6): 1391-1424. (lead article).

How do digital firms compare with industrial firms?

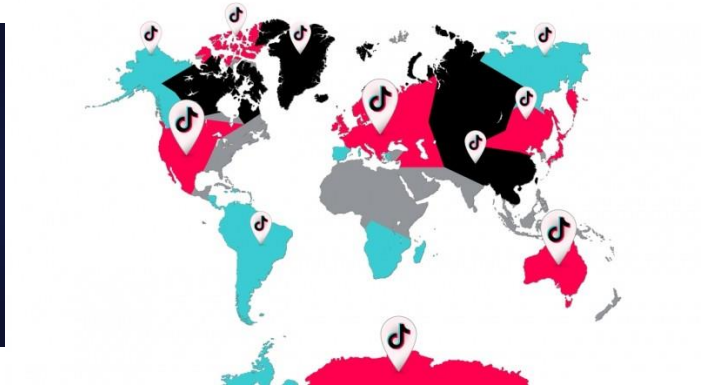
- Industrial enterprises grew large thanks to extensive scale and scope (Chandler, 1977, 1990).
- Digital firms do less—they are more specialized—but at the same time are much bigger than their industrial counterparts. That is, they have higher scale but narrower scope.

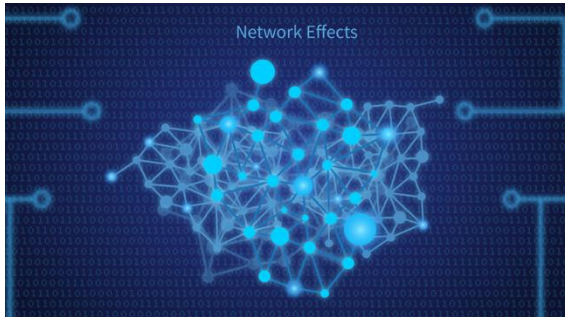
See its video abstract (SMS Journals Video Abstract Award)

- https://www.youtube.com/watch?v=RznoEeqz864

The scalability of a firm's resource bundle

- Reflects the types and relative shares of scale free (e.g., data and AI algorithm) and non-scale free resources and capabilities (e.g., human capital like AI engineers) in the bundle (Levinthal & Wu, 2010; Giustiziero, Kretschmer, Somaya, & Wu 2022).
- Captures the extent to which the value created increases with the extent of the resource bundle employed in a particular activity.





Hyperscaling AND Hyperspecialization

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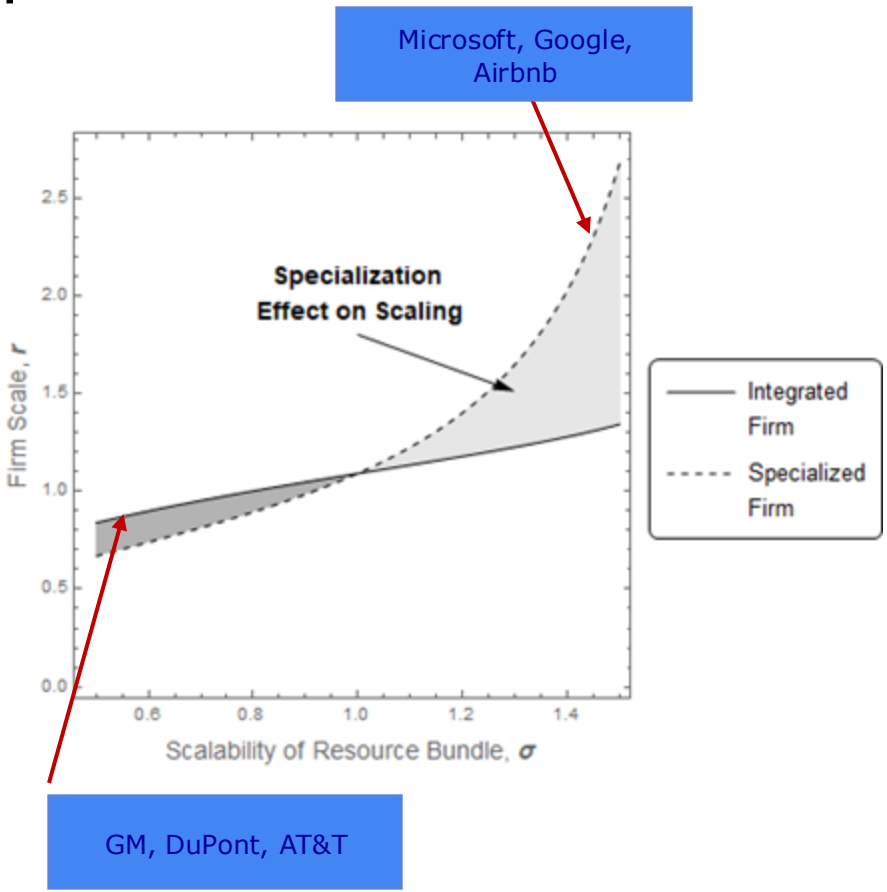
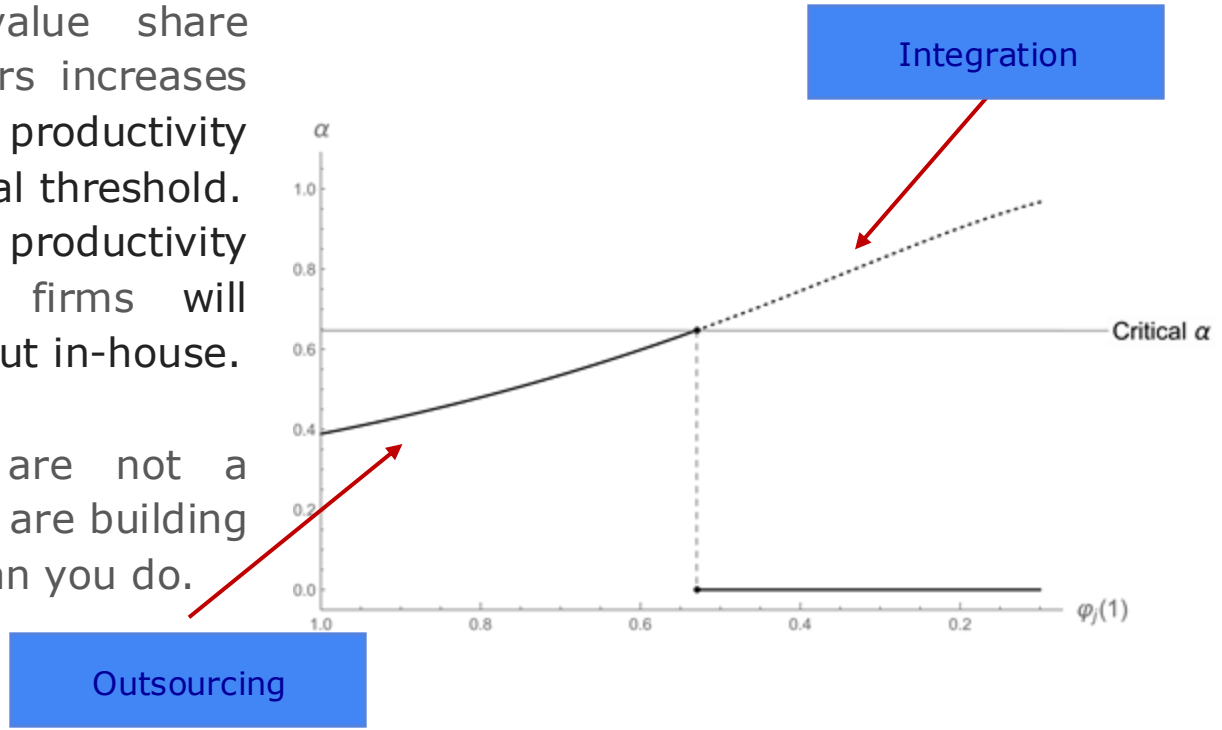
When a scalable resource bundle can be used to either scale within a focal activity or to increase scope into complementary ones, it leads to specialization because of the high opportunity cost of not focusing on the focal value-adding activity as intensively as possible, even if the resource bundle is fungible to other activities



Hyperscaling and value capture

- In digital firms, the value share captured by complementors increases when complementor productivity decreases… up to the critical threshold.
- If the complementor's productivity declines further, digital firms will integrate and make the input in-house.

THE "GATES LINE": You are not a platform until the people who are building on you make more money than you do.



Agenda

- Resource Redeployment and the Pursuit of the New Best Use: Economic Logic and Organizational Challenges
  - A Pipes and Prisms Framework (PPF)
- Strategic Management Journal (SMJ) Special Issue (2025): Resource Allocation and Strategic Management
  - Guest Editors: Catherine Maritan and Brian Wu
- Future Research Opportunities: resource allocation in the context of:
  - Global value chain climbing by emerging market firms
  - Hyperscaling and hyperspecialzation of digital firms