

Economic Analysis and Strategic Management

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The basic idea behind strategic management is that a firm needs to match its capabilities to its ever-changing environment if it is to attain its best performance.¹ This will typically involve the formulation and execution of plans relating to the establishment and deployment of a firm's assets. It would seem on its face, therefore, that resource allocation issues are involved in strategic management, and that there ought to be a well-known set of economic principles to guide strategic management decisions. But this is not the case. Economic analysis employing standard economic theories of the textbook variety is virtually unknown in strategic management.

The purpose of this article is to explain why economic analysis has until recently yielded few insights into strategic management issues, to examine the intellectual roots of several recent contributions from industrial organization economists, and to develop in an illustrative fashion several strategic management principles regarding enterprise structure. This last endeavor will involve mining the emerging economic theory of internal organization for normative propositions of practical import to those concerned with organizational design and "efficient boundary" issues.

In outlining and assessing the contribution of economics and economists, the treatment is necessarily incomplete. Many important contributions have been omitted. The aim is to capture the essence of the economists' contribution, to trace its antecedents, to suggest the importance of heterodox approaches, and to urge the development and testing of theory-based principles which can supplant the ad hoc approach so prevalent even in contemporary strategic management research.

This article is forthcoming in Johannes M. Pennings, ed., *Strategy for Decision Making In Complex Organizations* (San Francisco, CA: Jossey-Bass, forthcoming 1984). Printed here by permission of the publisher.

The Tension Between Orthodox Economic Theory And Strategic Management

The concept of strategy itself, at least as used in the field of strategic management, is somewhat alien to economic thinking. The term rarely appears in micro-economic texts, except in game-theoretic discussions of pricing, advertising policies, and the like. It is, therefore, in need of some translation before it can be examined in terms that most economists will find meaningful.

The notion that a firm can choose from a finite set of strategies (e.g., low cost high-volume strategies vs. high cost innovative-product strategies) implies that a firm's resources and capabilities are not completely fungible and generalizable, certainly in the short run, if not in the long run. Particular strategies imply particular investment decisions, organizational structures, and possibly particular organizational cultures. Put differently, the concept implies that certain factors of production are "semi-permanently tied to the firm by recontracting costs and, perhaps, market imperfections."² The assumption that resources are immobile and heterogeneous is implicitly if not explicitly embedded in the strategic manager's view of the world. However, this world view does not sit comfortably with the models and theories contained in most micro-economic texts, although the tension is not as great with the industrial organization literature. The problem is that the micro-economic theory of firms and markets was not developed with the education of business managers in mind. Indeed, in some contexts economists will point out that their characterizations of rationality do not pretend to describe how decisions are actually taken or ought to be taken. The discipline of economics in general, and formal economic theory in particular, is shaped by a concern with normative questions in public policy that are very different from the problems general managers must face. In addition, economics as an empirical science has long been determinedly oblivious to the problems of predicting behavior of the individual decision unit, and has focused its attention and developed its specialized tools for the statistical analysis of patterns of behavior of whole populations of economic actors. The fact that very different success criteria and information resources are associated with the normative study of the problems of the individual entity is often missed, and when noted is often underestimated in importance. Finally, and perhaps most importantly, the dominant mode of theorizing in contemporary microeconomics tends to distance the discipline from management problems, with the important exception of problems relating primarily to the functioning of organized auction markets operating under high information conditions (i.e. finance). The dominant mode combines unquestioning faith in the rational behavior paradigm as a framework, relative indifference to the delineation of the empirical phenomena that are thought to require theoretical explanation, and a delight in the construction of "parables of mechanism." Such

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parables provide a sharply defined view of an imaginary world in which the logic of a particular economic mechanism stands out with particular clarity. The insights generated by this method often seem valuable and compelling, but unfortunately there is often no attempt to bridge the vast gulf that separates the simple imaginary world with its isolated mechanism from the complex real world in which some analogous mechanism may, perhaps, operate.

Without doubting the legitimacy or importance of the concerns and objectives that have shaped mainstream economics, one can doubt very seriously that the discipline thus shaped makes a wholly constructive contribution to strategic management. The following section examines some areas where such doubt seems particularly well justified.

Treatment of Know-How—The production and utilization of technological and organizational knowledge is a central economic activity that is handled in a most cavalier way within economic theory. By far the most common theoretical approach is simply to take technology as given, ignoring entirely the fact that the options open to a manager almost always include an attempt at some degree of innovative improvement in existing ways of doing things. On the occasions when this pattern is broken by explicit attention to technological change, the treatment of states of knowledge and the changes therein is often simplistic and undifferentiated. It is common to assume that technology is uniformly available to all, or, if technology is proprietary, that it is embedded in a “book of blueprints.” However, in reality, know-how is commonly not of this form. It is often tacit, in that those practicing a technique can do so with great facility, but they may not be able to transfer the skill to others without demonstration and involvement.³ To assume otherwise often obscures issues relating to the generation and transfer of know-how.

In general, the fact that technological and organizational change is such an important and pervasive aspect of reality, and yet so peripheral in economic theory, may be the single most important consideration limiting the contribution of orthodox economics to issues in strategic management.

Focus on Static Analysis—Strategic management issues are centrally concerned with dynamics. Economic theory, on the other hand, deals almost exclusively with equilibrium analyses, which are very often static. In recent years, much greater attention has been given to theoretical formulations which are dynamic in nature, but formal modeling endeavors of this kind are often exceedingly difficult to perform. Accordingly, only very simple problems can be dealt with mathematically, and certainly not the kinds of problems of concern to managers. While comparative statics is one way to get at dynamic issues, it suffers from inattention to the path of equilibrium. These matters are usually exceedingly important. Managers are often as concerned with the journey as they are with the destination when industries and markets are being transformed.

Focus on Equilibrium—Economic analysis widely employs equilibrium analysis. (An equilibrium is where “the intended actions of rational economic agents are mutually consistent and can, therefore, be implemented.”⁴) In fact, almost all of the central propositions of economics rely on the assumption that markets are in equilibrium. Clearly, equilibrium is a fictitious state. The justification for its use is the supposed tendency towards equilibrium, which is, however, an empirical rather than a theoretical proposition. Indeed, G. B. Richardson argues that “the general equilibrium of production and exchange . . . cannot properly be regarded as a configuration toward which a hypothetical perfectly competitive economy would gravitate or at which it would remain at rest.”⁵ His argument is the obvious one, that for equilibrium to be attained, firms need information about each other’s investment plans. In the absence of collusion, however, this is not going to be fully and accurately revealed. Accordingly, “it is difficult to see what but an act of faith can enable us to believe that equilibrium would be reached.”⁶ Indeed, as Hahn has pointed out, the basic purpose of the famous Arrow-Debreu model of equilibrium is “to show why the economy cannot be in this state.”⁷ While equilibrium analysis yields valuable insights into certain public policy issues, it is of rather limited utility to managers of the strategic process. Indeed, it may obscure as well as clarify. It certainly distracts attention from process issues.

Inadequacy of the Theory of the Firm—With little exaggeration, we can assert that, until very recently, economics lacked a theory of the firm. To be sure, textbooks contain chapter headings labeled “the theory of the firm,” but on closer examination one finds a theory of production masquerading as a theory of the firm. Firms are typically represented as production functions, or, in some formulations, production sets. These constructs relate a firm’s inputs to its outputs. The firm is a “black box” which transforms the factors of production into usually just one output. Firms are thus single-product in their focus. If multiproduct firms exist, then they are flukes in that they have no distinct efficiency dimensions.⁸

The boundaries of the firm—the appropriate degree of vertical, lateral, or horizontal integration—thus lie outside the domain of traditional economic analysis. Moreover, the theory is completely silent with respect to the internal structure of the firm. In short, the firm is an entity which barely exists within received neoclassical theory. The only dimension of its activities which is given much play is the volume of its output and the price at which that output is sold.

Suppression of Entrepreneurship—Because equilibrium analysis plays such a dominant position within received theory, and because change is so often modeled as a movement from one equilibrium condition to another, the role of entrepreneurship tends to be downplayed, if not outright suppressed. In fact, “it may be said quite categorically that at present there

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is no established economic theory of the entrepreneur. The subject area has been surrendered by economists to sociologists, psychologists, and political scientists. Indeed, almost all the social sciences have a theory of the entrepreneur, except economics.”⁹ Casson goes on to identify two villains. One is “the very extreme assumptions about access to information which are implicit in orthodox economics . . . simple neoclassical models assume that everyone has free access to all the information they require for making decisions,”¹⁰ an assumption which reduces decision-making to the mechanical application of mathematical rules for optimization. This trivializes decision-making, and makes it impossible to analyze the role of entrepreneurs. Moreover, the Austrian school, which does take the entrepreneur more seriously, is trapped by extreme subjectivism, rendering predictive theory-building impossible. A predictive theory of the entrepreneur is impossible with the Austrian school because “anyone who has the sort of information necessary to predict the behavior of entrepreneurs has a strong incentive to stop theorizing and become an entrepreneur himself.”¹¹ The need for a theory of entrepreneurship—or at least a theory which does not suppress the process of entrepreneurship—is of considerable importance to strategic management.

Stylized Markets—In neoclassical theory, transactions are performed by faceless economic agents operating in impersonal markets. However, markets are not nearly so anonymous. Even traders on the New York Stock Exchange—supposedly the most “objective” of all markets—know a good deal about each other. Reputation effects, experience ratings, and the like are the very stuff which permits markets to operate efficiently. To strip such considerations out of the theory renders it impotent before many strategic management problems. Where managers know each other, trust relationships abound, and fly-by-night operators can generally be exposed.

Not only are markets characterized by a variety of information conditions, but they differ widely in the frequency with which transactions and the opportunities for and costs of disruption occur (compare the sale of nuclear power plants with the sale of a bushel of wheat). Intermediate markets and relational contracting¹² are virtually absent from the textbooks and most advanced theorizing. By neglecting the institutional foundations of market structure, the conventional tools of economic analysis are rendered impotent before many strategic management problems.

Assumptions with Respect to Decision-Maker Attributes—Economic analysis commonly assumes a form of behavior which has been referred to as superrational or hyperrational.¹³ Decision makers are supersmart, don’t have problems with memory loss or memory recall, and can instantly formulate and solve problems of great complexity. Even their expectations are rational. This is, of course, a caricature of real-world

decision makers. The abstraction may be appropriate for framing certain problems, but it is generally an approach which managers find quite unhelpful. It is not a characterization of individual behavior and, even more so, of organizational behavior. Little can be learned from treating firms in this fashion.

Behavior of Cost—In micro-economic theory, and in practically all textbook treatments, costs in the short run are considered to rise with increasing output because of the law of diminishing returns. While the empirical evidence generally contradicts the assumption of increasing short run marginal cost, the rising marginal cost curve persists in the textbooks because it must, if much of the rest of the paraphernalia of neoclassical micro-economic theory and welfare economics is to survive. Without the rising marginal cost curve, it is often harder to derive industry equilibria and to arrive at normative conclusions. Hence, the reluctance to push it into the appendices, where it might well belong in many instances.

That's not to say that economists have not been involved in an important stream of research on alternative cost structures, particularly the progress function. In essence, the progress function implies that unit costs fall with cumulative volume, because of learning by doing efforts. T. P. Wright, working as chief engineer and general manager at Curtis Aeroplane in Long Island, played a catalytic role in developing, applying and diffusing the progress function concept.¹⁴ After the war, industrial engineers and production managers pushed the construct empirically, while economists explored some of the theoretical implications.¹⁵ In the 1960s the concept was applied (and sometimes misapplied) by the Boston Consulting Group and others to strategic management.

The progress function and various derivative concepts have proved quite valuable in linking cost behavior to strategic choices. But the literature on it within economics remains somewhat enigmatic and apart from mainstream treatments of cost. The concept has meanwhile become an important, though perhaps an overused concept in strategy management. In fact, Richard Pascale has invented the term "Honda Effect" to describe how consultants, academics, and executives have tended to squeeze reality into the strait-jacket of the experience curve and other parables, "to the neglect of the process through which organizations experiment, adapt, and learn."¹⁶

Assessment—Orthodox micro-economic theory, useful as it is for understanding many important economic and public policy issues, is of little value to the strategic manager. Indeed, it can be suggested that received theory, standing alone, tends to saddle the practitioner with perceptual blinders which block peripheral vision. However, economics is a very diverse discipline and within the field of industrial organization, broadly defined, greater realism is permitted to operate, although several of the central

problems just surveyed are still pervasive. Since the field is developing very rapidly, the potential for positive contributions is considerable. Therefore, a brief journey through several of the streams of research in industrial organization which seem to be relevant to strategic management would appear to be warranted.

Industrial organization is that field of economics which has traditionally dealt with the structure of markets, the behavior of firms, and the social benefits and costs associated with various forms of market structure and firm behavior.¹⁷ As the author of the leading text points out, "the name is a curious one . . . [as the field] has little or nothing to say about how one organizes and directs a particular industrial enterprise."¹⁸ Rather, the focus of much of the industrial organization literature is on how particular forms of price and output behavior by firms affect consumer welfare.

There is now sufficient variety within the industrial organization literature that it is extremely difficult to characterize it as a whole. While research continues within the traditional structure-conduct-performance paradigm, interest is also being shown by economists within a variety of other traditions. These include transactions cost, game theory, and evolutionary theory. There are a number of other related fields as well such as information theory and agency theory, which are possibly relevant. I will discuss the contribution from several traditions, particularly those which are either already visible or offer considerable promise for future contributions.

The Structural Analysis of Industries

The Structure-Conduct-Performance Paradigm—The first and most visible contribution from industrial organization to strategic management has come, not surprisingly, from employing the first and most visible paradigm in industrial organization, namely the structure-conduct-performance paradigm. The most notable early developers of the structuralist paradigm were Edward Mason at Harvard during the 1930s and Joe Bain at Berkeley during the 1950s. Within the paradigm, the performance (profitability, efficiency, etc.) of firms in particular industries or markets depends upon the conduct of buyers and sellers in matters such as pricing practices and policies, tacit and overt inter-firm coordination and cooperation, research and development commitments, advertising and product-line strategies, investment in production facilities and the like. Conduct in turn depends on the *structure* of the relevant market, as determined by features such as the number and size distribution of buyers and sellers, the degree of product differentiation, the existence of barriers blocking the entry of new firms into the industry, the degree of vertical integration, and the ratio of fixed to variable costs associated with the industry's technology. Market structure and conduct are also influenced by various fundamental or basic conditions. On the demand side these include the price elasticity

of demand at various prices, the availability of substitutes, buyers' practices, and the like. On the supply side, basic conditions include the nature of access to raw materials, characteristics of the industry's technology and production processes (fixed or flexible, continuous flow or batch, etc.), product durability, and shipping and inventory costs. Other basic conditions include aspects of the regulatory and community environment. The causation runs from structure to conduct to performance, although most treatments recognize feedback effects, and some stress circumstances under which causation may run the other way, that is from performance to structure. The basic theme, though, is that the market structure is the critical factor, and the paradigm focuses on exploring its many facets and tying those to conduct and performance.

The trick that has been used to apply this paradigm to strategic analysis is to treat the normative theory of industrial organization as a positive theory of strategic management. The principal focus becomes not one of how to select antitrust and regulatory policies to increase consumer welfare by enhancing competition but rather how to increase profits (and, if necessary, reduce consumer welfare) by containing or restricting competition. The principle weapon is the erection of various forms of entry barriers. As Michael Porter has explained, "public policymakers could use their knowledge of the sources of entry barriers to lower them, whereas business strategists could use theirs to raise barriers, within the rules of the game set by anti-trust policy."¹⁹

The essence of strategic management in the structuralist framework is thus to shield the firm, to the maximum extent legally possible, from competitive forces.²⁰ In Porter's words, "The goal of competitive strategy for a business unit in an industry is to find a position in the industry where the company can best defend itself against these competitive forces or can influence them in its favor. Since the collective strength of the forces may well be painfully apparent to all competitors, the key for developing strategy is to delve below the surface and analyze the sources of each. Knowledge of those underlying sources of competitive pressure highlights the critical strengths and weaknesses of the company, animates its positioning in its industry, clarifies the areas where strategic changes may yield the greatest payoff, and highlights the areas where industry trends promise to hold the greatest significance as either opportunities or threats."²¹ This is simply a translation, redirection, and refinement of the Mason/Bain structure-conduct-performance paradigm of industrial organization, made visually apparent by comparing Porter's approach as presented in Figure 1A with the basic industrial organization (structuralist) paradigm as summarized by Scherer in Figure 1B.

Besides refashioning existing constructs, this tradition has also made considerable progress in refining the concept of entry barriers, which has led to the related concept of mobility barriers and strategic groups. Con-

The Structure – Conduct – Performance Paradigm of Industrial Organization Applied to Competitive Strategy

Figure 1A.
Forces Driving Industry Competition

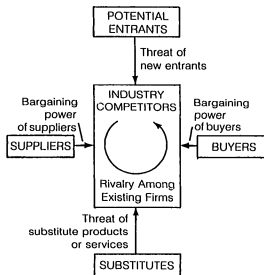
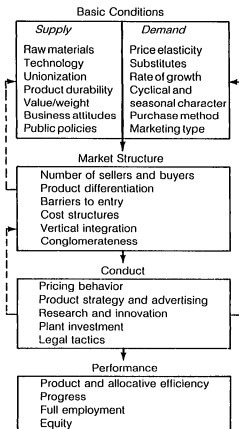


Figure 1B.
A Model of Industrial Organization Analysis



Sources: Figure 1A. Michael Porter, *Competitive Strategy* (New York, NY: Free Press, 1980), p. 4. Figure 1B. F.M. Scherer, *Industrial Market Structure & Economic Performance* (Chicago, IL: Rand McNally, 1980), p. 4.

sider entry deterrence through the erection of industry entry barriers. Such barriers are exposed to free rider "abuses" and hence underprovision. In order to overcome this problem, collusion amongst incumbents is needed. Overt collusion is of course illegal in many industrial settings. However, tacit collusion *is* legal, and possibly viable if firms' reactions to each other's strategic moves are predictable. This is conceivable where spatial elements in markets make some incumbents closer rivals than others. Hence, behavior by certain groups of firms to deter rival incumbents

may be more viable and valuable than deterring potential entrants through the erection of entry barriers at the industry level. One can thus arrive at the concept of *strategic groups*.

Committed strategic choices and industry heterogeneity obviously underlie the strategic group concept. Fine-grain differences in market requirements, firm capabilities, and transactional relationships allow for differentiation amongst strategies. Firms occupying the same market niche are likely to be more aware of each other's behavioral reactions than of the behavioral reactions to be expected by others. Mobility barriers separate the various groups from each other. According to Caves, the concepts of strategic groups and mobility barriers "do not add up to a tight formal model. Rather they serve [as] . . . a dynamized add-on to the traditional structure-conduct-performance paradigm."²²

With the redirection and refinement of structural analysis, a good start has been made towards the systematic understanding of the competitive environment of an industry. However, despite the useful work on strategic groups, this tradition does not provide much of a framework for assessing the capabilities and behavioral responses of individual firms, so that if the essence of formulating a competition strategy is relating a firm to its environment, the structuralist paradigm has dealt with only one half of the problem. As will be shown in the section below on transactions cost economics, recent work on the theory of the firm within a somewhat different industrial organization paradigm is helping to redress this deficiency. The complementary nature of these endeavors does not appear to have been fully recognized and exploited at this point in time.

Contestability, Sustainability, and Committed Competition—In the last few years, some old ideas have been repackaged and some new ones developed which, while often advanced by a group of scholars rather distinct from the structuralist school, nevertheless have a structuralist overtone. Some of these developments will be briefly surveyed and assessed with respect to their relevance to strategic management.

Consider, first, the concept of contestability.²³ A perfectly *contestable* market is one that is accessible to potential entrants and has the following two properties:

- The potential entrant can serve the same market and has access to the same technology on the same terms as incumbent firms. Thus, there are no entry barriers, if entry barriers are defined in the sense of potential entrants facing greater costs than those incurred by incumbent firms.
- The potential entrants evaluate the profitability of entry at the incumbent firms' pre-entry prices.

A *sustainable* industry configuration or structure involves prices and outputs such that supply equals demand and there are zero excess profits

available to potential entrants if they take the prices of incumbent firms as given. Clearly, only sustainable industry configurations are consistent with contestability and equilibrium. Contestability of course requires that potential entrants have available to them the same technology as does the incumbent, and on the same terms and conditions.

It is clear that the classical case of a perfectly competitive market satisfies the condition of perfect contestability, but so might a natural monopolist if potential competitors have access to the same technology and costs as does the incumbent. Thus, markets may be natural monopolies and remain contestable, thereby earning zero economic rents for the incumbents.

One example may be small airline markets where demand is satisfied before economies of scale are exhausted. Consider two small towns where the demand for travel is only sufficient to support a single daily non-stop flight. It is a natural monopoly market and yet, because air transport equipment is highly mobile and can thus be redeployed ("flown") at low cost, entry into *and* exit from the market ought to be easy. If the incumbent prices so as to capture higher-than-competitive returns, an entrant need only deploy an aircraft to the market and undercut the incumbent's price. Should the incumbent lower prices to competitive levels, the new entrant can exit as effortlessly as he entered, so long as there are other hit-and-run opportunities, or so long as there is a well-developed aircraft leasing market, as is apparently the case. It ought to be clear that the reversibility of sunk costs²¹ (or equivalently the non-existence of transaction-specific assets) and the absence of customer loyalties is essential for contestability. A contestable market is thus one subject to "hit-and-run" entry. Were it not for such exposure, some firms might want to lower their output and raise prices. However, the threat of hit-and-run entry prevents the exercise of market power.

The utility of the concept of contestability for short-to-medium term strategy formulation is limited by the widespread existence of some degree of investment irreversibility. The assumptions may be met in some transportation industries and in various other service industries, e.g. circuses. But whenever irreversible investments in physical and human capital must be made, a market is unlikely to be contestable. Thus, while contestable market theory is useful for sharpening one's appreciation of the role of costs, technology, and potential competition, it is of limited applicability as it suppresses the role of irreversibilities, strategic interactions, and demand variability. Nevertheless, it is a lens through which one can view certain types of service industries. Where entry barriers lack durability, it is a framework that has applicability for evaluating the long run as well as the short run.

A concept orthogonal to and more relevant than contestability is *committed competition*. Whereas contestability assumes that investments are re-

versible, committed competition assumes that they are not. As suggested earlier, the concept of entry barriers implicitly rests on irreversible commitments by industry incumbents. Entry barriers are therefore exit barriers as well.²⁵

Recent research on entry deterrence has identified ways in which it may pay to expand the commitment of irreversible investments in order to make entry unfeasible. Expanding production capacity ahead of demand, advertising outlays, brand proliferation, and the like may sometimes be effective. Whether such strategies can be profitable is another matter.

Transactions Cost Economics

Within a somewhat different tradition of industrial organization, sometimes referred to as the transactions cost or markets and hierarchies literature, an important set of new ideas and theories has emerged with strong normative implications for several central strategic management issues, including: the degree to which a firm should integrate (backward, forward, lateral, multinational, and conglomerate) and the appropriate internal structure for the large enterprise. The first set of issues can be labeled efficient boundary issues, and the second, internal organization issues.

The transactions cost approach starts with Coase's observation that markets and hierarchies are alternative organizational mechanisms for supporting transactions, and that the choice of the one or the other ought to be made according to which is the more efficient way to support the transaction in question.²⁶ Thus, arms-length transactions in markets, such as when one firm purchases an input from another, and "in-house" production, as with vertical integration, can be thought of as alternatives. Table One identifies several market forms and their corporate equivalents. Note that the economic transactions conducted within the corporate form could conceivably take place in a market. One must, therefore, investigate why it may not always be desirable to push economic activity into the market, and vice versa. In order to do so, one must explore the nature of market processes in some detail. The development below owes much to Oliver Williamson, although many others have contributed as well, as indicated by the footnotes.²⁷

One feature of markets is that they are informationally economical. If prices are left free to clear markets, they will often do so quickly. However, the adjustment features of markets are often illustrated in the textbooks with markets for highly standardized commodities, such as wheat or cloth. But in modern industrial societies, some rather unique and nonstandardized products often need to be procured or traded, for instance, electronic switches in the telecommunications network, weapons, aircraft engines, low sulfur crude oil, experienced scientists and engineers. Unassisted spot markets, such as those used to trade wheat, do not always work well as

Table 1. Organizational Alternatives

Market Form	Corporate Form
Intermediate Product Markets	Vertical Integration
Capital Markets	Conglomerate
Markets for Know-how	
(a) Horizontal	Multinational Firms*
(b) Lateral	Lateral Diversification†

* David J. Teece, "Technological and Organizational Factors in the Theory of the Multinational Enterprise," in Mark Casson, ed., *The Growth of International Business* (London: George Allen & Unwin, 1983).

† David J. Teece, "Economies of Scope and the Scope of the Enterprise," *Journal of Economic Behavior and Organization*, Vol. 1, No. 3 (1980):223-247; David J. Teece, "Towards an Economic Theory of the Multiproduct Firm," *Journal of Economic Behavior and Organization*, 3 (1982):39-63.

some alternative arrangements. To see why this is so, one must zero in on the properties of transactions.

A transaction occurs when a good or service is transferred across a technologically separable interface, such as when a firm buys an input from an independent supplier. The attributes of transactions that are of special interest are: the frequency with which they recur, the uncertainty to which they are subject, and the degree to which the transfer of technological and managerial know-how is involved.²⁸ In most textbook descriptions of the functioning of markets, it is usually assumed that transactions are frequent, uncertainty is low or non-existent, transaction specific investment is not involved, and the commodities traded are tangible or at least can be packaged and clearly labeled as to their performance features. But in the real world, commodities are not always that standardized. Let's see how it matters.

Infrequent exchange prevents purchasers from building up an experience rating on particular suppliers, such as when a new company offers an (allegedly superior) microprocessor to board designers and manufacturers. Uncertainty means that writing, executing, and enforcing contracts that are anywhere near complete is extraordinarily difficult since many contingencies cannot be identified and responded to during the contract negotiation period. As a result, exchange is governed by incomplete contracts, and unexpected contingencies will surely arise—a potentially hazardous situation for all of the parties. Asset specificity can occur because of locational imperatives, (as with iron and steel production, residuum and petroleum manufacture, R&D and first commercialization of complex petrochemical processes), physical asset specificity (as when specialized tools and dies are needed to produce a component), or knowledge specificity (as when research and developed knowledge is generated which is specialized

to a particular firm's requirement). The reason why asset specificity is critical is that once the investment has been made it is largely irreversible, so that buyers and sellers may be operating in a bilateral exchange relation for a considerable period thereafter. To the degree that the value of highly specific capital in other uses is, by definition, much smaller than the specialized use for which it has been designed, the buyer is "locked in" to the transaction to a significant degree. The buyer and seller must thus make special efforts to protect the relationship, since both can be injured if it breaks down.

The criterion for organizing commercial transactions is assumed to be cost minimization. For analytical purposes, this can be broken down into two parts: minimizing production costs and minimizing transactions costs.²⁹ The former are fairly well understood and will not receive much attention here. Rather, it is the relatively poorly understood transaction costs which will be emphasized.

It is convenient to assume that transactions will be organized by markets unless market exchange gives rise to contractual difficulties, and hence transactions costs. In other words, the presumption is that economic activity is best organized by markets as this seems to reduce various bureaucratic distortions to which internal exchange may be subject. Furthermore, there are obvious production cost advantages associated with using markets. For instance, scale economies can be more fully exhausted by buying rather than making if the firm's own needs are insufficient to exhaust scale economies. Furthermore, markets can aggregate uncorrelated demands, thereby achieving intertemporal efficiencies. Finally, contracting out may avoid diseconomies of scope when a particular firm's requirements are only one of several which can be produced using the same equipment. Accordingly, we should presume that firms will contract out unless contractual difficulties can be anticipated. There are a number of such regularities which can be used to derive several principles of organizational design.³⁰

The Sunkcost Principle—If a firm, in order to minimize costs, must put in place specialized and hence dedicated assets in order to keep costs to the minimum, then it ought to protect itself against the possibility that the supporting transactions will be upset in an opportunistic way by suppliers, purchasers, or rivals. Thus, if an aluminum refinery is to some degree dedicated to a particular grade or type of bauxite, then the owner of the refinery ought to be sure that the ore will be available on competitive terms. Integration generally affords more control than relying on arms-length contracts with unaffiliated enterprises. Accordingly, the supply relationship should involve a progressive degree of vertical integration as the extent of the dedication increases.³¹ Hence the following principle:

Principle 1: As asset dedication increases (so that once committed, invest-

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ment decisions involve some degree of irreversibility) bring the supporting transactions under tighter control, vertically integrating if necessary to ensure the continued supply of raw materials and other inputs necessary to keep the specialized asset fully employed.³²

Quality Assurance Principles—For many goods and services, the provision of product quality has economic value to the consumer enabling the quality product to support a higher price. In some cases, such as the camshaft of an engine, the buyer may not be able to establish the quality of the good by inspection of the final product, and may not even be able to screen for quality with trial use. If the potential damage caused by utilization of a substandard good is great, it is essential that quality be checked before the buyer takes delivery. This is a special case of the more general proposition that the seller of a product has a natural advantage over the buyer in screening for product quality because he is one step closer to the producer and may, in fact, be the producer himself. Information about product quality is generated naturally as a joint product of the production process and accrues in the first instance to the person supervising production. The costs of quality control may be reduced significantly by drawing upon this information instead of replicating its discovery at a subsequent stage.

For an intermediate product, there are three main strategies available for giving assemblers confidence in the supplier's quality control. The first is simply to build up confidence through successful experience through frequent trade between the same buyer and seller. The second strategy is for the seller to agree to the buyer supervising the production of the component/product in question, and the third is for the buyer to integrate backward into the manufacture of the component, i.e., to bring the production process in-house, where the buyer has maximum access to information and is able to take remedial measures without having to negotiate with an independent enterprise. The argument is also symmetric in the sense that a seller who feels that it will be slow or difficult to build up confidence among buyers may decide to integrate forward into the user's business. This suggests the following principle:

Principle 2 (a): Producers of high-quality products ought to be vertically integrated into component production when the costs of product failure are high, when limited opportunity exists to develop an experience rating on suppliers, and when effective in-plant monitoring of the supplier's production activities involves significant contracting costs.³³

Quality-assurance issues also explain the incentive to forward integrate in situations where the activities of individual distributors affect one another (rather than the manufacturer as in the situation just considered), as when one retailer's poor service injures the product's reputation and limits the sales of other retailers. Independent forward integration, or possibly fran-

chising, will thus tend to displace independent distributors as the most efficient mode of organization, leading to the following principle:

*Principle 2 (b): Franchising and forward integration become progressively desirable as spillover effects among retailers become more significant.*³⁴

The Systemic-Innovation Principle—As discussed earlier, uncertainty makes contractual relations especially complex, since it is impossible to write all contingencies into a contract. One of the activities in which a corporation may engage and which gives rise to uncertainty is innovation. Innovation by its very nature involves uncertainty. Costs and outcomes of the innovation process are never clear until commercialization and significant market penetration have occurred.

Technological innovations vary enormously in nature and characteristics. For present purposes, it is useful to distinguish between two types of innovation: autonomous (or “stand-alone”) and systemic. An autonomous innovation is one which can be introduced without modifying other components or items of equipment. The component or device in that sense “stands alone.” A systemic innovation, on the other hand, requires significant readjustment to other parts of the system. The major distinction relates to the amount of design coordination which development and commercialization are likely to require. An example of a systemic innovation would be electronic funds transfer, instant photography (it required redesign of the camera and the film), front wheel drive, and the jet airliner (it required new stress resistant airframes). An autonomous innovation does not require modification to other parts of a system for first commercialization, although modification may be necessary to capture all of the advantages of the innovation in question. The transistor, for example, originally replaced vacuum tubes and the early transistor radios were not much different from the old ones, although they were more reliable and used much less power. But one did not have to change radio transmission in order to commercialize transistor radios. Another example would be power steering—the automobile did not have to be redesigned to facilitate the introduction of this innovation, although it did permit designs which placed more weight over the front wheels. A faster microprocessor or a larger memory would be further examples. The third principle of efficient organizational design relates the firm’s boundaries—the degree of vertical integration in particular—and the rate and direction of technological innovation.

When technological interdependencies are important, it is likely that the commercialization of an innovation will require complementary investments in several different parts of the industry. Thus, suppose that a cost saving (equipment) innovation has been generated which can enhance efficiency if successfully introduced into an industry, and suppose that introduction into one part requires that complementary investments be made in other parts. If the subparts are independently owned, cooperation will have to be obtained in order for the innovation to be commercialized.

There are two powerful reasons why common ownership of the parts will speed both the adoption and the subsequent diffusion of the innovation. Where there are significant interdependencies, introduction of an innovation will often result in differing benefits and cost to various parties. This effect makes it difficult if not impossible to coordinate the introduction of such an innovation. While a system of frictionless markets could overcome this problem—the firms obtaining the benefits could compensate those incurring the costs so that the introduction of the innovation would not depend on the degree of integration in the industry—it is commonly recognized that it may be extremely difficult to engineer a workable compensation agreement, in part because all relevant contingencies are not known when the contract would need to be drawn up.

For example, inasmuch as innovation involves uncertainty and difficulty in measuring costs and benefits, the *distribution* of costs and benefits cannot be evaluated as accurately as the net total effects, and it is this distribution among separate firms which would premise any agreement to introduce the innovation and the requisite adjustments in the production process. Thus, genuine differences can arise among the parties in their assessment of cost and benefits. Moreover, even if the costs and benefits are perceived similarly by the parties involved, differences in risk preferences may affect the manner in which the risks are priced. These problems will make it difficult to reach agreement with attendant delays in commercialization. Even if an arrangement for sharing costs and benefits is devised, initial terms and conditions can be circumvented, and unforeseen contingencies—of which there are likely to be many—can be interpreted opportunistically. By rendering distributional and contracting issues irrelevant, integration reduces contractual problems and facilitates the commercialization of innovation which affects several stages of production or several parts of an operating system.

Therefore, in the absence of integration, commercialization can be slowed or completely stalled. Considerable cost disparities can open up between old and new methods, yet the new method may not be implemented because the individual parties cannot agree upon the terms under which it will be introduced. There can be a reluctance on the part of both parties to make the necessary investments in specialized assets, and to exchange information about each other's needs and opportunities—even if cooperation would yield mutual gains, and certainly if the gains will go to one party at the expense of the other. Hence, in the absence of integration, there can be a reluctance on the part of one or more of the parties in an industry to develop or commercialize a systemic innovation requiring the participation of two or more firms.

To summarize, integration facilitates systemic innovations by facilitating information flows, and the coordination of investment plans. It also removes institutional barriers to innovation where the innovation in question requires allocating costs and benefits, or placing specializing investments into several

parts of an industry. In the absence of integration, there will be a reluctance on the part of both parties to make the necessary investments in specialized assets, even if this would yield mutual gains. One reason is that both parties know that the exercise of opportunism might yield even greater benefits to one of the parties. Hence, in the absence of common ownership of the parts, there will be reluctance on the part of one or more of the parties to adopt a systemic innovation. This leads to the third principle of organizational design:

Principle 3: A structure which displays common ownership of the various organizational units which must participate in the adoption of an innovation is the structure which, ceteris paribus, is the most likely to facilitate the innovation in question.

Corollary I:

Autonomous innovations do not require complex transactions amongst organizational units and will proceed efficiently in (small) unintegrated enterprises.

Corollary II:

Systemic innovations require transactions amongst several organizational units, and will proceed most efficiently in (integrated) enterprises whose boundaries span the various participating organizations.

The Appropriability and Efficient Technology Transfer Principle—Successful firms possess one or more forms of intangible assets, such as technological or managerial know-how. Over time, these assets may expand beyond the point of profitable reinvestment in a firm's traditional market. Accordingly, the firm may consider deploying its intangible assets in different product or geographical markets, where the expected returns are higher, if efficient transfer modes exist.

The arms-length market for know-how and other intangible assets is, however, riddled with transactional difficulties and costs. There are both problems of recognition and disclosure—potential trading opportunities may go unrealized because it is difficult to fully publicize the availability of certain forms of highly proprietary know-how, and when publicity is attempted, the buyer may thereby be able to obtain much of know-how without actually paying for it. The buyer often needs to be fully informed about the technology before he is able to value it, but once he knows all the pertinent aspects of the technology needed to evaluate it, he no longer needs to purchase it! Accordingly, it is often risky for the seller to rely on licensing to nonaffiliated enterprises as a mechanism for appropriating the returns to its intangible assets. However, if the “buyer” is an affiliated enterprise, such as a foreign subsidiary, or another domestic division selling in a different market, the spillover effects mentioned above will wash out and will not effect the overall returns to stockholders unless divisional profits

are taxed differently in different markets. This suggests the following principle:

Principle 4: When know-how licensing leads to significant transactions cost and substantial spillovers to nonaffiliated enterprises, the firm ought, ceteris paribus, to adjust its boundaries so as to internalize the transactions in question. This implies foreign direct investment when the markets in question are international, and lateral integration when the markets in question involve modification of the primary production process.

The Hierarchical Decomposition Principle—If a transaction is moved in-house, there is no necessary assurance that the activity will be effectively organized thereafter. Decision making must be factored into relatively independent subsystems, each of which can be designed with only minimal concern for its interactions with the others. The other operating parts must be grouped into separable entities, the interactions within which are strong and between which are weak. The strategic function, involving lower frequency interactions, needs also to be separated and associated with higher levels in the organizational hierarchy. The hierarchical decomposition principle has been stated by Alfred Chandler and Oliver Williamson approximately as follows:

Principle 5: The internal structure of an enterprise should be designed so as to effect quasi-independence between the parts. Operations management and strategic planning should be clearly distinguished and incentives should be aligned so as to promote global profitability rather than group or divisional goals.³⁵

Other Contributions

The two streams of industrial organization research identified above are the most developed, although the second is more recent and is not frequently applied in current strategic management practice. As mentioned earlier, there are a number of additional streams that appear promising in terms of their potential contributions to economic science and to strategic management. Prominent among them is an evolutionary theory of economic change which has recently been outlined by Nelson and Winter.³⁶

The Nelson & Winter framework is significant because it promises to address an important deficiency in the existing literature: a theory which can delineate the firm's distinctive capabilities. Existing theory is almost completely silent on this matter, and the field of strategic management often succumbs to an ad hoc approach. Yet the whole concept of strategy involves matching the firm's capabilities to its environment, so that in the absence of an adequate theory of the firm's capabilities, one is absent an adequate theory for addressing important issues in strategy formulation.

The firm in evolutionary theory is conceived as having a distinctive



package of economic capabilities of relatively narrow scope. The information required for the functioning of the enterprise is stored in routines, in which much of the underlying knowledge is tacit, not consciously known or articulatable by anyone in particular. As Nelson & Winter point out: "Routines are the skills of an Organization."³⁷ Prevailing routines define a truce, and attempts to change routines often provoke a renewal of conflict which is destructive to the participants and to the organization in routine operation, but it is a flow that is continuously primed by external message sources.

For such a system to perform production activities, some highly specific conditions must be satisfied, and these will be different in particular cases. The specific features that account for the ability of a particular organization to accomplish particular things are reflected in the character of the collection of individual member's repertoires, and the possession of particular collections of specialized plant and equipment. Restaurants have chefs and kitchens, while universities have professors, research laboratories, libraries, and classrooms. Central to productive activity is coordination and central to coordination are individual skills and the existence of an information and control system which enables the right skills to be exercised at the right time.

What emerges is a conception of the firm with a limited range of capabilities based on its available routines and physical assets. There is no "shelf of technologies" external to the firm and available to all industry participants. A firm's capabilities are defined very much by where it has been in the past, and what it has done. History becomes important, as the firm's performance is a function of deeply engrained repertoires.

Nelson and Winter's concept of routines thus cuts across orthodox notions of capabilities (the techniques that a firm can use) and of choice, and treats these as similar features of a firm. To view firm behavior as governed by routines implies that what a firm is currently doing or has recently done defines its capabilities more appropriately than the set of abstract possibilities which an external observer might conceive to be available to the firm.³⁸ Thus a firm's flexibility is constrained not only by the irreversible investments which it may have made, but also by its limited range of available routines. Identifying these for a firm and its rivals thus becomes an important part of strategy formulation.

This view also suggests, however, that the strategy lever may not be as powerful as is commonly supposed. If a firm has only a limited range of repertoires, its range of strategic choices is correspondingly limited. However, if its distinctive skill—be it innovation, service, or quality—is not readily imitable, it can be an almost unassailable source of above-normal profits.

Evolutionary theory also directs one's attention to the process and mechanisms of imitation.³⁹ The interest in imitation arises because it often

happens that a firm observes that some other firm is achieving the success that it would like for itself. The envious firm may then try to duplicate this imperfectly observed success. If the envious firm does not have open access to the target firm's internal operations, then the target firm's routines are not available as a template, so that when problems arise in the copy, it is not possible to resolve them by closer scrutiny of the original (the target). This implies that the copy may construct a substandard mutation of the original. At one extreme, the target routine may involve so much idiosyncratic and difficult-to-unravel tacit knowledge that even if the organization tried to replicate itself, success would be highly problematic, and imitation from a distance would be completely impossible.⁴⁰

At the other extreme, the product in question may be a novel combination of highly standardized technological elements, so that engineering may suffice for successful imitation. Even vague rumors from good sources may provide enough clues to permit almost complete replication.

The theory of imitation, which may be lurking here, can be linked back to the structuralist concept of entry barriers, and its group level equivalent, mobility barriers. Individual firms as well as groups or industries may be insulated from competition by the high costs or impossibility of imitation. Richard Rumelt has used the term *isolating mechanism* to refer to phenomena which limit the *expost* equilibration of rents among individual firms. Isolating mechanisms include patents, trade secrets, and tacit knowledge. The importance of isolating mechanisms in business strategy is that they are the phenomena which make competitive positions stable and defensible. They may appear as first mover advantages which can only be undone by changes in the environment which cause the value of the underlying inimitable assets to dissipate.

Conclusion

The economic theory of the firm and of markets is to the point where, if correctly applied, it can have a constructive impact on the field of strategic management. As a robust theory of the firm with strong normative implications develops, and as the structural analysis of markets improves so as to focus more attention on the fine-grained aspects of structure and conduct, and as theorists and practitioners find ways of blending together the theories and various findings of research and best business practice, the possibility arises that economics can make an increasingly positive contribution to certain aspects of strategic management, especially questions relating to the design of business strategies. However, it is most important that the analysis of strategic positioning, to which economic analysis has much to contribute, be balanced with concern for the building of distinctive competences, and with strategy implementation and execution. In fact, some argue—correctly in many instances—the execution is

strategy.⁴¹ One thing is clear. It is not enough to choose fundamental competitive strategies which *assume* the performance of the production system. In some instances one may be able to attain superior performance by reorganizing existing competences, or by positioning business units more advantageously. In general, however, it is critically important to focus on the building of distinctive competences. Thus in suggesting above that there are important contributions to management to be derived from economic analysis, particularly through employing a heterodox theoretical framework, I do not mean to suggest that this is a priority matter for the field of management. American management is more in need of sharpening basic skills in the stimulation and management of innovation and human resources in a global context.

I wish to thank Sidney Winter of Yale University for helpful discussion on many points in this paper. Part II ("The Tension Between Orthodox Economic Theory & Strategic Management") of this article is drawn from David J. Teece and Sidney Winter, "The Limits of Neoclassical Theory in Management Education," *American Economic Review* (May 1984). I have also benefited from useful discussion with Richard Rumelt of UCLA and Wes Cohen of Carnegie-Mellon University.

References

1. For an excellent recent statement and development of this, see the article by Raymond E. Miles and Charles C. Snow elsewhere in this issue.
2. Richard Caves, "Corporate Strategy and Structure," *Journal of Economic Literature*, Vol. 18 (1980): 65.
3. David J. Teece, "The Market for Knowhow and the Efficient International Transfer of Technology," *The Annals of the Academy of Political and Social Science* (November 1981).
4. F. H. Hahn, *On the Notion of Equilibrium in Economics* (Oxford: Oxford University Press, 1960), pp. 21.
5. G. B. Richardson, *Information and Investment* (Oxford: Oxford University Press, 1960), pp. 1-2.
6. *Ibid.*, p. 11.
7. Hahn, *op. cit.*, p. 4.
8. David J. Teece, "Economics of Scope and the Scope of the Enterprise," *Journal of Economic Behavior and Organization*, Vol. 1, No. 3 (1980): 223-247; David J. Teece, "Towards an Economic Theory of the Multiproduct Firm," *Journal of Economic Behavior and Organization* 3 (1982): 39-63.
9. Mark Casson, *The Entrepreneur: An Economic Theory* (Totowa, NJ: Barnes and Noble, 1982), p. 9.
10. *Ibid.*
11. *Ibid.*
12. Oliver E. Williamson, "Transactions Cost Economics: The Governance of Contractual Relations," *Journal of Law and Economics* 22 (1979): 223-261.
13. H. A. Simon, "Rationality as Process and Product of Thought," *American Economic Review*, Vol. 68, No. 2 (1978): 1-16.
14. John Dutton, Annie Thomas, and John E. Butler, "The History of Progress Functions as a Managerial Technology," unpublished manuscript, Graduate School of Business Administration, New York University, October 1983.
15. Armen Alchian, "Costs and Outputs," in Moses Abramovitz, ed., *The Allocation of Economic Resources: Essays in Honor of B. F. Haley* (Berkeley, CA: University of California

Press, 1959); Alchian's research was performed at RAND in the late 1940s, but the classified nature of sources prevented publication until much later. See also, Jack Hirschleifer, "The Firm's Cost Function: A Successful Reconstruction," *Journal of Business* (July 1962), pp. 235-253.

16. See the article by Richard T. Pascale elsewhere in this issue. Pascale juxtaposes the Boston Consulting Group's (BCG) parable of Honda's entry into the British and American motorcycle industry with the reality as seen by Honda's management team. The BCG paradigm imputes coherence and purposive rationality when, in Pascale's view, the opposite was closer to the truth.

17. As one text puts it, "the field of industrial organizations is about: (1) how enterprises function within a variety of market structures, and (2) how well the outcomes fit the public interest." William Shephard, *The Economics of Industrial Organization* (Englewood Cliffs, NJ: Prentice Hall, 1979), p. 4.

18. F. M. Scherer, *Industrial Market Structure & Economic Performance* (Chicago, IL: Rand-McNally, 1980).

19. Michael Porter, "The Contributions of Industrial Organizations to Strategic Management," *Academy of Management Review*, Vol. 6, No. 4 (1981): 612.

20. The structuralist approach is in marked contrast to the transactions-cost paradigm, outlined below, which focuses on economic efficiency as the mechanism to achieve advantage against one's rivals. It could be argued that some forms of strategic positioning which the structuralist paradigm helps identify involve contrived barriers to entry, and are contrary to the public interest, whether or not they violate the antitrust laws.

21. Michael Porter, *Competitive Strategy* (New York, NY: Free Press, 1980), p. 4.

22. Richard Caves, "Economic Analysis and the Quest for Competitive Advantage," *American Economic Review* (May 1984).

23. William Baumol, John Panzar, and Robert Willig, *Contestable Markets and the Theory of Industry Structure* (New York, NY: Harcourt Brace Jovanovich, 1982).

24. Sunk costs would include the cost of shutting down and opening up plants.

25. Richard Caves and Michael Porter, "From Entry Barriers to Mobility Barriers," *Quarterly Journal of Economics* 91 (1977): 241-262.

26. Ronald Coase, "The Nature of the Firm," *Economica* (1937), p. 386-405.

27. Oliver E. Williamson, *Markets and Hierarchies* (New York, NY: Free Press, 1975); Oliver E. Williamson, "The Modern Corporation: Origins, Evolution, Attributes," *Journal of Economic Literature* 19 (1981): 4; and Williamson, op. cit., 1979.

28. Williamson, op. cit., 1979, 1981; David J. Teece, "Technology Transfer by Multinational Firms: The Resource Cost of International Technology Transfer," *Economic Journal* (June 1977); Teece, op. cit., 1982; Kirk Monteverde and David J. Teece, "Supplier Switching Costs and Vertical Integration in the Automobile Industry," *Bell Journal of Economics*, Vol. 13, No. 1 (Spring 1982).

29. Williamson, op. cit., 1981.

30. Several of these are from Williamson (op. cit., 1981), some are derived from my earlier work, and some are presented here for the first time. Subsequent footnotes attempt to trace the antecedents.

31. Where the input in question is a specialized component, the buyer may be in a position to demand that the seller license out his know-how so that the component in question can be second-sourced. In some cases, this will overcome the need for vertical integration.

32. See Williamson, op. cit., 1981, p. 1548.

33. For an earlier treatment, see David J. Teece, *Vertical Integration and Vertical Divestiture in the U.S. Oil Industry* (Stanford, CA: Stanford University Institute for Energy Studies, 1976).

34. See Williamson, op. cit., 1981, p. 1549.

35. *Ibid.*, p. 1550. Empirical support for this principle can be found in H. O. Armour and

David J. Teece, "Organizational Structure and Economic Performance: A Test of the Multitudinal Hypothesis," *Bell Journal of Economics*, 9 (Spring 1978): 106-122.

36. R. R. Nelson and S. G. Winter, *An Evolutionary Theory of Economic Change* (Cambridge, MA: Harvard University Press, 1982).

37. *Ibid.*, p. 124.

38. This is unlikely to be news to strategy practitioners but it does bear an uneasy tension with textbook treatments of the firm's technological choice set as contained in most micro theory texts.

39. Nelson & Winter, *op. cit.*, pp. 123-124.

40. This may be at the heart of what Lippman and Rumelt (S. A. Lippman and R. P. Rumelt, "Uncertain Imitability: An Analysis of Interfirm Differences in Efficiency Under Competition," *Bell Journal of Economics*, Vol. 13, No. 2 (Autumn 1982): 418-438) refer to as "uncertain imitability." Uncertainty in their model arises from ambiguity as to the factors of production and how they interact. If the precise reasons for success and failure cannot be discerned, even *ex post*, then replication is impossible. Given uncertain imitability, the average firm will earn positive economic profit and incumbents will be more efficient than new entrants. With uncertain imitability, new entry activity will be essentially a function of market growth rather than industry profitability. High levels of profitability in stable markets may well signal incumbents possessing difficult-to-imitate skills that deter entry.

41. See the article by Thomas J. Peters elsewhere in this issue.