Theoretical Developments in the Field of Strategic Management

Frank T. Rothaermel
Georgia Institute of Technology

Georgia Tech College of Management

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Thank you

- Prof. Dr. Rudi Bresser
  - **Theorie und Praxis des Strategischen Managements**
- Prof. Dr. Thomas Mellewigt
- Dr. Ingo Weller

Theoretical Development in Strategic Management: Outline

1. What is Strategic Management?
2. What is Strategy?
3. Early Development
4. Industrial Organization Economics
5. Transaction Cost Economics
6. Agency Theory
7. Game Theory
8. Resource Based View
9. Relational View
10. Dynamic Capability Perspective
11. Some Comments on Methodology

What is Strategic Management?

- Strategic Management is the attempt to explain and predict inter-firm performance differences (competitive advantage) using the scientific method

What is Strategic Management?

- Explaining and predicting inter-firm performance differentials, example:
  - Why is VW outperforming all the other car manufacturers (stock returns 12/07-10/08)?
    - VW +87.1%
    - Audi –22.1%
    - BMW –43.1%
    - Ford –56.%
    - Porsche –60.0%
    - Mercedes –62.4%
    - GM –70.1%

What is Strategic Management?

- Explaining and predicting performance differentials, example:
  - Why is Michael Phelps outperforming everyone else?

What is Strategic Management?

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  - Why is Michael Phelps outperforming everyone else?

Strategic Management

- Strategy Process
  - Where do strategies come from?
  - How are strategies formulated?
- Strategy Formulation
  - How shall we compete to gain competitive advantage?
- Strategy Implementation
  - How do we change the organization to make the strategy work?

What is Strategy?

- Strategy is the managerial application of findings from research in strategic management
  - University courses
  - Basic research
    - Academic journals
  - Applied research
    - Practitioner journals
  - Consulting firms

What is Strategy?

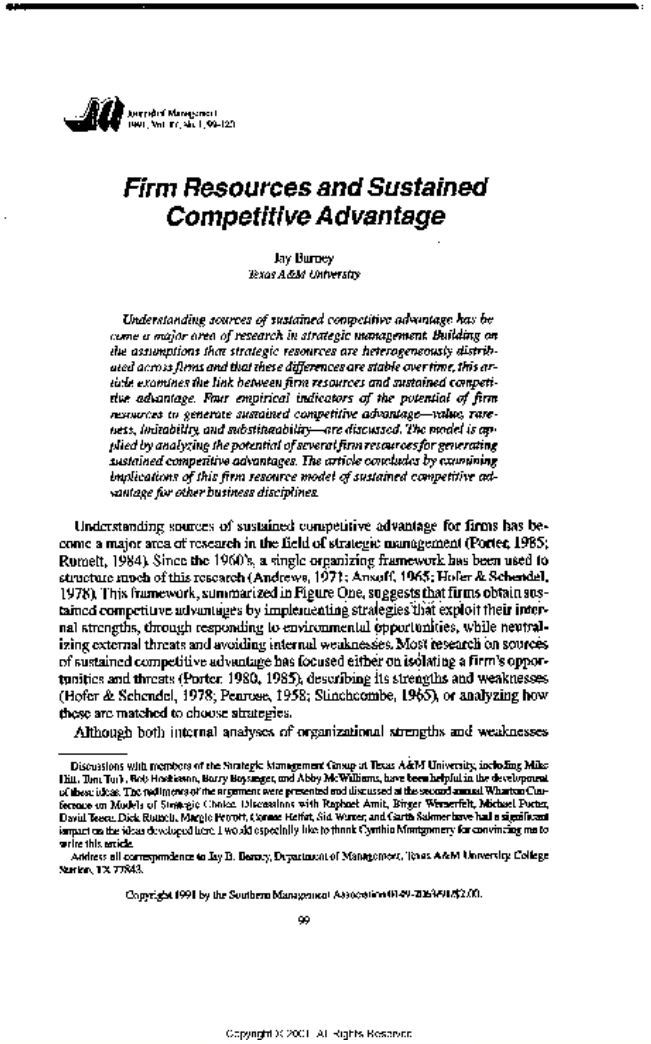
- Strategy is about gaining and sustaining Competitive Advantage

What is Strategy?

- Strategy is the managers' theory of how to gain and sustain competitive advantage (Drucker, 1994)
- Strategy is the creation of a unique and valuable position, involving a different set of activities (Porter 1996)
  - Generic strategies
    - Low cost, differentiation, niche
  - Trade-offs
- A strategy is an integrated and coordinated set of commitments and actions designed to explore core competencies and gain a competitive advantage (Hitt, Ireland, Hoskisson 2008)

What is Competitive Advantage?

- A firm has a CA when it is implementing a value creating strategy not simultaneously being implemented by any current or potential competitors (Barney 1991)
- A firm that outperforms its competitors has a CA
  - CA = superior performance
  - ALWAYS RELATIVE



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Firm Resources and Sustained Competitive Advantage

Jay Barney
Texas A&M University

Understanding sources of sustained competitive advantage has become a major area of research in strategic management. Building on the assumptions that strategic resources are heterogeneously distributed across firms and that these differences are stable over time, this article examines the link between firm resources and sustained competitive advantage. Four empirical indicators of the potential of firm resources to generate sustained competitive advantage—value, rareness, initability, and substitutability—are discussed. The model is applied by analyzing the potential of several firm resources for generating sustained competitive advantages. The article concludes by examining implications of this firm resource model of sustained competitive advantage for other business disciplines.

Understanding sources of sustained competitive advantage for firms has become a major area of research in the field of strategic management (Porter, 1985; Rumelt, 1984). Since the 1960's, a single organizing framework has been used to structure much of this research (Andrews, 1971; Ansoff, 1965; Hofer & Schendel, 1978). This framework, summarized in Figure One, suggests that firms obtain sustained competitive advantages by implementing strategies that exploit their internal strengths, through responding to environmental opportunities, while neutralizing external threats and avoiding internal weaknesses. Most research on sources of sustained competitive advantage has focused either on isolating a firm's opportunities and threats (Porter, 1980, 1985), describing its strengths and weaknesses (Hofer & Schendel, 1978; Pearson, 1958; Stinchcombe, 1965), or analyzing how these are matched to choose strategies.

Although both internal analyses of organizational strengths and weaknesses

Discussions with members of the Strategic Management Group at Texas A&M University, including Mike Hitt, Tim Turk, Bob Hoskisson, Barry Baysinger, and Abby McWilliams, have been helpful in the development of these ideas. The realignment of the argument were presented and discussed at the second annual Wharton Conference on Models of Strategic Choice. Discussions with Raphael Amit, Birger Wernerfelt, Michael Porter, David Teece, Dick Rumelt, Margie Peteraf, Connie Helfat, Sid Winter, and Garth Saloner have had a significant impact on the ideas developed here. I would especially like to thank Cynthia Montgomery for convincing me to write this article.

Address all correspondence to Jay B. Barney, Department of Management, Texas A&M University, College Station, TX 77843.

Competitive Advantage

- Competitive advantage
  - A firm's profitability/value creation is greater than the average profitability/value creation for all firms in its industry
- Sustained competitive advantage
  - A firm maintains competitive advantage for a number of years


AAPL Daily
10/01/08
DELL
NASDAQ
+1,000%
+800%
+600%
+400%
+200%
+0%
-200%
Volume
©BigCharts.com
150
100
50
0
Millions
05
06
07
08


AAPL Daily
10/01/08
DELL
NASDAQ
+1,000%
+800%
+600%
+400%
+200%
+0%
-200%
150
100
50
0
Millions
05
06
07
08
iPhone
iPhone Nano
iPhone Shuffle
iPod
Music
Videos
Photos
Podcasts
Extras
Settings
Shuffle Songs
Now Playing
MENU

Early Development

Early Development

- Emphasis on normative aspect
  - Identifying “best practices”
- Impossible to generalize
  - Each organization/situation is unique
  - Skeptical about the contribution of other academic disciplines (e.g., psychology, economics) (e.g., Learned, Christensen, Andrews, and Bower 1965)
- Only Method: Case studies (HBS)
  - Taught by retired executives (not Ph.D.s)

Strategic Management Journal (1980)

Strategic Management Journal (2008)

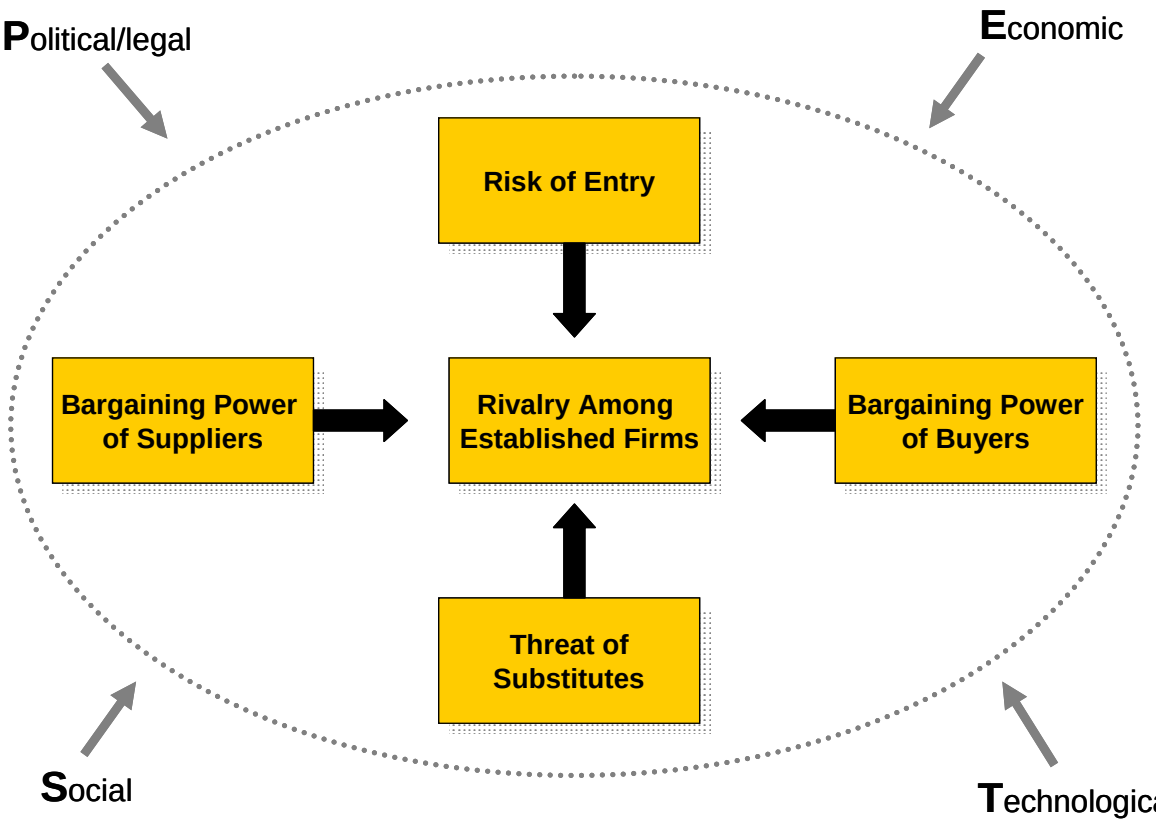
Prof. Bresser,
Associate Editor

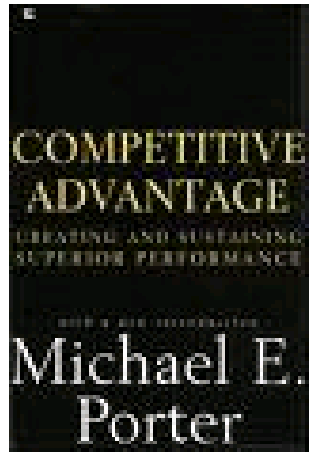
Prof. Mellewigt,
Editorial Board Member

Industrial Organization Economics

Industrial Organization Economics

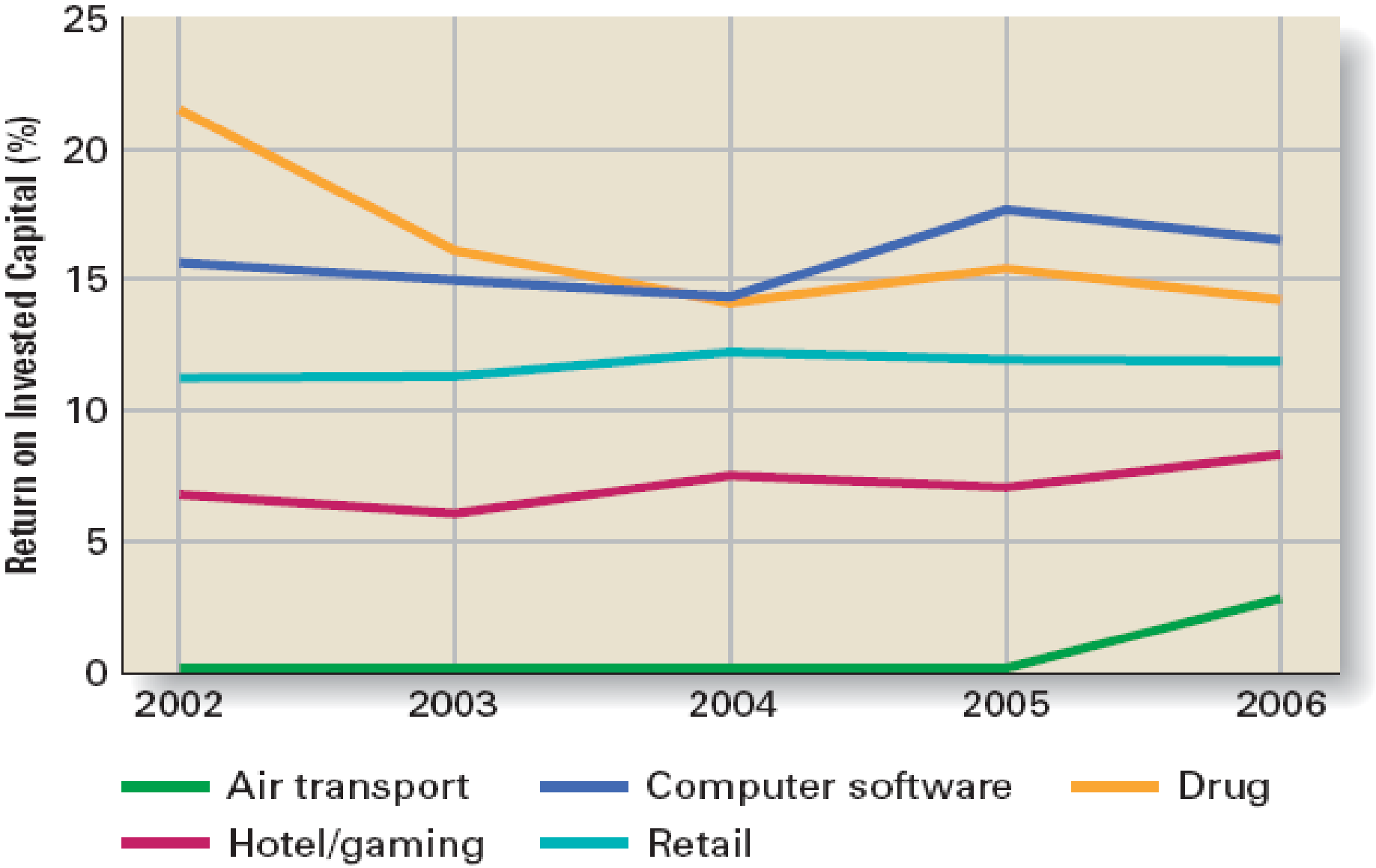
- Structure-Conduct-Performance (Bain, 1956)
- Firm performance is primarily a function of the industry in which it competes (Porter, 1980)





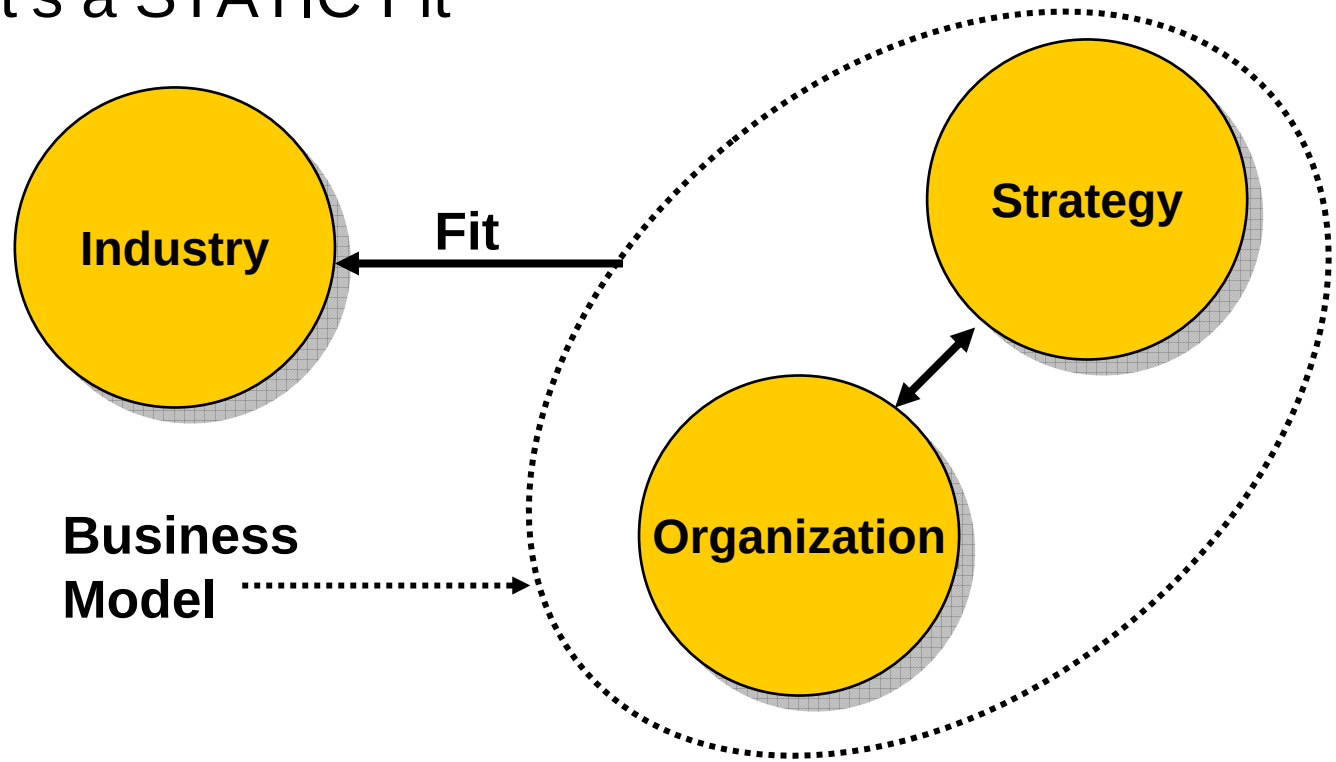
Differences in Industry Performance

Return on Invested Capital in Selected Industries



Industrial Organization Economics

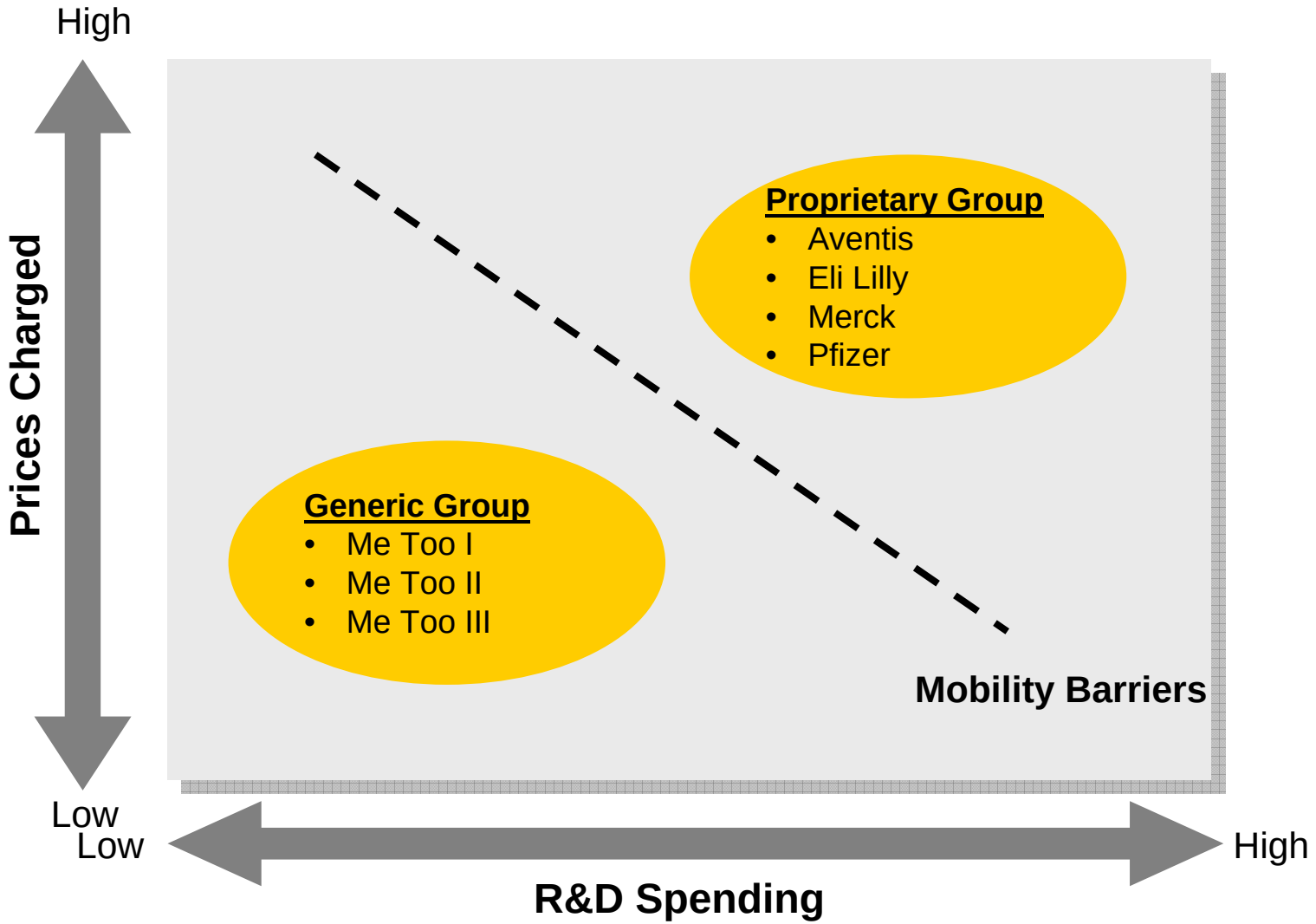
- **Strategic Coherence Fit**: Superior performance requires coherence, or fit, between business model (competitive strategy and organization architecture) and industry
- But: It's a STATIC Fit



Strategic Groups

- Vexing problem: Firm heterogeneity
- Strategic groups defined as a group of firms in the same industry following the same or similar strategies (Caves and Porter, 1979)
  - Mobility barriers

Strategic Groups



Strategic Groups

- Critique (Barney & Hoskisson, 1990)
  - Do strategic groups exist?
  - Does firm performance depend on strategic group membership?

Competitive Dynamics

- Competitive dynamics
  - Explicit recognition of firms strategic interactions
  - Hypercompetition (D'Aveni, 1994)
  - Market commonality & resource similarity (Chen, 1996)
    - Airline industry
- Methods
  - Deductive (often based game theory)
  - Large-scale econometrics studies
- More scientific and positivist approach

Transaction Cost Economics

Transaction Costs Economics

- Williamson (1981) derives transaction costs approach from three independent literatures
  - **Economics**
    - boundary of the firm (Coase, 1937)
    - economic adaptations (Hayek, 1945)
  - **Organizational theory**
    - purposive organization & bounded rationality (Barnard, 1938; Simon, 1947)
    - core technology, domains of organizations, power & limit of market and hierarchy (Thompson, 1967)
  - **Contract law**
    - hard vs. soft contracting (Llewellyn, 1931; MacNeil, 1974)

Transaction Costs Economics

- Transaction costs occur when a good or service is transferred across a technologically separable interface (Williamson, 1981)
  - Production cost
    - technology and steady-state production cost
  - Governance cost
    - cost of planning, adapting, and monitoring task completion
- Behavioral assumptions:
  - Bounded rationality
  - Opportunism
  - Small numbers
  - Asset specificity

Transaction Costs Economics

- Critical dimensions for describing transactions:
  - Uncertainty
  - Frequency of transactions
  - Degree to which durable, transaction-specific investments are required
- Implicit assumption: Firms can make or buy at their discretion
- Critique (Ghosal & Moran, 1996)
  - Inconsistency in internal logic
  - Firms are knowledge communities (Kogut and Zander, 1992)
  - May create self-fulfilling prophecy for managers

Agency Theory

Agency Theory

- Based on game theory of imperfect information between players (i.e., principals and agents)
  - Divergence of interest between shareholders (principals) and managers (agents)
  - Increasing utility of agents comes at the expense of decreasing utility of principals
    - Power and perks
    - On the job consumption
      - Corporate jets
      - Corporate vacation homes
      - Corporate maid service in private homes
      - Relocate head quarters to Pebble Beach, CA, next to golf course

Agency Theory

- Central question:
  - What are mechanisms (e.g., government structures, contract designs) that can minimize agency costs, which arise from the divergence of interests? (e.g., Fama, 1980)
- Strategic management adopt positivist agency theory (Hoskisson et al., 1999)
  - Jensen & Meckling (1976) integrate literature on property rights, agency, and finance to develop a theory of ownership structure for the firm
  - Firm is a “Nexus of Contracts”

Institutional Theory

Institutional Theory

- Central question:
  - Why do organizations become more alike in structural and procedural features?
- Isomorphism
  - A constraining process that forces one unit in a population to resemble other units that face the same set of environmental conditions (Selznick, 1949; Hawley, 1968; DiMaggio and Powell, 1983)
    - Legitimacy, reputation, power, and status
    - You have to look like the others in these positions….

Institutional Theory

- The main drivers of isomorphism (Meyer & Rowan, 1977; DiMaggio & Powell, 1983)
  - Need for power
  - Legitimacy
  - Social fitness
    - less driven by efficiency
- Mechanisms of institutional isomorphic change (DiMaggio & Powell, 1983)
  - Coercive
  - Mimetic
  - Normative
- Cannot explain firm differences – does the opposite

Resource Based View

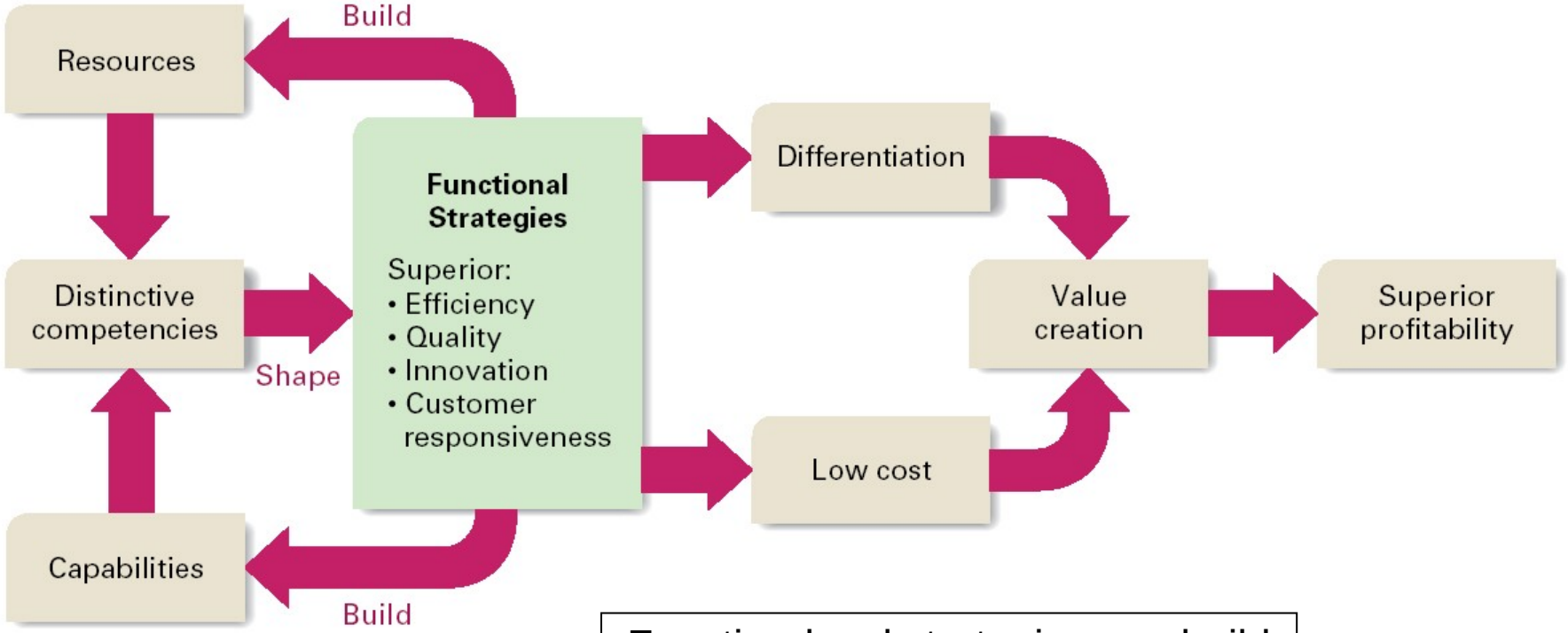
Resource Based View

- RBV attempts to explain firm performance differentials based on a firm's idiosyncratic resource endowments
  - Resource perspective gives a different insight than the product perspectives in traditional economics or product portfolio theory (Wernerfelt, 1984)
- Firm resources
  - "all assets, capabilities, organizational processes, firm attributes, information, knowledge, etc., controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness" (Barney, 1991)

Resource Based View

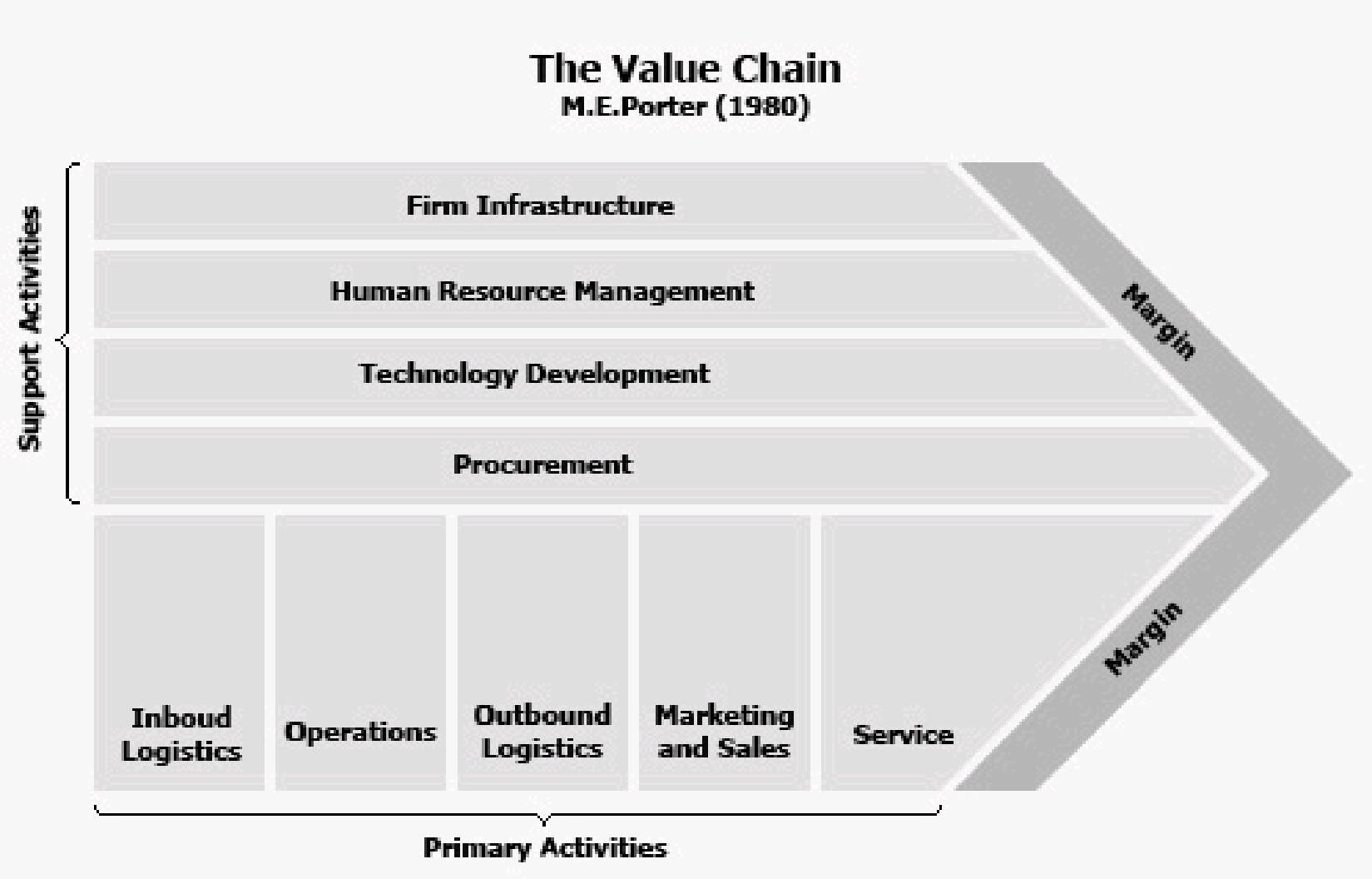
- Firm resources provide competitive advantage (Barney,1991) when they are
  - Valuable
  - Scarce
  - Inimitability
  - non-substitutable
- Critique (Priem & Butler, 2001):
  - Tautological: “Value” is determined only ex post
  - Difficult to do empirical research based on RBV constructs
    - What are your predictions *ex ante?*

Distinctive competencies shape the functional-level strategies that a company can pursue.



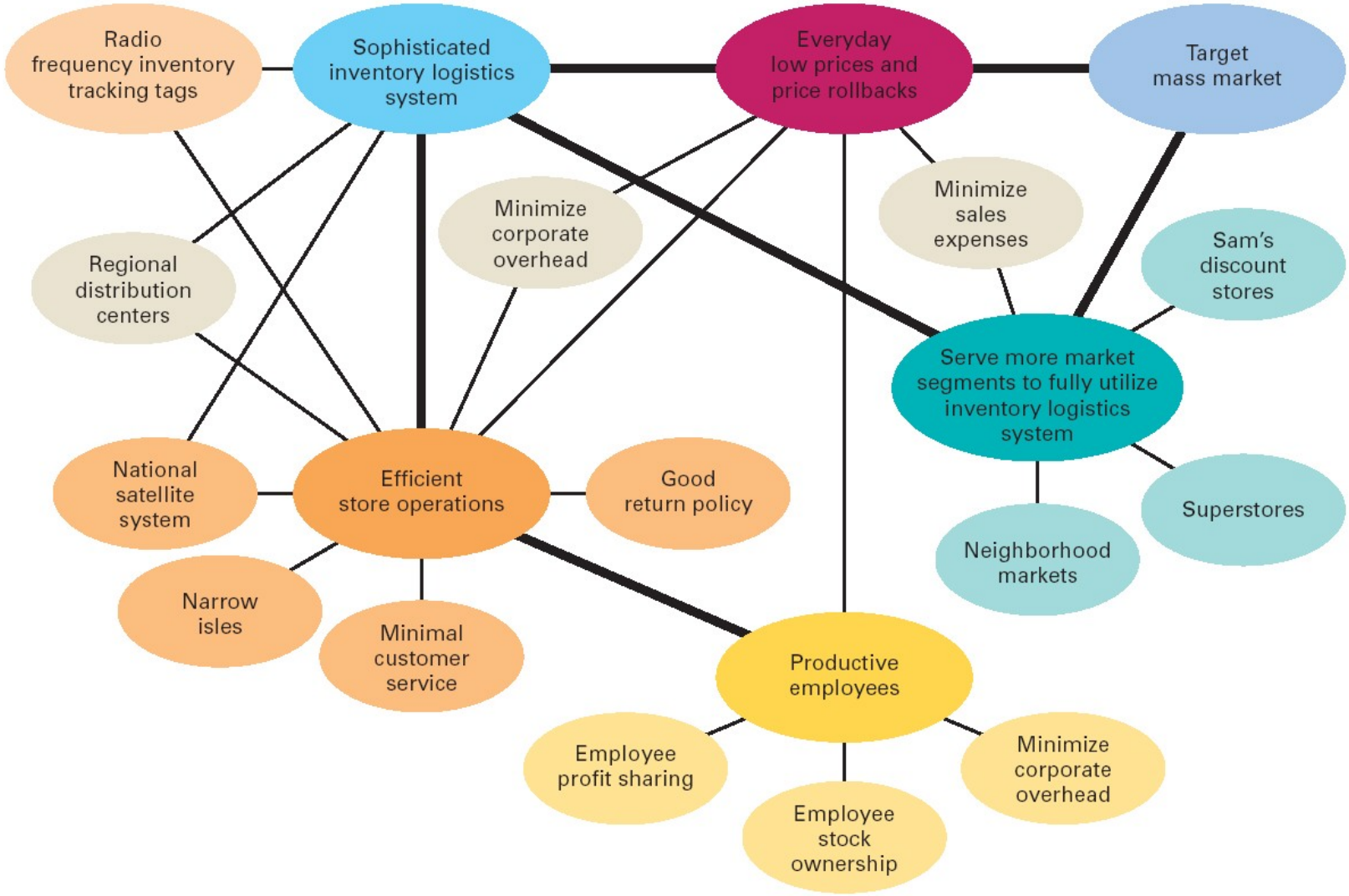
Function-level strategies can build resources and capabilities to enhance a company's distinctive competencies.

Porter: Its activities, not resources!



Porter: Its activities, not resources!

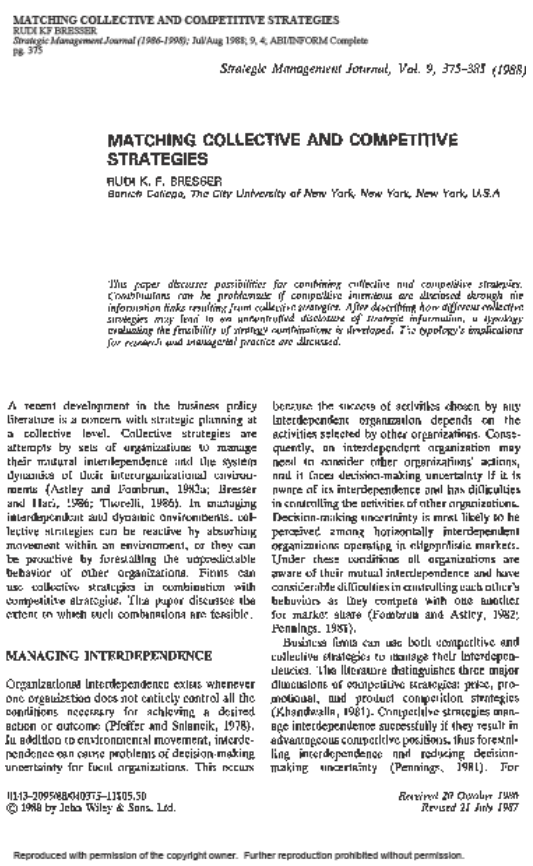
e.g., Wal-Mart's Business Model



Relational View

Relational View

- Alliances or networks allow firms to develop relationships that can result in sustained competitive advantage (Dyer & Singh, 1998)
  - Smart car by Mercedes and Swatch
- Relational rent generating process
  - relation-specific assets
  - knowledge-sharing routines
  - complementary resource endowments
  - effective governance
- Where is the locus of competitive advantage?
- Collective vs. cooperative strategies (Bresser, 1988)



MATCHING COLLECTIVE AND COMPETITIVE STRATEGIES
RUDI KF BRESSER
Strategic Management Journal (1986-1998); Jul/Aug 1988; 9, 4; ABI/INFORM Complete
pg. 375

Strategic Management Journal, Vol. 9, 375–385 (1988)

MATCHING COLLECTIVE AND COMPETITIVE STRATEGIES

RUDI K. F. BRESSER
Baruch College, The City University of New York, New York, New York, U.S.A.

This paper discusses possibilities for combining collective and competitive strategies. Complications can be problematic if competitive interests are discussed through the information links resulting from collective strategies. After describing how different collective strategies may lead to an uncontrolled disclosure of strategic information, a typology evaluating the feasibility of strategy combinations is developed. The typology's implications for research and managerial practice are discussed.

A recent development in the business policy literature is a concern with strategic planning at a collective level. Collective strategies are attempts by sets of organizations to manage their mutual interdependence and the system dynamics of their interorganizational environments (Astley and Fombrun, 1983a; Bresser and Harl, 1986; Tiwerli, 1986). In managing interdependent and dynamic environments, collective strategies can be reactive by absorbing movement within an environment, or they can be proactive by forestalling the unpredictable behavior of other organizations. Firms can use collective strategies in combination with competitive strategies. This paper discusses the extent to which such combinations are feasible.

MANAGING INTERDEPENDENCE

Organizational interdependence exists whenever one organization does not entirely control all the conditions necessary for achieving a desired action or outcome (Pfeffer and Salancik, 1978). In addition to environmental movement, interdependence can cause problems of decision-making uncertainty for focal organizations. This occurs because the success of activities chosen by any interdependent organization depends on the activities selected by other organizations. Consequently, an interdependent organization may need to consider other organizations' actions, and it faces decision-making uncertainty if it is aware of its interdependence and has difficulties in controlling the activities of other organizations. Decision-making uncertainty is most likely to be perceived among horizontally interdependent organizations operating in oligopolistic markets. Under these conditions all organizations are aware of their mutual interdependence and have considerable difficulties in controlling each other's behaviors as they compete with one another for market share (Fombrun and Astley, 1982; Pennings, 1981).

Business firms can use both competitive and collective strategies to manage their interdependencies. The literature distinguishes three major dimensions of competitive strategies: price, promotional, and product competition strategies (Khandwalla, 1981). Competitive strategies manage interdependence successfully if they result in advantageous competitive positions, thus forestalling interdependence and reducing decision-making uncertainty (Pennings, 1981). For

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Relational View

- Inherent empirical challenge to measure alliance contribution to firm performance (Gulati, 1998; Lavie, 2007)
  - Firms do not report quantitative measures of alliance performance in financial reports
  - Performance from alliances is often confounded with firm's internal operations
- Overcoming the challenge:
  - Project-level outcomes
  - Examination of attributes of network structure (e.g., Rothaermel and Deeds, 2006)

Dynamic Capabilities Perspective

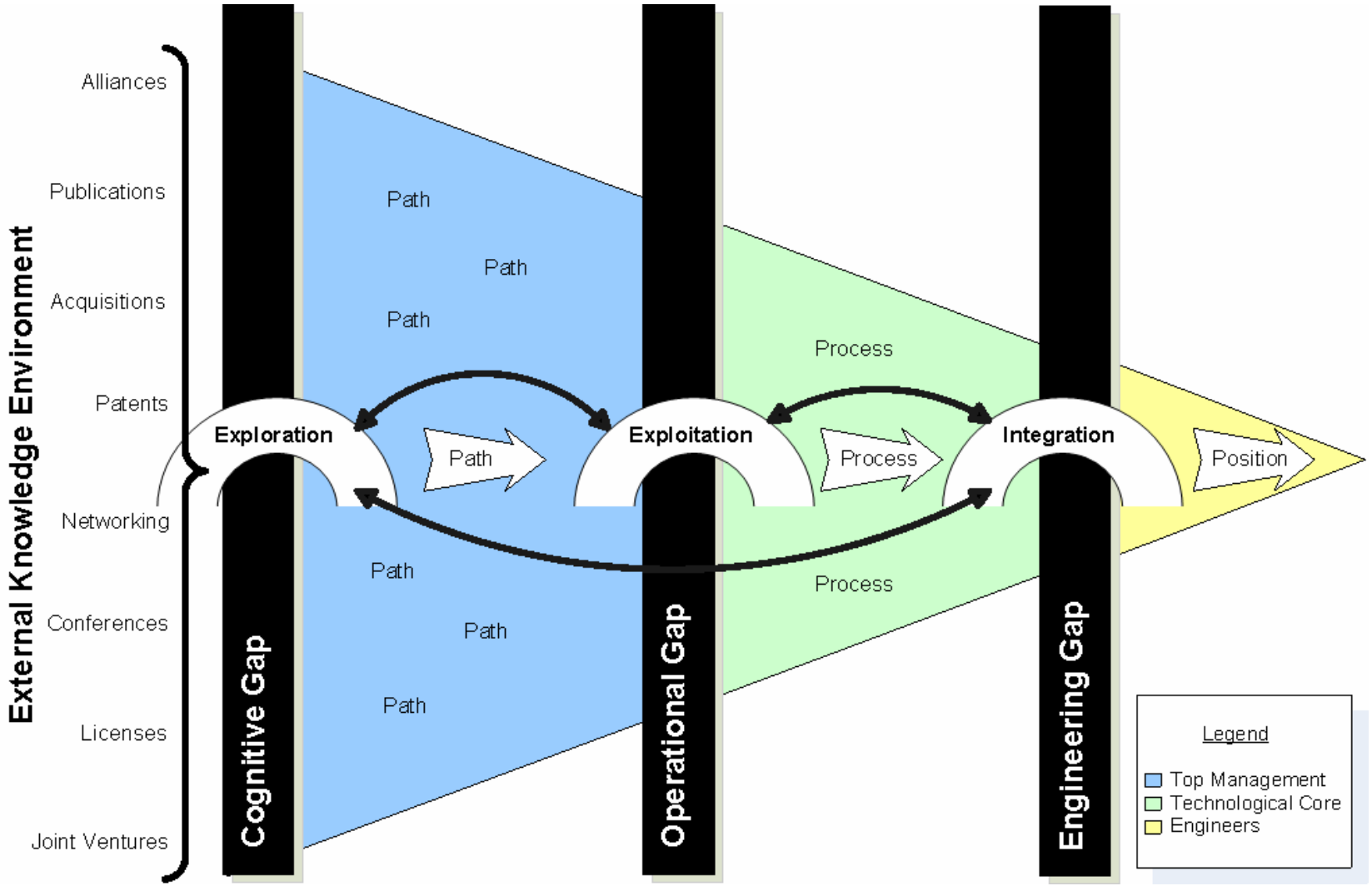
Dynamic Capabilities Perspective

- Dynamic capability is a “firms’ ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments” (Teece, Pisano, Shuen, 1997: 516)
- Dimensions of firms’ dynamic capabilities
  - **Process**: Coordination/integration, learning, and reconfiguration
  - **Position**: Current specific endowments of technology, IP, complementary assets, customer base, and its external relations with supplier and complementors
  - **Path**: path dependencies, technological opportunities

Dynamic Capabilities Perspective (cont.)

- Eisenhardt and Martin (2000: 1107) define dynamic capabilities as "the firm's processes that use resources—specifically the processes to integrate, reconfigure, gain and release resources—to match and even create market change. Dynamic capabilities thus are the organizational and strategic routines by which firms achieve new resource configurations as markets emerge, collide, split, evolve, and die."
- Helfat, *et al.*'s (2007: 4) define dynamic capabilities as "the capacity of an organization to purposefully create, extend, or modify its resource base."
- "How dynamic can organizational capabilities be? Towards a dual-process model of capability dynamization" (Schreyögg and Kliesch-Eberl, 2007, FU Berlin)

Where do dynamic capabilities come from?



Source: Hess & Rothaermel, 2008

VIELEN DANK!

http://mgt.gatech.edu/rothaermel

frank.rothaermel@mgt.gatech.edu

Georgia Tech Ph.D. in Strategic Management, Innovation, and Entrepreneurship

Methodology

The problem of unobservable in strategic management research (Godfrey & Hill, 1995)

- Positivists vs. Realists
- Unobservable constructs lie at the core of a number of influential strategic management theories (e.g., TCE, RBV, DCP, etc)

The problem…(cont.)

- Realist solution:
  - Identify what the observable consequences of unobservable resources/capabilities are likely to be.
  - “what scholars need to do is to theoretically identify what the observable consequences of unobservable [constructs] are likely to be, and then go out and see whether such predictions have a correspondence in the empirical world. The analogy here is with quantum mechanics, which has been confirmed *not* by observing subatomic entities (since they are unobservable) but by observing the trail left by subatomic entities in the cloud chambers of linear accelerators” (Godfrey and Hill, 1995: 530)

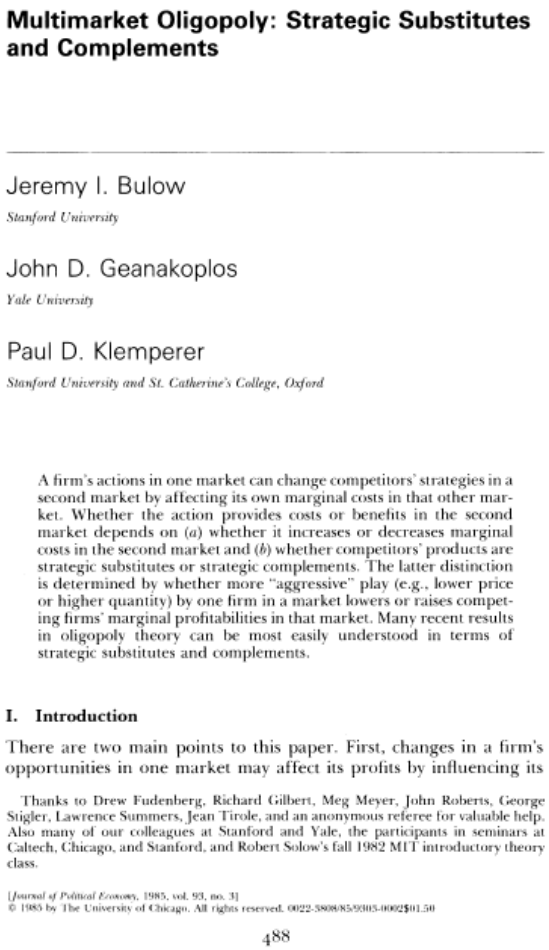
Methodology

- Formal theory
- Qualitative studies
  - Inductive theory building
- Quantitative studies
  - Deductive theory testing
- Simulation
- Experimental Design

Methodology: Formal Theory

- Pros: Internal consistency, ensures logically coherent argument
- Cons: Can be oversimplified because of the need for clear prediction and attenuate the difficulty of finding mathematical solution

Methodology: Formal Theory



Multimarket Oligopoly: Strategic Substitutes and Complements

Jeremy I. Bulow
Stanford University

John D. Geanakoplos
Yale University

Paul D. Klemperer
Stanford University and St. Catherine's College, Oxford

A firm's actions in one market can change competitors' strategies in a second market by affecting its own marginal costs in that other market. Whether the action provides costs or benefits in the second market depends on (*a*) whether it increases or decreases marginal costs in the second market and (*b*) whether competitors' products are strategic substitutes or strategic complements. The latter distinction is determined by whether more "aggressive" play (e.g., lower price or higher quantity) by one firm in a market lowers or raises competing firms' marginal profitabilities in that market. Many recent results in oligopoly theory can be most easily understood in terms of strategic substitutes and complements.

I. Introduction

There are two main points to this paper. First, changes in a firm's opportunities in one market may affect its profits by influencing its

Thanks to Drew Fudenberg, Richard Gilbert, Meg Meyer, John Roberts, George Stigler, Lawrence Summers, Jean Tirole, and an anonymous referee for valuable help. Also many of our colleagues at Stanford and Yale, the participants in seminars at Caltech, Chicago, and Stanford, and Robert Solow's fall 1982 MIT introductory theory class.

[*Journal of Political Economy*, 1985, vol. 93, no. 3]

Bulow, J., Geanakoplos, J. and Klemperer, P. 1985. Multimarket Oligopoly: Strategic Substitutes and Complements.
Journal of Political Economy, 93(3): 488-511.

Methodology: Qualitative Studies

- Pros:
  - Can stimulate new theoretical insight
- Cons:
  - Usually limited generalizability since conducting large number of case studies are costly

Methodology: Qualitative Studies

Dynamics of Social Capital and Their Performance Implications: Lessons from Biotechnology Start-ups

Indre Maurer
Mark Ebers
University of Cologne

Based on comparative longitudinal case analyses of six new biotechnology firms, this paper explores how the configuration, management, and evolution of entrepreneurial firms' social capital affect firm performance. Findings suggest that firms can realize performance benefits when their members repeatedly adapt the configuration of their social capital to changing resource needs, while inertia turns a firm's social capital into a liability. Our research provides a dynamic view of the conditions and processes that produce such inertia, allow firms to overcome it, and develop a firm's social capital to organizational advantage. A core theoretical contribution of our study is to identify and theorize how the internal organization of firms' management of relationships with external partners, through horizontal and vertical differentiation and integration, affects the dynamic of firms' social capital, adaptive capacity, and performance.•

The importance of social capital for the founding, survival, and success of entrepreneurial firms in general, and new biotechnology firms in particular, has been widely acknowledged and demonstrated empirically (Larson, 1991; Pennings, Lee, and van Witteloostuijn, 1998; Zucker, Darby, and Brewer, 1998; Oliver, 2001). Although social capital has been defined in a number of ways, the core intuition behind the notion is that it signifies an asset available to individual or collective actors that draws on these actors' positions in a social network and/or the content of these actors' social relations (Gabbay and Leenders, 1999). Social capital has potential value because it provides an opportunity for actors to access information and resources in their social network. Research on social capital has mainly concentrated on how and why firms can generate value from their social capital. It has shown in different settings that social capital provides information and learning benefits (Powell, Koput, and Smith-Doerr, 1996), increased legitimacy (Higgins and Gulati, 2003), power and control (Burt, 1992), and coordination benefits (Coleman, 1990; Uzzi, 1997). Furthermore, research has begun to demonstrate that the value of social capital depends on a number of moderators and contingencies, among these, task characteristics (Hansen, Podolny, and Pfeffer, 2001), industry characteristics (Rowley, Behrens, and Krackhardt, 2000), market uncertainty (Gulati and Higgins, 2003), prevalent norms (Gabbay and Zuckerman, 1998), and complementary capabilities (Hargadon and Sutton, 1997).

Yet research on the antecedents and consequences of social capital still faces a number of important challenges (see Adler and Kwon, 2002). In particular, to date we know very little about how organizations' social capital develops over time, about the factors and processes enabling and constraining its development, and about possible related performance implications (Baum, Calabrese, and Silverman, 2000). Such a dynamic perspective is significant because an organization faces different task and resource requirements at different stages of its organizational development (Kazanjian, 1988) and is often exposed to changing demands from an evolving internal and external task environment (Ebers, 1999). Whether or not an organization is able to accommodate these evolving demands by adjusting its social capital to

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•

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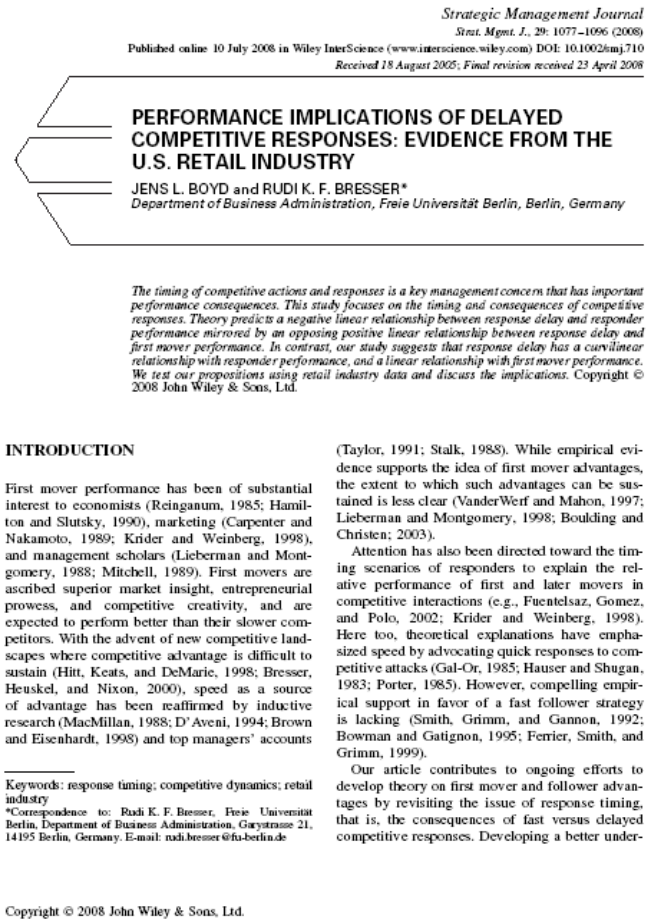
Maurer, I., & Ebers, M. 2006. Dynamics of Social Capital and Their Performance Implications: Lessons from Biotechnology Start-ups. **Administrative Science Quarterly**, 51: 262–292.

Methodology: Quantitative Studies

- Pros:
  - Generalizability
  - Theory testing
- Cons:
  - Do you measure what you hypothesize?
  - Do you rule out alternative explanations?

Methodology: Quantitative Studies



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PERFORMANCE IMPLICATIONS OF DELAYED COMPETITIVE RESPONSES: EVIDENCE FROM THE U.S. RETAIL INDUSTRY

JENS L. BOYD and RUDI K. F. BRESSER*
Department of Business Administration, Freie Universität Berlin, Berlin, Germany

The timing of competitive actions and responses is a key management concern that has important performance consequences. This study focuses on the timing and consequences of competitive responses. Theory predicts a negative linear relationship between response delay and responder performance mirrored by an opposing positive linear relationship between response delay and first mover performance. In contrast, our study suggests that response delay has a curvilinear relationship with responder performance, and a linear relationship with first mover performance. We test our propositions using retail industry data and discuss the implications. Copyright © 2008 John Wiley & Sons, Ltd.

INTRODUCTION

First mover performance has been of substantial interest to economists (Reinganum, 1985; Hamilton and Slutsky, 1990), marketing (Carpenter and Nakamoto, 1989; Krider and Weinberg, 1998), and management scholars (Lieberman and Montgomery, 1988; Mitchell, 1989). First movers are ascribed superior market insight, entrepreneurial prowess, and competitive creativity, and are expected to perform better than their slower competitors. With the advent of new competitive landscapes where competitive advantage is difficult to sustain (Hitt, Keats, and DeMarie, 1998; Bresser, Heuskel, and Nixon, 2000), speed as a source of advantage has been reaffirmed by inductive research (MacMillan, 1988; D'Aveni, 1994; Brown and Eisenhardt, 1998) and top managers' accounts (Taylor, 1991; Stalk, 1988). While empirical evidence supports the idea of first mover advantages, the extent to which such advantages can be sustained is less clear (VanderWerf and Mahon, 1997; Lieberman and Montgomery, 1998; Boulding and Christen; 2003).

Attention has also been directed toward the timing scenarios of responders to explain the relative performance of first and later movers in competitive interactions (e.g., Fuentelsaz, Gomez, and Polo, 2002; Krider and Weinberg, 1998). Here too, theoretical explanations have emphasized speed by advocating quick responses to competitive attacks (Gal-Or, 1985; Hauser and Shugan, 1983; Porter, 1985). However, compelling empirical support in favor of a fast follower strategy is lacking (Smith, Grimm, and Gannon, 1992; Bowman and Gatignon, 1995; Ferrier, Smith, and Grimm, 1999).

Our article contributes to ongoing efforts to develop theory on first mover and follower advantages by revisiting the issue of response timing, that is, the consequences of fast versus delayed competitive responses. Developing a better under-

Keywords: response timing; competitive dynamics; retail industry
*Correspondence to: Rudi K. F. Bresser, Freie Universität Berlin, Department of Business Administration, Garystrasse 21, 14195 Berlin, Germany. E-mail: rudi.bresser@fu-berlin.de

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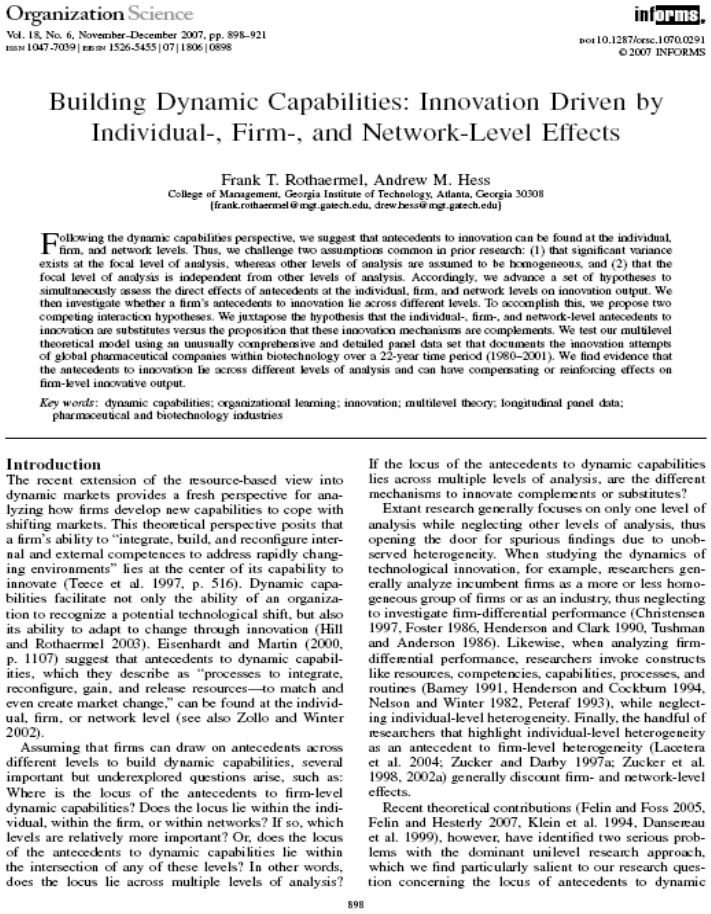
Methodology: Quantitative Studies
Multi-Level Analysis



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Building Dynamic Capabilities: Innovation Driven by Individual-, Firm-, and Network-Level Effects

Frank T. Rothaermel, Andrew M. Hess
College of Management, Georgia Institute of Technology, Atlanta, Georgia 30308
{frank.rothaermel@mgt.gatech.edu, drew.hess@mgt.gatech.edu}

Following the dynamic capabilities perspective, we suggest that antecedents to innovation can be found at the individual, firm, and network levels. Thus, we challenge two assumptions common in prior research: (1) that significant variance exists at the focal level of analysis, whereas other levels of analysis are assumed to be homogeneous, and (2) that the focal level of analysis is independent from other levels of analysis. Accordingly, we advance a set of hypotheses to simultaneously assess the direct effects of antecedents at the individual, firm, and network levels on innovation output. We then investigate whether a firm's antecedents to innovation lie across different levels. To accomplish this, we propose two competing interaction hypotheses. We juxtapose the hypothesis that the individual-, firm-, and network-level antecedents to innovation are substitutes versus the proposition that these innovation mechanisms are complements. We test our multilevel theoretical model using an unusually comprehensive and detailed panel data set that documents the innovation attempts of global pharmaceutical companies within biotechnology over a 22-year time period (1980–2001). We find evidence that the antecedents to innovation lie across different levels of analysis and can have compensating or reinforcing effects on firm-level innovative output.

Key words: dynamic capabilities; organizational learning; innovation; multilevel theory; longitudinal panel data; pharmaceutical and biotechnology industries

Introduction

The recent extension of the resource-based view into dynamic markets provides a fresh perspective for analyzing how firms develop new capabilities to cope with shifting markets. This theoretical perspective posits that a firm's ability to "integrate, build, and reconfigure internal and external competences to address rapidly changing environments" lies at the center of its capability to innovate (Teece et al. 1997, p. 516). Dynamic capabilities facilitate not only the ability of an organization to recognize a potential technological shift, but also its ability to adapt to change through innovation (Hill and Rothaermel 2003). Eisenhardt and Martin (2000, p. 1107) suggest that antecedents to dynamic capabilities, which they describe as "processes to integrate, reconfigure, gain, and release resources—to match and even create market change," can be found at the individual, firm, or network level (see also Zollo and Winter 2002).

Assuming that firms can draw on antecedents across different levels to build dynamic capabilities, several important but underexplored questions arise, such as: Where is the locus of the antecedents to firm-level dynamic capabilities? Does the locus lie within the individual, within the firm, or within networks? If so, which levels are relatively more important? Or, does the locus of the antecedents to dynamic capabilities lie within the intersection of any of these levels? In other words, does the locus lie across multiple levels of analysis? If the locus of the antecedents to dynamic capabilities lies across multiple levels of analysis, are the different mechanisms to innovate complements or substitutes?

Extant research generally focuses on only one level of analysis while neglecting other levels of analysis, thus opening the door for spurious findings due to unobserved heterogeneity. When studying the dynamics of technological innovation, for example, researchers generally analyze incumbent firms as a more or less homogeneous group of firms or as an industry, thus neglecting to investigate firm-differential performance (Christensen 1997, Foster 1986, Henderson and Clark 1990, Tushman and Anderson 1986). Likewise, when analyzing firm-differential performance, researchers invoke constructs like resources, competencies, capabilities, processes, and routines (Barney 1991, Henderson and Cockburn 1994, Nelson and Winter 1982, Peteraf 1993), while neglecting individual-level heterogeneity. Finally, the handful of researchers that highlight individual-level heterogeneity as an antecedent to firm-level heterogeneity (Lacetera et al. 2004; Zucker and Darby 1997a; Zucker et al. 1998, 2002a) generally discount firm- and network-level effects.

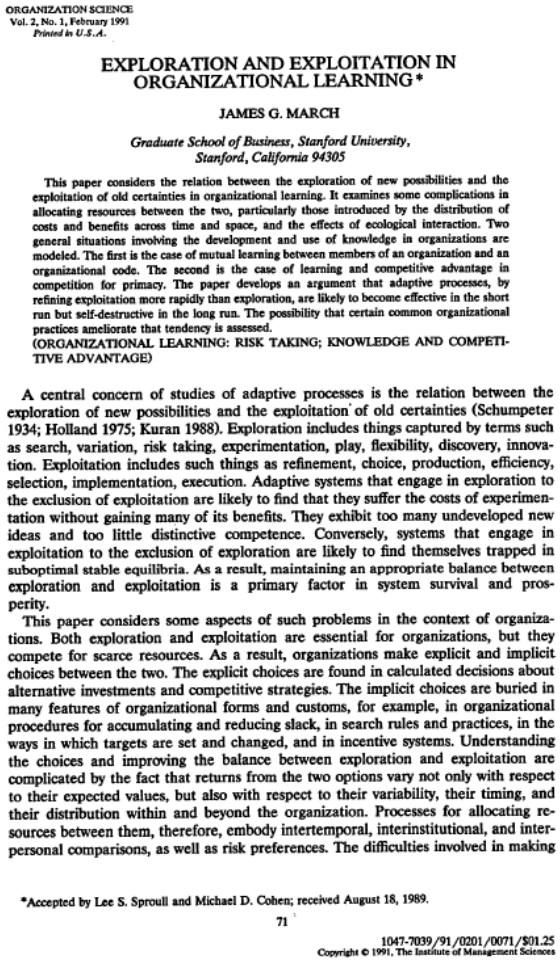
Recent theoretical contributions (Felin and Foss 2005, Felin and Hesterly 2007, Klein et al. 1994, Dansereau et al. 1999), however, have identified two serious problems with the dominant unilevel research approach, which we find particularly salient to our research question concerning the locus of antecedents to dynamic

Rothaermel, F.T., Hess, A.M. 2007. Building dynamic capabilities: Innovation driven by individual, firm, and network-level effects. **Organization Science**, 18 (6): 898-921.

Methodology: Simulation

- Pros:
  - Enables researchers to implement realistic assumptions
  - Enables researchers to do complex things that cannot be done with paper and pencil
  - Enables researchers to ‘compress’ time and observe dynamics
  - Enables researchers to vary assumptions to see the change in outcomes
- Cons:
  - The same result can be obtain by different processes

Methodology: Simulation



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EXPLORATION AND EXPLOITATION IN ORGANIZATIONAL LEARNING*

JAMES G. MARCH

Graduate School of Business, Stanford University, Stanford, California 94305

This paper considers the relation between the exploration of new possibilities and the exploitation of old certainties in organizational learning. It examines some complications in allocating resources between the two, particularly those introduced by the distribution of costs and benefits across time and space, and the effects of ecological interaction. Two general situations involving the development and use of knowledge in organizations are modeled. The first is the case of mutual learning between members of an organization and an organizational code. The second is the case of learning and competitive advantage in competition for primacy. The paper develops an argument that adaptive processes, by refining exploitation more rapidly than exploration, are likely to become effective in the short run but self-destructive in the long run. The possibility that certain common organizational practices ameliorate that tendency is assessed.
(ORGANIZATIONAL LEARNING: RISK TAKING; KNOWLEDGE AND COMPETITIVE ADVANTAGE)

A central concern of studies of adaptive processes is the relation between the exploration of new possibilities and the exploitation of old certainties (Schumpeter 1934; Holland 1975; Kuran 1988). Exploration includes things captured by terms such as search, variation, risk taking, experimentation, play, flexibility, discovery, innovation. Exploitation includes such things as refinement, choice, production, efficiency, selection, implementation, execution. Adaptive systems that engage in exploration to the exclusion of exploitation are likely to find that they suffer the costs of experimentation without gaining many of its benefits. They exhibit too many undeveloped new ideas and too little distinctive competence. Conversely, systems that engage in exploitation to the exclusion of exploration are likely to find themselves trapped in suboptimal stable equilibria. As a result, maintaining an appropriate balance between exploration and exploitation is a primary factor in system survival and prosperity.

This paper considers some aspects of such problems in the context of organizations. Both exploration and exploitation are essential for organizations, but they compete for scarce resources. As a result, organizations make explicit and implicit choices between the two. The explicit choices are found in calculated decisions about alternative investments and competitive strategies. The implicit choices are buried in many features of organizational forms and customs, for example, in organizational procedures for accumulating and reducing slack, in search rules and practices, in the ways in which targets are set and changed, and in incentive systems. Understanding the choices and improving the balance between exploration and exploitation are complicated by the fact that returns from the two options vary not only with respect to their expected values, but also with respect to their variability, their timing, and their distribution within and beyond the organization. Processes for allocating resources between them, therefore, embody intertemporal, interinstitutional, and interpersonal comparisons, as well as risk preferences. The difficulties involved in making

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1047-7039/91/0201/0071/$01.25

March, J. G. 1991. Exploration and exploitation in organizational learning. **Organization Science**, 2(1): 71-87.

Methodology: Experimental Studies

- Pros:
  - Enables researchers to draw causal relationships
  - Enables researchers to control ‘everything else’
  - Enables investigations where field data are not available
- Cons:
  - Experiment does not replicate complexity in the real situations. Relevancy of experiment with real situations might be questionable

Methodology: Experimental Studies

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2001, Vol. 44, No. 2, 393–417.

KNOWLEDGE REPRESENTATIONS AND KNOWLEDGE TRANSFER

RICHARD J. BOLAND, JR.
JAGDIP SINGH
PAUL SALIPANTE
JOHN D. ARAM
SHARON Y. FAY
PRASERT KANAWATTANACHAI
Case Western Reserve University

Cognitive and learning theories were used to develop a framework in which different knowledge representations prime recipients with different schemata and thereby differentially affect their decision making. We evaluated interpretive, general, and particular knowledge representations in a laboratory experiment with managers. The hypotheses received mixed support, with significant results indicating the importance of particular knowledge representations in managerial decision making and an intriguing role for interpretive knowledge representations.

It is a widespread perception that knowledge created by scholars is not used in practice. This perception exists in the social sciences and humanities (Easton, 1991), psychology (Fowler, 1990; Hoshmand & Polkinghorne, 1992; McGuire, 1983; Peterson, 1991) and education (Hallinan, 1996; Johnson, Malone, & Hightower, 1997) as well as in the management disciplines (Beyer, 1982; Cheit, 1991; Hambrick, 1994; Myers, Massey, & Greyser, 1980; Porter & McKibbon, 1988). Management researchers have proposed to reduce this perceived gap by arguing for their preferred approaches to knowledge creation and transfer. Many of them call for creating management knowledge by identifying unambiguous basic principles and demonstrating how they transcend specific contexts. Thompson (1956) advocated this approach over 40 years ago, and more recently Hitt (1998) emphasized the development of theoretical knowledge as the primary objective of the discipline.

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The first four authors contributed equally to this article, with assistance from the remaining two. Correspondence regarding this article may be directed to Jagdip Singh.

Other management researchers have responded to the perceived gap between knowledge and practice by generating applied knowledge. Thomas and Tymon (1982), for example, proposed that the producer of knowledge should enhance its relevance by obtaining information about specific problems and situations encountered by knowledge users. Likewise, Pfeffer (1993) advocated unstructured early-stage observations and interviews with system participants to learn the unique ways in which they understand their own system. Shrivastava (1987) called for researchers in strategic management adopt variables that easily relate to organizational goals, to test research results in specific organizational settings, to use rigorous qualitative methodologies to incorporate practical insights, and documenting contextual conditions within which research becomes useful.

Reviewing the results of 27 empirical studies about the use of social science research, Beyer and Trice (1982) described a complex process that depends on many contextual factors, such as how organizations process information, how affect between clients and researchers is established, how strategy is formulated and controlled, and how action is generated. Other management scholars have also recognized the importance of users' contexts and processes, hypothesizing that knowledge use is influenced by such factors as task complexity and communication flows (Menon & Varadarajan, 1992) and cognitive team processes (Madhavan & Grover, 1998).

In this article, we take a step back from these diverse claims about the specific forms, contexts, or

Boland, R., and Singh, J., Salipante, P., and Aram, J. 2001. Knowledge representations and knowledge transfer. **Academy of Management Journal**, 44: 393-418

Which Methodology ?

- “Methodological fit, an implicitly valued attribute of high-quality .. research, has received little attention in the management literature. Fit refers to internal consistency among elements of a research project—research question, prior work, research design, (methodology), and theoretical contribution”

Edmonson, A.C. & McManus, S.E. 2007. Methodological fit in management field research. *Academy of Management Review* **32**(4):1155-1179

Conclusion

- Move towards theories that are
  - dynamic
  - combine internal resources/competencies with external factors
  - view competitive advantage as transient

Conclusion

- Methods must follow research question
  - What is the research question / phenomenon?
  - How do I best answer this question?
    - Theory
    - Method

Conclusion

- Strategic Management is a multi-disciplinary field, but informed by social science disciplines
  - Economics
  - Sociology
  - Psychology