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THE THEORY OF INNOVATIVE ENTERPRISE

by

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Abstract

The purpose of this paper is to outline a theory of innovative enterprise that provides microeconomic foundations for understanding the evolving relation between industrial (technological, market, and competitive) conditions that result in innovation and the institutional (financial, employment, and regulatory) conditions that support an innovative economy. Critical to building this link is an understanding of the organizational conditions of the business enterprise, and the ways in which these organizational conditions interact with institutional conditions across industrial activities to create the "social conditions of innovative enterprise". Insights into the social conditions of innovative enterprise derive from comparative-historical analysis of advanced economic development brought up to the present. Firstly, I show how, by transforming the standard neoclassical theory of the optimizing firm, we can 1) expose the fundamental problem of the "monopoly model" which, throughout the twentieth century and to the present, has underpinned the belief in the theory of the "perfect market" economy as a system of resource allocation that yields superior economic performance, and 2) clarify the need for a theory of the organizational, as well as industrial, conditions for innovative enterprise. Secondly, I then perform a similar theoretical transformation on the transaction-cost theory of the firm, as developed by Oliver Williamson, in which organizational conditions are deemed to be central but which, like the standard neoclassical theory of the firm, lacks a theory of innovative enterprise. On the basis of these theoretical transformations, I argue that a theory of innovative enterprise must be able to comprehend the interaction of cognitive, behavioral, and strategic conditions -- that is, organizational conditions -- in the transformation of technological and market -- or industrial conditions. Thirdly, I shall consider the relation of the theory of innovative enterprise thus outlined to the “dynamic capabilities” perspective on the enterprise developed by US innovation economists during the 1990s. Having origins in the Williamsonian framework that stresses the importance of organizational conditions, dynamic capabilities theory has sought to combine findings from resource-based and evolutionary theories of the firm with empirical research, much of it industry-specific or enterprise-specific, in the fields of strategic management and the management of innovation. While I am in agreement with the emphasis of dynamic capabilities theory on the centrality of the organization of the innovation process, I argue that the dynamic capabilities approach has thus far ignored critical issues of strategic control within the innovative enterprise and the relation of strategic control to the organizational learning processes that are central to the development of an enterprise’s core competences. Without an analysis of the integration of strategic control and organizational learning, a theory of the firm cannot address the central issues of the governance of innovative enterprise.

1. Transforming the Neoclassical Theory of the Firm

The purpose of this paper is to outline a theory of innovative enterprise that provides microeconomic foundations for understanding the evolving relation between industrial (technological, market, and competitive) conditions that result in innovation and the institutional (financial, employment, and regulatory) conditions that support an innovative economy. Critical to building this link is an understanding of the organizational conditions of the business enterprise, and the ways in which these organizational conditions interact with institutional conditions across industrial activities to create the "social conditions of innovative enterprise".

The conventional neoclassical theory of the optimizing firm avoids addressing the issue of innovative enterprise by assuming that, in its decisions to allocate resources, the firm takes technological and market conditions as given constraints. Neoclassical theory purports to be applicable to the real world of business, with implications for macroeconomic performance, by comparing such "optimal" decision-making -- taking technological and market conditions as given constraints -- under conditions of "perfect competition" and "monopoly". Compared with perfectly competitive conditions, monopoly results in higher product prices and lower volumes of output. Elaborated within the Marshallian tradition of partial equilibrium in the 1920s and 1930s (see Lazonick 1991: ch. 5), this conventional perspective on industrial organization remains implanted within today's economics textbooks. Throughout the twentieth century, the comparison of conditions of perfect competition and monopoly provided the theoretical basis for the implementation of antitrust policies on the assumption that economic performance is enhanced when there are more rather than fewer competitors in an industry.

The comparison of constrained optimization under conditions of perfect competition and monopoly contains, however, a fundamental flaw (see Figure 1). The problem is not with the logic of constrained optimization *per se* but with the logic of comparing the competitive model with the monopoly model within the constrained-optimization framework. If technological and market conditions make perfect competition a possibility, how can one firm (or even a small number of firms) come to dominate an industry? One would have to assume that the monopolist somehow differentiated itself from other competitors in the industry. But, the constrained-optimization comparison that yields the monopoly model argues that both the monopolist firm and perfectly competitive firms *optimize subject to the same cost structures* that derive from given technological and factor-market constraints. Indeed, except for the assumption that in one case the firm can make its profit-maximizing output decision as if it can sell all of its output at a constant price and that in the other case the firm is so large that it can only sell more output at a lower price, there is absolutely nothing in terms of the structure or operation of the firm that distinguishes the perfect competitor from the monopolist! So why would monopoly ever emerge under such conditions?

Of course, economists have argued that some industries, as exemplified by electric utilities, are characterized by natural monopoly. Relative to the size of the market to be served, the fixed costs of setting up an enterprise in an industry are so high that it is uneconomical to have more than one firm in the industry. But, if that is the case, then the comparison with the "optimal" levels of product price and product output

under competitive conditions is irrelevant. If one opts for the "natural monopoly" explanation for the concentrated structure of an industry, one cannot then logically invoke the "perfectly competitive" comparison to demonstrate the inefficiency of monopoly. Recognizing the irrelevance of the competitive alternative, governments have long regulated utilities by (in principle at least) setting output prices that can balance the demands of consumers for reliable and affordable products with the financial requirements of utility companies for developing and utilizing the productive resources that enable the delivery of such products to consumers. In the presence of cumulative, collective, and uncertain learning in the industry (see below), the analysis of the conditions for realizing such long-term projections concerning the evolving relation of demand for and supply of such products requires a theory of the innovative enterprise, not a theory of the optimizing firm.

To draw conclusions concerning the relative economic performance of the optimizing firm of neoclassical theory, its output and price should be compared with those that can be achieved by an innovative enterprise that transforms technological and/or market conditions (see Figure 2). To do so, the theory of innovative enterprise must have an analysis of the determinants of total fixed costs and the relation between average fixed costs and average variable costs during the innovation process. The task for a theory of innovative enterprise is to explain how, by changing its cost structure to generate output of a certain quality (or to generate output of a higher quality at a certain unit cost), a particular enterprise can emerge as dominant in its industry.

Unlike the optimizing firm, the innovative enterprise does not take as given the fixed costs of participating in an industry. Rather, given prevailing factor prices, the level of fixed costs that it incurs reflects its innovative strategy. This “fixed-cost” strategy is not dictated by indivisible technology or the “entrepreneur” as a fixed factor (typical ad hoc assumptions in the neoclassical theory of the optimizing firm), but by the innovative enterprise’s assessment of the quality and quantity of productive resources in which it must invest to *develop* products that are higher quality and lower cost than those that it had previously been capable of producing and than those that (in its estimation) its competitors will be able to produce, given *their* investment strategies. It is this development of productive resources internal to the enterprise that creates the potential for an enterprise that pursues an innovative strategy to gain a sustained competitive advantage over its competitors and emerge as dominant in its industry.

Such development, when successful, becomes embodied in products, processes, and people with superior productive capabilities than those that had previously existed. But the generation of superior productive capabilities will not result in sustained competitive advantage if the high fixed costs of the innovative strategy place the innovative enterprise at a cost disadvantage relative to less innovative, or even “optimizing”, competitors. An innovative strategy that enables the enterprise to generate superior productive capabilities may place that enterprise at a cost disadvantage because innovative strategies tend to entail higher fixed costs than the fixed costs incurred by rivals that optimize subject to given constraints.

For a given level of factor prices, these higher fixed costs derive from the *size* and *duration* of the innovative investment strategy. Innovative strategies tend to entail

higher fixed costs than those incurred by the optimizing firm because the innovation process tends to require the *simultaneous development* of productive resources across a broader and deeper range of integrated activities than those undertaken by the optimizing firm (see references in Lazonick 1998; see also Patel and Pavitt 1997; Prencipe 2000). Hence, at a point in time, the innovative enterprise must generally make a broader range of investments in fixed plant and equipment and a deeper range of investments in administrative organization than would have to be undertaken by the optimizing firm. But in addition to, and generally independent of, the size of the innovative investment strategy at a point in time, high fixed costs will be incurred because of the duration of time required to develop productive resources until they result in products that are sufficiently high quality and low cost to generate returns. If the size of investments in physical capital tends to increase the fixed costs of an innovative strategy, so too does the duration of the investment in an organization of people who can engage in the collective and cumulative – or organizational -- learning that is the central characteristic of the innovation process (O'Sullivan 2000a).

The high fixed costs of an innovative strategy create the need for the enterprise to attain a high level of *utilization* of the productive resources that it has developed. As in the neoclassical theory of the optimizing firm, given the productive capabilities that it has developed, the innovative enterprise may experience increasing costs because of the problem of maintaining the productivity of variable inputs as it employs larger quantities of these inputs in the production process. But rather than, as in the case of the optimizing firm, taking increasing costs as a given constraint, the innovative enterprise will attempt to transform its access to high-quality productive resources at high levels of output. To do so, it invests in the *development* of that productive resource, the *utilization* of which as a variable input has become a source of increasing costs (see Lazonick 1991: ch. 3).

The development of the productive resource adds to the fixed costs of the innovative strategy, whereas previously this productive resource was utilized as a variable factor that could be purchased at the going factor price incrementally on the market as extra units of the input were needed to expand output. Having added to its fixed costs in order to overcome the constraint on enterprise expansion posed by increasing variable costs, the innovative enterprise is then under even more pressure to expand its share of the market in order to transform high fixed costs into low unit costs. As, through the development and utilization of productive resources, the enterprise succeeds in this transformation, it in effect “unbends” the U-shaped cost curve that the optimizing firm takes as given (see Figure 3). By shaping the cost curve in this way, the innovative enterprise creates the possibilities for gaining competitive advantage over its rivals (see Lazonick 1991: ch. 3 and 1993).

Hence the innovative enterprise is not constrained by market demand to produce at the profit-maximizing output where marginal cost equals marginal revenue because, over the long run, it is not subject to increasing costs. The innovative enterprise may be subject to increasing costs in the short run, but, by continually confronting and transforming those technological and market conditions that result in increasing costs, the innovative enterprise can generate high-quality products, the unit costs of which decline as it reaps larger and larger market shares. The innovative enterprise thus not only has differentiated itself from its competitors but also has gained a sustained competitive advantage that is reinforced as it expands its level of output. In contrast

to the neoclassical monopoly model that posits that an optimizing monopolist will choose to produce at a smaller volume of output and at higher prices than the aggregate of optimizing competitive firms in a particular industry, the innovative enterprise becomes dominant by transforming the industry cost structure and producing at a larger volume of output that it can sell at lower prices than the optimizing firms in the industry. By confronting and transforming technological conditions rather than accepting them as constraints on its activities, the innovative enterprise, that is, can outperform the "optimizing" firm in terms of both output and cost.

The ability of the innovative enterprise to achieve decreasing costs even as it produces larger volumes of output relative to the size of the industry's market means that the neoclassical "optimizing" rule of marginal cost equals marginal revenue is irrelevant to its output and pricing decisions. Constraining its level of output at a point in time is typically the presence in the industry of a small number of other innovative enterprises that compete among themselves for market share. Given the cost structure that it has put in place, the innovative enterprise can seek to increase its market share by offering buyers lower prices. But constraining such price reductions at a point in time is the need of the innovative enterprise to generate sufficient surplus revenues to invest in new technology, including the skills of workers and the building of an integrated organization to develop and utilize the new technology (such organizational integration may entail, for example, the remuneration of employees of the innovative enterprise at levels above and beyond those that their labor services would fetch on the open labor market) (Lazonick and O'Sullivan 2000). Such investments can enable the enterprise to maintain or extend its competitive advantage in a given market or transfer some of its productive capabilities to produce output for another market that can make use of these capabilities. Insofar as the enterprise undertakes an innovative strategy in this diversification process, it will have to complement its existing capabilities with investments in, and the development of, new capabilities, thus adding to the fixed costs that it must utilize to achieve low unit costs.

The developmental impact of the innovative enterprise, therefore, manifests itself in a larger volume of output that it can, if is so chooses, make available to users at lower prices than the optimizing firm. By raising its output and lowering prices, the innovative enterprise grows to be larger than the optimizing firm. Neoclassical industrial organization takes the outcome – the enterprise's relatively large size -- as its analytical starting point, thus avoiding the apparent need for a theory of the growth of the innovative enterprise. Neoclassical economists argue that, optimizing subject to given technological and market constraints, the "monopolistic" firm will choose to raise prices and restrict output. Thus they avoid asking whether the large corporations that they observe are, and will remain, innovative enterprises or optimizing firms.

Unlike the optimizing firm that is the microeconomic foundation of the neoclassical analysis of industrial organization, the innovative enterprise has an interest in lowering prices as part of a strategy to increase the extent of the market available to it, which in turn lowers unit costs further as the enterprise reaps economies of scale. The economies of scale are not given to the industry but reflect the innovative enterprise's ability to transform the high-fixed costs of its innovative investment strategy that in and of itself places the enterprise at a competitive *disadvantage* relative to the optimizing firm into the low unit costs that give it competitive *advantage*. Indeed, the

innovative enterprise has the potential of not only outperforming the optimizing firm in terms of product quantity and price but also generating sufficient surplus revenues to pay higher wages to employees and higher returns to other stakeholders such as suppliers and stockholders. The innovation process, that is, can overcome the "constrained-optimization" trade-offs between consumption and production in the allocation of resources and between capital and labor in the allocation of returns.

2. Transforming Transaction-Cost Theory

Notwithstanding its entrenched position in the economics textbooks and in the system of belief of conventional economics, there have been powerful attacks on the "monopoly model" as a foundation for evaluating the efficiency of the enterprise and welfare in the economics has been questioned. In Capitalism, Socialism, and Democracy, of course, Joseph Schumpeter (1960: 106) made his position clear:

> What we have got to accept is that [the large-scale enterprise] has come to be the most powerful engine of [economic] progress and in particular of the long-run expansion of total output not only in spite of, but to a considerable extent through, this strategy that looks so restrictive when viewed in the individual case and from the individual point of time. In this respect perfect competition is not only impossible but inferior, and has no title to being set up as a model of ideal efficiency.

Richard Nelson and Sidney Winter (1982: 39) have credited "the Schumpeterian view of capitalism as an engine of progressive change" with providing the fundamental inspiration for their evolutionary theory. But the most concerted attack on the "monopoly model" has been made by Oliver Williamson (1975, 1985, and 1996) as a basis for arguing against the American theory of antitrust that has the model as its foundation. Building on Ronald Coase's (1937) famous article, "The Nature of the Firm", Williamson has sought to explain why, in a "market economy," hierarchies rather than markets might organize economic activity. Unlike Coase, however, Williamson locates "transactions", and hence "transaction costs", not only in market exchange but also within the firm. Therefore, to assess the relative performance of markets and hierarchies in allocating resources, one must compare the transaction costs of the two different modes of economic organization. It is Williamson's inclusion of behavioral and cognitive conditions as central to the theory of the firm that marks his contribution as an important advance over theories of the firm that ignore the role of organization in determining the performance of the enterprise.

What is the relation between Williamson's transaction-cost theory and a theory of the innovative enterprise that can explain the transformation of technological conditions, as illustrated in Figure 3? To answer this question requires a brief summary of the Williamsonian theory.

Williamson (185: 8, 45) attributes "transaction costs" to a behavioral condition that, following Kenneth Arrow, he calls "opportunism" and a cognitive condition that, following Herbert Simon, he calls "bounded rationality". Williamson defines "opportunism" as a condition of "self-interest seeking with guile." "Opportunism," says Williamson (185: 47), "refers to the incomplete or distorted disclosure of

information, especially to calculated efforts to mislead, distort, disguise, obfuscate, or otherwise confuse." In organizing transactions, markets and hierarchies possess different capabilities for "attenuating opportunism", and hence for minimizing transaction costs. Market transactions provide a protection against opportunism because the market provides options for one party not to transact with another. In contrast, hierarchical transactions expose one party to the opportunism of another.

Yet such opportunism only becomes a problem in the presence of bounded rationality. In entering into transactions, economic actors have incomplete access to information and a limited ability to absorb that information to which they do have access. They make decisions that they intend to be rational – by which Williamson means to minimize costs – but they have a limited cognitive competence to do so. Bounded rationality is this condition of being "intendedly rational but only limitedly so" (Williamson 1985: 45). With unbounded rationality, economic actors would not be reliant on others for information. Indeed, absent limits to their cognitive competence, decision-makers would know the opportunistic propensities of other actors and could simply avoid entering into transactions with those known to be prone to "self-interest seeking with guile."

The critical phenomenon that links the condition of bounded rationality with the condition of opportunism is uncertainty that is both cognitive and behavioral. The possibility of unforeseen "disturbances" in the economic environment creates the need for "adaptive, sequential decision making", and markets and hierarchies "differ in their capacities to respond effectively to disturbances." But for the condition of bounded rationality, the changing environment would not create cognitive uncertainty and pose problems of adaptation, because "it would be feasible to develop a detailed strategy for crossing all possible bridges in advance" (Williamson 1985: 56-7).

The occurrence of these unforeseen disturbances creates opportunities for one party to a transaction to take advantage of the other. In the presence of parties to transactions who are looking for the opportunity to seek their own self-interest in deceitful, dishonest or guileful ways, cognitive uncertainty is transformed into behavioral uncertainty – that is "uncertainty of a strategic kind . . . attributable to opportunism." As Williamson (1985: 58-9) goes on to argue: "Behavioral uncertainty would not pose contractual problems if transactions were known to be free from exogenous disturbances, since then there would be no occasion to adapt and unilateral efforts to alter contracts could and presumably would be voided by the courts or other third party appeal."

So what does the interaction of bounded rationality and opportunism tell us about the choice between markets and hierarchies, and hence about the activities in which a firm will engage? Given the behavioral condition of opportunism and the cognitive condition of bounded rationality, individuals who want to minimize transaction costs should choose to organize their transactions through markets rather than hierarchies. Markets permit those entering into a contract to attenuate opportunism by switching to other parties, and to operate within the constraint of bounded rationality by engaging in adaptive, sequential decision-making.

Why then do firms exist and grow in a modern economy? The critical condition that, according to Williamson, favors hierarchies over markets is "asset specificity".

Williamson introduced asset specificity as a *deus ex machina* into his argument when it became apparent that the assumptions of opportunism and bounded rationality provided an explanation for why *markets, not hierarchies*, would organize transactions (compare Williamson 1975 and 1985). The problem that Williamson wanted to explain, however, was why, given the possibility of organizing transactions by markets, hierarchies – that is, business organizations – exist. As Williamson (1985: 56) himself puts it: "The absence of asset specificity [would] vitiate much of transaction cost economics."

Asset specificity is inherent in "transaction-specific durable assets", both human and physical, that cannot be deployed to alternative uses – that is, to other transactions -- without incurring a financial loss. Williamson distinguishes between *physical* asset specificity and *human* asset specificity. Physical asset specificity can exist because of what he calls "site specificity" – the physical immobility of invested resources that have been located in a particular place to be near a particular supplier or buyer – or because of "dedicated assets" – the special-purpose nature of capital goods (even if they can be easily moved), especially when the investments have been made to service a limited extent of the market (in the extreme, a particular buyer). Human asset specificity can exist because of the need for continuity ("learning by doing") or collectivism ("team configurations) in the development of human resources (Williamson 1985: 34, 55-6, 95-6, 104).

Generally, what imbues assets involved in any specific transaction, therefore, with "specificity" is the participation of particular parties, as investors, workers, suppliers, or buyers, in the transaction. "Faceless contracting," characteristic of market transactions, is, according to Williamson (1985: 62, also 69, 195), "supplanted by contracting in which the pairwise identity of the parties matters." As a result, transaction-specific assets cannot be reallocated to another use without a loss.

Therefore, to generate revenues from these assets, the party that has invested in them requires *continuity* in its ability to utilize them. In effect, asset-specificity is a form of Marshallian fixed costs that requires that the asset be utilized for a high "frequency" of transactions if these fixed costs are to be transformed into low unit costs (Williamson 1985: 52, 20, 72-3). But, in Williamson's framework, the *governance* of these transactions in the presence of asset specificity is critical to minimizing costs because, with bounded rationality, the participation of particular parties in transactions creates the possibility for opportunistic behavior. Bounded rationality means that the economic actor cannot foresee future "disturbances", while opportunism means that other parties to the transactions will deliberately take advantage of these disturbances to promote their own self-interests.

Non-market transaction relations exist, therefore, because of asset specificity, and, in the presence of bounded rationality and opportunism, the optimal governance of these relations must seek to minimize transaction costs. According to Williamson (1985: 387-8): "Transactions, which differ in their attributes, are assigned to governance structures, which differ in their organizational costs and competencies, so as to effect a discriminating (mainly transaction cost economizing) match." Specifically, he hypothesizes that "market contracting gives way to bilateral contracting, which in turn is supplanted by unified contracting (internal organization) as asset specificity progressively deepens" (Williamson 1985: 78, see also 42).

But, when confronted with asset specificity, opportunism, and bounded rationality, why does internal organization outperform market contracting? According to Williamson (1985: 60, see also 79, 151, 204), the economic virtues of internal organization lie in its relative ability to "work things out":

> Whenever assets are specific in nontrivial degree, increasing the degree of uncertainty makes it more imperative that the parties devise a machinery to "work things out" – since contractual gaps will be larger and the occasions for sequential adaptations will increase in number and importance as the degree of uncertainty increases.

These internal governance structures that "work things out" add to the fixed costs of internal organization, and thus require that these costs be spread over larger numbers of transactions (that presumably result in more units of revenue-generating output) to obtain lower *unit* governance costs (Williamson 1985: 60, see also 72-3). As the frequency of transactions organized by a particular governance structure increases, economies of "scale" and "scope" appear. But these economies are not the result of spreading out the costs of indivisible technology and/or the fixed entrepreneurial factor as the post-Marshallian economists assumed. Rather, in the face of opportunism and bounded rationality Williamson contends that these economies of scale and scope are the result of economizing on the combined costs of asset-specific investments and the governance structures to "work things out".

The main virtue of Williamson's transaction-cost theory of the firm is that, in contrast to the conventional theory of the firm, he focuses on relationships among people who have specified cognitive and behavioral characteristics. The main problem with his theory is that he employs the constrained-optimization methodology to analyze the organizational and performance implications of bounded rationality, opportunism, and asset specificity. That is, Williamson takes these cognitive, behavioral, and technological conditions as given, and asks how those who control corporate resources optimize subject to these conditions as constraints. Hence Williamson's perspective contains no theory of innovative strategy -- that is, a strategy for confronting and transforming these constraining conditions (see Lazonick 1991: chs. 6 and 7). Indeed, Williamson specifically denies the importance of strategic corporate behavior in the evolution of the US economy in the twentieth century (to which his transaction-cost analysis purportedly applies) -- and in any case views corporate strategy as inherently predatory behavior.[1]

[1] To quote Williamson (1985: 128): "Suffice it to observe here that strategic behavior has relevance in dominant firm or tightly oligopolistic industries. Since most of the organizational change reported [here] occurred in nondominant firm industries, appeal to strategic considerations is obviously of limited assistance in explaining the reorganization of American industry over the past 150 years." This despite numerous references by Williamson's to the work of Alfred D. Chandler, Jr., (1962 and 1977). For Williamson (1985: 373, 376-80), strategic behavior represents predatory attempts by corporations that already have dominant market power to bankrupt existing rivals and create barriers to entry against potential competitors. In Williamson's (1985: 128) words, "Strategic behavior has reference to efforts by dominant firms to take up and maintain advance or preemptive positions and/or to respond punitively to rivals." For a critique of Williamson's use of Chandler, see Lazonick (1991: ch. 7).

Despite his invocation of "asset specificity" as a central theoretical concept, Williamson's analysis does not address the issue of how productive resources are developed within an enterprise. As Williamson (1985: 143) recognizes explicitly:

> The introduction of innovation plainly complicates the earlier-described assignment of transactions to markets and hierarchies based entirely on an examination of their asset specificity qualities. Indeed, the study of economic organization in a regime of rapid innovation poses much more difficult issues than those addressed here.

So they do. By portraying corporate strategy as solely predatory behavior and the organization of transactions by "hierarchies" as a second-best solution to their organization by markets, Williamson's transaction-cost theory explains the modern corporate enterprise as a response to what economists call "market failure". The cause of this market failure is "asset specificity" – a technological condition that is given to the firm. Also given to the firm in Williamson's transaction-cost theory are bounded rationality and opportunism. Opportunism is inherent in "human nature as we know it" (Williamson 1985: 80), while bounded rationality is given by the limited capacity of individuals to absorb information. From the Williamsonian perspective, markets create "high-powered" incentives for participants in the economy because the returns that participants can reap from the application of their efforts are not constrained by the need to share these returns with any other participants on a continuing basis (Williamson 1985: 132). The modern business corporation, in contrast, offers only "low-powered incentives", as exemplified by the payment of salaries that segment remuneration from productive effort (Williamson 1985: 144-5). In the presence of asset specificity, and given the inherent limits on cognitive competence and the inherent human pursuit of self-interest with guile, for the Williamsonian firm "to work things out" means to optimize subject to these technological, cognitive, and behavioral constraints.

In sharp contrast, for a theory of the innovative enterprise, "to work things out" is about how, through an investment strategy and an organizational structure, the enterprise transforms these technological, market, cognitive, and behavioral conditions so that they support the generation of higher quality, lower cost products. From this perspective, the modern corporation can be viewed as a manifestation of "organizational success" rather than as a response to "market failure" (Lazonick 1991: chs, 2 and 6). Asset specificity" results from an enterprise investment strategy to develop and utilize productive resources. The challenge for the innovative enterprise is then to transform these investments in physical and human resources into higher quality, lower cost products than had previously been available. Such an innovative transformation requires organizational learning.

The critical determinant of the success of the innovative strategy is what Mary O'Sullivan and I have called "organizational integration" -- a set of social relations that provides participants in a specialized division of labor with the incentives to cooperate in contributing their skills and efforts toward the achievement of common goals (Lazonick and O'Sullivan 1996, 1997a, and 2000). Organizational integration can be strategic, functional, and hierarchical, and the three types of organizational

integration may interact dynamically in the innovation process (see Figure 4) (see, e.g., Lazonick 1998).

As such, organizational integration provides an essential social condition for an enterprise to engage in and make use of organizational learning – that is, learning that is *collective* and *cumulative* (O'Sullivan 2000a). Organizational learning is collective because it depends on the development of the skills and application of the efforts of an array of people in a specialized division of labor. Organizational learning is cumulative because the extent of the collective learning required for innovation makes it necessary to cumulate learning within an integrated organization. Moreover, as O'Sullivan (2000a and 2000b) argues, because the innovation process is not only cumulative and collective but also *uncertain*, the innovative enterprise must also be *strategic*, and hence for a theory of innovative enterprise the abilities and incentives of those who exercise *strategic control* are critical determinants of the types of specialized capabilities in which the enterprise invests to generate organizational learning and the incentives that are used to integrate the people bearing these specialized capabilities into the organizational learning process.

From the perspective of the innovative enterprise, the essence of organizational integration is that, by making possible organizational learning, it transforms "bounded rationality" and "opportunism" so that the cognitive and behavioral characteristics of participants in the enterprise contribute to the innovation process. Organizational integration can transform “individual rationality” into “collective rationality”,[2] and thus unbounds the cognitive abilities available to the enterprise. Organizational integration can transform opportunism, and indeed transform “human nature as [Oliver Williamson] know[s] it”, by both generating and sharing the gains of the innovation process in ways that create “high-powered” incentives – employment security, career opportunities, collective purpose -- for the people on whom the enterprise relies to develop and utilize productive resources.[3]

[2] The seminal work on the role of the executive in integrating the individual into the organization is Barnard (1938), whose classic work basically focused on organizations can transform opportunism into cooperation.

[3] For an elaboration of this critical point, see the discussion in Lazonick (1991: 226-7) that concludes the chapter entitled, "The Innovative Business Organization and Transaction Cost Theory." In a more recent article, Sumantra Ghoshal and Peter Moran (1996) have critiqued Williamson’s notion of opportunism by arguing that, while markets foster self-aggrandizement, individualism, and competition, organizations foster trust, collectivism, and cooperation. They chastise scholars of strategy and organization who are "increasingly embracing TCE -- by proposing incremental modifications, like the inclusion of variables such as 'trust'…, which their research reveals to be important -- instead of challenging it on the grounds that such findings falsify its basic tenets" (Ghoshal and Moran 1996: 42). While Ghoshal and Moran make no reference to my extended critique of Williamson's theory contained in Business Organization and the Myth of the Market Economy, the final paragraph of their paper comes to very similar conclusions to mine concerning the significance of this integrative role of organization for the study of the economy: "We believe that the time has come for these scholars to stop building on theories of organizations that persist with the myth of the market economy and to start afresh by developing an alternative theory that acknowledges the reality of the organizational economy" (Ghoshal and Moran 1996: 42).

The essence of the modern corporation as an innovative enterprise is that, through its investment strategy, it relies on “asset specificity” as a developmental source of competitive advantage, and that, through its organizational structure, it unbounds “rationality” and reduces “opportunism” -- or even transforms opportunists into cooperative members of a learning organization (see Figure 5). It is only when one has developed a viable explanation of the social foundations of innovative enterprise in the modern corporation that one can begin to analyze how, within an existing business enterprise, organizational success turns to organizational failure. From the perspective of the theory of innovative enterprise it can be posited that organizational integration dissolves into organizational segmentation as participants in the enterprise, and particularly, one might argue, those at the top, become prisoners of bounded rationality, act opportunistically, and seek to use accumulated assets as if they were general sources of revenues rather than the historical accumulations of organizational learning that provide the indispensable foundations for sustained competitive advantage.

3. Dynamic Capabilities in a Theory of Innovative Enterprise

Of the attempts that have been made to implant the analysis of innovation in transaction-cost theory, the most relevant for our purposes is that by Richard Langlois and Paul Robertson (1995) to construct what they call "a dynamic theory of business institutions". As Langlois and Robertson (1995: 1) put it at the beginning of their book, Firms, Markets, and Economic Change: "One way to understand our project in this volume is to see it as an attempt to carry evolutionary economics more forcefully into the traditional bailiwicks of transaction-cost theory by presenting and applying an evolutionary theory of economic capabilities." Focusing on the Coasian-Williamsonian question of why two or more distinct vertically related activities that could be performed by two or more distinct firms might be integrated into one firm, Langlois and Robertson invoke a process that they call "systemic innovation".

They argue that "dynamic transaction costs" solves a coordination problem in the presence of the need for a systemic change. Systemic innovation requires the simultaneous change in a number of stages of production at once, and the individual actors who need to be involved in this change would not be able or willing to make the change without coordination. As Langlois and Robertson (1995: 4) state:

> The firm overcomes the 'dynamic' transaction costs of economic change. It is in this sense that we may say the firm solves a coordination problem: it enables complementary input-holders to agree on the basic nature of the system of production and distribution of the product. It provides the structure in a system of structured uncertainty.

More specifically, dynamic transaction costs are, according to Langlois and Robertson (1995: 35), "the costs of persuading, negotiating, coordinating, and teaching outside suppliers."

On the surface it may appear that Langlois and Robertson's "dynamic transaction cost" theory is very similar to the theory of innovative enterprise that I have set out. In fact, they do not provide a theory of the relation between organizational strategy and organizational learning. Yet this relation is, I would argue, at the core of a theory

of innovative enterprise. As a result, Langlois and Robertson put forth a dubious explanation of organizational integration -- in this case, specifically vertical integration -- as a relation among previously independent firms that exogenous technology imposes on participants in a specialized division of labor

The first problem is that Langlois and Robertson introduce the notion of "systemic innovation" in the same *deus ex machina* manner that, as I have already shown, Oliver Williamson uses the notion of "asset specificity." They provide no theoretical perspective of how, when, and why systemic innovation appears. Unlike Williamson, however, Langlois and Robertson purport to be analyzing the "innovation process", thus rendering transaction-cost analysis "dynamic". Yet, for them, the appearance of a systemic innovation in a particular industry simply imposes an "innovative strategy" on firms that these firms are compelled to adopt if they want to remain competitive participants in that industry.

The second problem is that, given the purported necessity for firms to adopt the systemic innovation, there is no learning in the Langlois-Robertson theory that goes beyond a core firm "teaching" its outside suppliers that they can no longer remain independent firms but must join the vertically integrated firm. The assumption is that, given a choice, firms will want to remain independent of one another. As Langlois and Foss (1999: 210) have recently written, "Langlois and Robertson (1995) build a broad theory of industrial dynamics around [the] idea" that

> much vertical integration occurs not when firms venture into new areas of similar capabilities but when firms are dragged, kicking and screaming, as it were, into complementary but dissimilar activities because only in that way can they bring about a profitable reconfiguration of production of distribution.

The appearance of a systemic innovation leads a firm that plays the role of systems integrator to convince independent suppliers that they must give up their independence. The implicit assumption is that when such a change in vertical relations occurs, the presumed benefits of systemic innovation will be to some extent offset by the "dynamic transaction costs" of overcoming the resistance of highly individualistic firms.

The desire to remain independent is a *possible* behavioral characteristic of the "firm", but, in an age of mergers and acquisitions in which a firm's principles can are often positioning themselves to be bought out (see Carpenter and Lazonick 2000), it is a characteristic that has to demonstrated rather than assumed. Moreover, there are large literatures on supplier relations and strategic alliances that demonstrate that innovation can occur through cooperation across legally independent firms as well as within a firm as a distinct legal entity (see Figure 6) (see, e.g., Sako 1998 and Doz 1996). Indeed, for a theory of innovative enterprise, the biggest problem with the Langlois-Robertson perspective is that they treat the firm as if it were a unitary actor -- that is, an individual -- and hence do not put forth any framework or agenda for exploring the organization of individuals who occupy positions within the specialized divisions of labor within firms. The lack of such a perspective is problematic for an organization made up of only two people (think of a married couple), never mind a business enterprise with tens of thousands of employees. The willingness to see the firm as an individual reflects an individualistic bias in the analysis of "industrial

dynamics" that avoids such critical issues as a) the structure of strategic control within an enterprise and the process of strategic decision-making, b) the transformation of individual learning into organizational learning in the innovation process, and c) the transformation of organizational learning into higher quality, lower cost products, thus transforming the high fixed costs of an innovative strategy into the basis for competitive advantage (see Figures 2 and 3) (Lazonick and O'Sullivan 2000). Indeed, I would argue that an understanding of how an innovative enterprise develops and utilizes productive resources across firms as distinct units of financial control will depend on the evolution of these capabilities within a dominant firm or firms within this network of relations (see Figure 6 for a schematic representation of such co-evolution).

Within the strategic management literature, there were during the 1980s and 1990s, a number of contributions, many of them by people trained as economists, to the roles of strategy and learning in innovative enterprises.[4] The most developed statement of this perspective to date is that of David Teece, Gary Pisano, and Amy Shuen (1997; see also Teece and Pisano 1994). Teece at al. (1997: 509) contrast the dynamic capabilities perspective with a dominant perspective in the management literature on "strategizing" that entails "engaging in business conduct that keeps competitors off balance, raises rival's costs, and excludes new entrants" and that conceives of "rents" as "flow[ing] from privileged product market positions". Teece at al. (1997: 509-10) argue that

> the [dynamic capabilities] framework suggests that private wealth creation in regimes of rapid technological change depends in large measure on honing internal technological, organizational, and managerial processes inside the firm. In short, identifying new opportunities and organizing efficiently and effectively to embrace them are generally more fundamental to private wealth creation that is strategizing [against existing and potential rivals].

They see the distinctiveness of firms as opposed to markets as residing in the capabilities in "organizing and getting things done" in ways that "cannot be accomplished merely by using the price system to coordinate activity. The very essence of capabilities/competences is that they cannot be readily assembled through markets" (Teece et al. 1997: 517). Of the three elements of their framework – positions, processes, and paths – it is organizational processes that define their approach:

> We define dynamic capabilities as the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments. Dynamic capabilities thus reflect an organization's ability to achieve new and innovative forms of competitive advantage, *given path dependencies and market positions*. (Teece et al. 1997: 516, my emphasis)

Or, as Teece et al. (1997: 524) state later in the paper: "The essence of a firm's competence and dynamic capabilities is presented here as being resident in the firm's

[4] See Lazonick and O'Sullivan (2000: Parts 5 and 6) for an extended review and evaluation of this literature from the perspective of the theory of innovative enterprise that is being proposed here.

organizational; processes, that are in turn shaped by the firm's assets (positions) and its evolutionary path." "Organizational processes," they argue, "often display high levels of coherence, and when they do, replication may be difficult because it requires systemic changes throughout the organization and also among interorganizational linkages, which may be hard to effectuate" (Teece et al.: 1997: 519). They liken "coherence" to Nelson and Winter's (1982: ch. 5) notion of "routines", with the caveat that "the routines concept is a little too amorphous to properly capture the congruence among processes and between processes and incentives that we have in mind" (Teece et al. 1997: 520). They stress the importance of learning processes that are "intrinsically social and collective" and argue that the "concept of dynamic capabilities as a coordinative management process opens the door to the potential for interorganizational learning" (Teece et al. 1997: 520).

Whereas *organizational processes* transform the capabilities of the firm over time, *asset positions* determine the firm's "competitive advantage at any point in time" (Teece et al. 1997: 521). Teece et al. (1997: 521-2) describe asset positions under the separate headings of "technological", "complementary", "financial", "reputational", "structural", "institutional", "market structure", and "organizational" – that is, they include under the label "asset positions" virtually any descriptive dimension of the firm as an organizational entity at any point in time. And while organizational processes can transform these characteristics of the firm, and hence its competitive capabilities over time, the firm's evolutionary path – its particular history – constrains the types of industrial activities in which a firm can be competitive. Teece et al. (1997: 523-4) stress that, although the firm's technological paths are constrained by its history, or "path dependency", it nevertheless has the capacity to take advantage of technological opportunities created by "new scientific breakthroughs". The technological opportunities created by these breakthroughs, moreover, "may not be completely exogenous to industry, not only because some firms have the capacity to engage in or at least support basic research, but also because technological opportunities are often fed by innovative activity itself" (Teece et al. 1997: 523).

Nevertheless, Teece et al. (1997: 524). argue, the firm's "evolutionary path, despite managerial hubris that might suggest otherwise, is often rather narrow." Strategic change is generally incremental, as new capabilities have to build cumulatively on the capabilities previously put in place. From the dynamic capabilities perspective, "strategy involves choosing among and committing to long-term paths or trajectories of competence development" (Teece et al. 1997: 529). Teece, Pisano, and Shuen say nothing specific about the locus of strategic control that ensures that the enterprise seeks to grow using the collective processes and along the cumulative paths that are the foundations of its distinctive competitive success. That is they have nothing to say about who within the organization's hierarchical and functional division of labor should make strategic decisions to maintain the integration of strategy and learning and thereby sustain the innovation process. Nor do they have anything to say about how returns should be allocated to ensure the sustained finance – what O'Sullivan and I have called "financial commitment" (Lazonick and O'Sullivan 1997b and 1997c) -- to support the process of organizational learning. As a result, the dynamic capabilities approach has thus far provided no insights into the conditions under which strategic control might become segmented from the organizational learning process that are central to the development of an enterprise's core competencies, or

how, under such circumstances, the structure of strategic control can be transformed to effect the reintegration of strategy and learning.

Nor has the dynamic capabilities approach as of yet provided guidance for understanding how an enterprise can and should respond strategically when it is confronted by new competitors, supported by different institutional environments, whose dynamic capabilities render the enterprise's processes and paths, and hence asset positions, obsolete. But the "dynamic capabilities" approach is an emergent perspective, and one that is, in its general orientation, consistent with the theory of innovative enterprise that I have proposed in this paper.

4. Social Conditions of Innovative Enterprise

At the conclusion of their paper, Teece, Pisano and Shuen (1997: 530) call for further theoretical and empirical work -- an "ambitious research agenda" -- to help

> understand how firms get to be good, how they sometimes stay that way, why and how they improve, and why they sometimes decline. Researchers in the field of strategy need to join forces with researchers in the fields of innovation, manufacturing, and organizational behavior and business history if they are to unlock the riddles that lie behind corporate as well as national competitive advantage. There could hardly be a more ambitious research agenda in the social sciences today.

To undertake such a research agenda requires a theoretical perspective on the social process that enables business enterprises to transform industrial conditions in different times and places. If one accepts that business enterprises are social structures that are in turn embedded in broader (typically national) institutional environments, the theoretical perspective on innovative enterprise must put forth a model of the relations among *industrial conditions*, *organizational conditions*, and *institutional conditions* in the process of that transforms technologies and markets to generate products that are higher quality and/or lower cost than those that had previously existed (see Figure 7).

I shall conclude with a description of the basic structure of a theoretical perspective on the social conditions of innovative enterprise (referred to hereafter as the SCIE perspective). The SCIE perspective derives from syntheses of large bodies of existing comparative-historical research on the industrial, organizational, and institutional foundations of economic development in the advanced economies over the course of the twentieth century (see Lazonick and O'Sullivan 1996, 1997a, 1997b, 1997c, and 2000; Lazonick 1998; O'Sullivan 2000b; Lazonick 2001).

Central to the SCIE perspective is the specification of the key characteristics of the industrial, organizational, and institutional conditions that can promote or constrain the innovation process. As illustrated in Figure 7, the key characteristics are:

- industrial conditions: *technological*, *market*, and *competitive*,
- organizational conditions: *cognitive*, *behavioral*, and *strategic*,
- institutional conditions: *employment*, *financial*, and *regulatory*.

As a product of prior empirical research, the SCIE perspective provides a tool for further, generally more pointed and detailed, empirical research into the social conditions of innovative enterprise. As an iterative intellectual process for understanding complex and ever-changing economic systems, the empirical knowledge that we gain using the SCIE perspective as a theoretical framework enables the elaboration, amendment, and refinement of the perspective on an ongoing basis.

To understand how industrial, organizational, and institutional conditions, acting as elements of a social system, influence the innovation process, we must also specify the key characteristics of that process. Drawing on the literature on innovation, the innovation process can be characterized as *cumulative*, *collective*, and *uncertain* (O'Sullivan 2000a). The innovation process is cumulative because the possibilities for transforming technological and market conditions today and tomorrow depend on the development of those conditions in the past. Hence, an innovative enterprise must engage in cumulative learning. The innovation process is collective because the transformation of technological and market conditions requires the integration of large numbers of people with specialized knowledge and skills so that they engage in cooperative interaction to develop and utilize productive resources. Hence, an innovative enterprise must engage in collective learning. The innovation process is uncertain because the cumulative and collective processes that can transform technological and market conditions to generate higher quality, lower cost products are unknown at the time at which commitments of resources to these processes are made. Hence, an innovative enterprise must be strategic in how it engages in cumulative and collective learning.

A theory of innovative enterprise must comprehend the implications of an innovation process that is cumulative, collective, and uncertain for the abilities and incentives of business enterprises to transform the technological and market, and hence competitive, conditions that characterize an industry at a point in time. The abilities and incentives of business enterprises to transform these industrial conditions to generate innovation in turn depend on the "social conditions of innovative enterprise" as determined by the interaction of organizational and institutional conditions in the innovation process.

Industrial conditions:

Technological conditions refer to the productive capabilities, embodied in both human and physical capital, that characterize an industry (or an enterprise within an industry, depending on the unit of analysis) at a point in time. Market conditions refer to the existing demand (in terms of quantity, quality, and price) for an industry's products and the existing supply of factors of production (in terms of quantity, quality, and price) in the economy. Competitive conditions refer to the differential ability (measured in terms of both productivity and cost) of enterprises in an industry (or the same industries in different institutional environments) to transform productive resources into revenue-generating products.

The technological and market conditions that characterize an enterprise at a point in time constrain the ability and incentive of that enterprise to develop and utilize productive resources over time. Innovation entails the transformation of existing

technological and/or market conditions to generate higher quality and/or lower cost products. The success of an enterprise in transforming these technological and market conditions in turn transforms the competitive conditions facing other enterprises in the industry. These new competitive conditions may or may not induce an innovative response from these rivals. Challenged by an innovative enterprise, the competitive response of another enterprise may entail a strategy either to *adapt* on the basis of the pre-existing technological and market conditions or to *innovate* by itself seeking to transform these conditions to generate higher quality, lower cost products. The competitive viability of an adaptive response will itself be dependent on the relative success of the innovative competitor in transforming pre-existing technological and market conditions to generate higher quality, lower cost products (Lazonick 1991: ch. 3).

Organizational conditions:

Cognitive conditions refer to the cumulated knowledge and available skill base on which at any point in time an enterprise can expect to develop and utilize its productive resources. Behavioral conditions refer to the set of incentives existing at any point in time that can motivate participants in the enterprise to use their knowledge and skill to develop and utilize productive resources. Strategic conditions refer to the structure of control within the enterprise at a point in time over the allocation of financial, physical, and human resources. Embodying these organizational conditions within the enterprise is a hierarchical and functional division of labor, which is itself influenced by the combination of industrial and institutional conditions in which the enterprise has evolved.

Strategic conditions determine whether an enterprise responds to changes in competitive conditions innovatively or adaptively. An enterprise's strategy is influenced by the cognitive conditions and behavioral conditions on the basis of which those who exercise strategic control in the enterprise can seek to transform technological and market conditions, often in response to changes in competitive conditions. The implementation of an innovative strategy to transform technological and market conditions entails strategic choices concerning a) whose knowledge and skill within the organization's hierarchical and functional division of labor will be developed and utilized, and b) what incentives will be offered to these different participants in the specialized division of labor to motivate them to cooperate in the pursuit of enterprise goals. Hence, the process of transforming industrial conditions generally entails the transformation of cognitive and behavioral conditions, with the types of organizational transformations that take place depending on the structure of strategic control within the enterprise. Cognitive, behavioral, and strategic conditions do not evolve independently of one another, but rather as conditions within an organizational system that seeks to develop and utilize productive resources in particular industrial activities.

Institutional conditions:

Financial conditions determine the ways in which a society allocates financial resources to states, enterprises, and individuals for investment and consumption as well as the ways in which that society distributes financial returns to the holders of various forms of financial claims. Employment conditions determine how a society

develops the capabilities of its present and future labor forces (and hence include education, research, and training systems) as well as how it seeks to influence (for example, through government spending and union activity) the availability of employment and the conditions of work and remuneration. Regulatory conditions determine how a society assigns rights and responsibilities to different groups of people over the management of society's productive resources, including human resources, and how it imposes restrictions on the development and utilization of these resources. As in the case of organizational conditions, financial, employment, and regulatory conditions do not evolve independently of one another but rather as conditions within an institutional system that seeks to develop and utilize an economy's productive resources.

Of particular importance for understanding the relation between a society's regulatory institutions and the performance of a modern economy dominated by corporate enterprises are the prevailing rights, responsibilities, and restrictions in the society over the management of *corporate* resources. A fundamental hypothesis that derives from the SCIE perspective is that institutional, organizational, and industrial conditions interact historically to determine a unique set of rights, responsibilities, and restrictions that characterize a particular economy and society in a particular era. This perspective hypothesizes that the historical emergence of institutional conditions related to finance, employment, and regulation reflect the changing requirements of business enterprises (and especially corporate enterprises in a society in which they dominate business activity) for the development and utilization of productive resources.

Over time these financial, employment, and regulatory practices become institutionalized in laws and norms as well as the practices of related non-business organizations that play important roles in administering and undertaking the financial, employment, and regulatory functions. Insofar as they derive from the requirements of business organizations to develop and utilize productive resources, these institutions become "embedded" in the financial, employment, and regulatory practices of these business organizations themselves.[5] The SCIE perspective argues that, at a point in time, these social conditions determine the types of industrial transformations, and hence the type of industrial innovations, that can occur in the economy. Over time, however, the transformation of certain dimensions of these institutional and organizational conditions -- in effect transformations of what may be called "the political economy" -- can open up new possibilities for innovative activity.

Social conditions of innovative enterprise:

How then within this theoretical framework can we characterize the social conditions of innovative enterprise? From a characterization of the innovation process as cumulative, collective, and uncertain combined with a comparative-historical analysis

[5] The SCIE perspective has relevance for related work in economic sociology and institutional economics, the consideration of which is beyond the scope of this entry. See Granovetter (1985) for the notion that the "embeddedness" of social relations constrains self-interested behavior and collective institutions; and North (1990) for a perspective on the relation between institutions and organizations that focuses on the creation of "efficient markets" rather than, as we do here, "innovative enterprises" as the foundation for superior economic performance.

of successful economic development in the twentieth century, we can identify three social conditions of innovative enterprise: *financial commitment, organizational integration, and strategic control*. The existence and forms of these social conditions of innovative enterprise reflect prevailing financial, employment, and regulatory conditions that are embedded in prevailing cognitive, behavioral, and strategic conditions.

Financial commitment is the social condition that allocates financial resources to sustain the process that develops and utilizes productive resources until the resultant products can generate financial returns. As a social condition for innovative enterprise, the need for financial commitment derives directly from the cumulative character of the innovation process -- that is from the need for learning. For an enterprise or economy that has accumulated capabilities, financial claims can take on an existence that, for a time at least, are independent of the need to reproduce or augment those capabilities. But, for innovation to occur within an enterprise or economy, a basic social condition is financial commitment from some source for a sufficient period of time to generate returns. A theory of innovative enterprise must show how, given the financial requirements of the transformation of technology and markets in particular industrial activities, institutions and organizations combine to provide the requisite financial commitment.

Organizational integration is the social condition that creates incentives for participants in the hierarchical and functional division of labor to apply their skills and efforts to engage in interactive learning in pursuit of organizational goals. As a social condition for innovative enterprise, the need for organizational integration derives directly from the collective character of the innovation process. Hence, a theory of innovative enterprise must show how, given the collective character of the transformation of technology and markets in particular industrial activities, institutions and organizations combine to create the necessary incentives for those who must engage in interactive learning.

Strategic control is the social condition that enables people within an enterprise who have access to financial commitment and who influence organizational integration to allocate resources in ways that can transform technologies and markets to generate innovation. As a social condition for innovative enterprise, the need for strategic control derives directly from the uncertain character of the innovation process. Hence, a theory of innovative enterprise must show how, given the uncertain character of the transformation of technology and markets in particular industrial activities, control over financial commitment and organizational integration rests with those people within the enterprise who, as strategic decision-makers, have a willingness and ability to use that control to attempt innovative transformations of technologies and markets.

The SCIE perspective posits a dynamic historical relation between organizations and institutions. One can in principle treat the business enterprise as an independent social entity in analyzing the social conditions of innovative enterprise. Such an analysis entails an identification of the structure of strategic learning within the enterprise and its relations to the sources of financial commitment and the modes of organizational integration. In effect, the financial, employment, and regulatory arrangements that characterize the enterprise itself (rather than the wider society in

which it is embedded) would constitute its "institutional conditions", while, operating within these institutional conditions, the knowledge base, structure of incentives, and strategic orientations of the enterprise would constitute its "organizational conditions." To treat the enterprise as an independent social entity, however, would run the risk of ignoring how the institutional environment that extends beyond the enterprise proscribes and enables it to acquire and retain certain types of knowledge bases, to structure employment incentives for participants, and to consider strategic alternatives. That is, the evolution of the institutional environment in which an enterprise is embedded, as distinct from the "institutional conditions" that have evolved historically within the enterprise itself, may have a significant impact on the social conditions of innovative enterprise as experienced by the enterprise. Moreover, insofar as innovative enterprises are able to reshape the conditions of strategic learning, financial commitment, and organizational integration in ways that are in conflict with prevailing institutional norms in the wider society, these new organizational conditions may over time encourage the reform of institutional conditions. Thus, the SCIE perspective seeks to understand the dynamic interaction between the organizational conditions of business enterprises and the institutional environments in which they operate, and the relation of these social conditions of innovative enterprise to the transformation of technological and market, and hence competitive, conditions in different industrial activities.

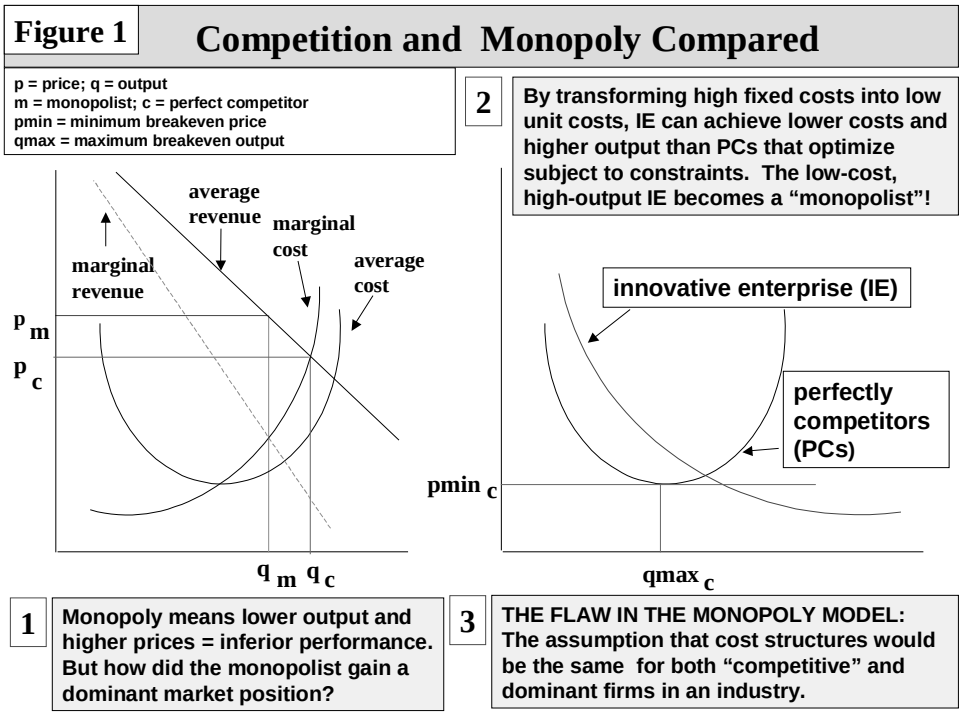
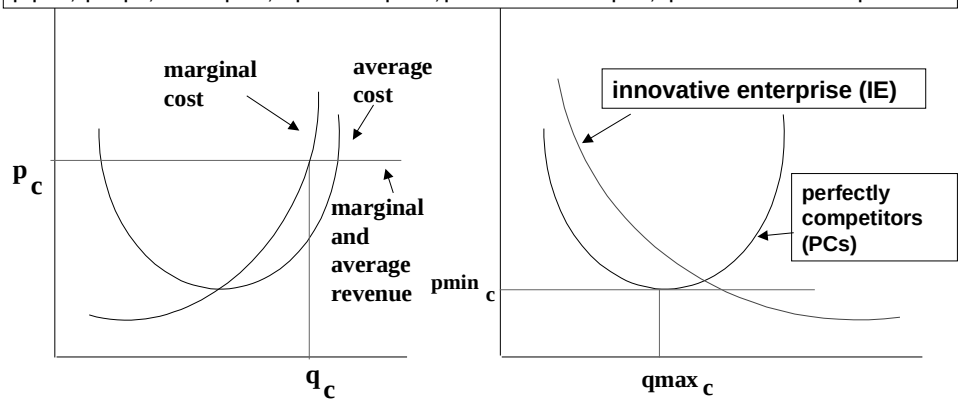


Figure 2

Transforming the Conventional Theory of the Firm

- Technological and market conditions given by cost and revenue functions.
- The "good manager" optimizes subject to technological and market constraints.

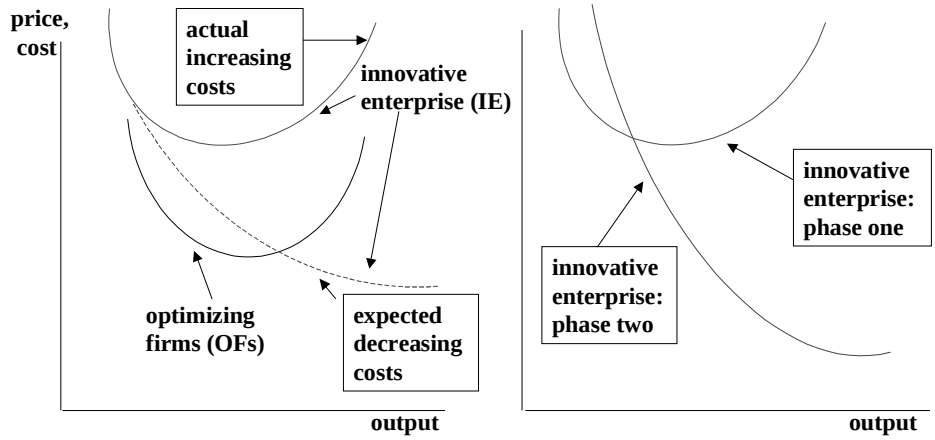
p=price; q=output; m=monopolist; c=perfect competitor; pmin=min. breakeven price; qmax=max.breakeven output



- The innovative enterprise transforms the technological and market conditions it faces to generate higher quality, lower cost products.
- There is no "optimal" output. There is no "optimal" price.

Figure 3

Industrial Transformation: Technology, Markets and Innovative Enterprise

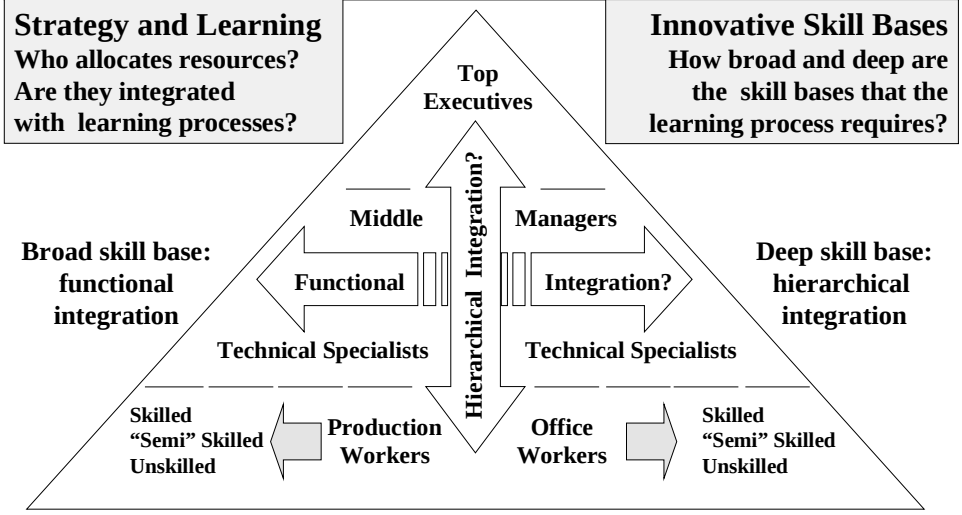


Through high fixed-cost strategy , IE expects to outcompete OFs. But, in period one, IE's strategy only results in high unit costs, and IE remains at a competitive disadvantage.

By internalizing variable factor creating increasing costs, IE incurs even higher fixed costs but the investment enables it to "unbend" the U-shaped cost curve.

Figure 4

Organizational Conditions: Integration, Learning, and Innovation



Research agenda: how do innovative skill bases vary in breadth and depth across nations, industries, enterprises within industries and nations, and over time?

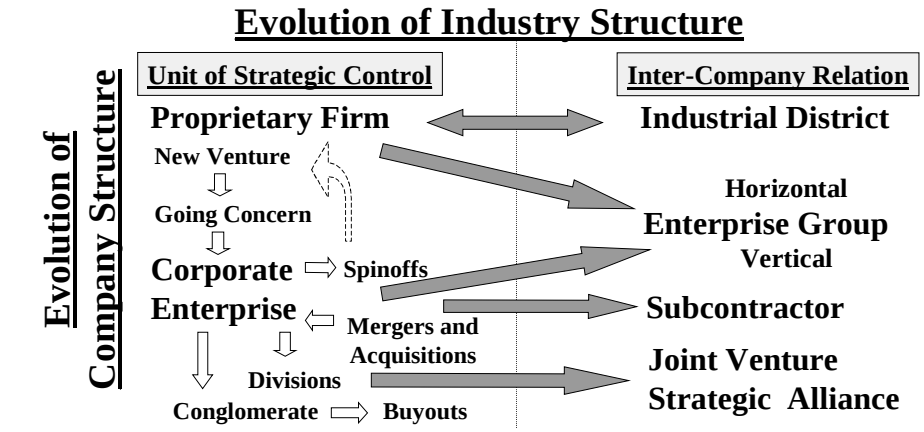
Figure 5

Innovative Enterprise or Optimizing Firm? The Transformation of Transaction-Cost Theory

Transaction-Cost Theory		Theory of Innovative Enterprise
Given Constraints		***Innovative Transformations***
Asset Specificity (Industrial)	⇒	Enterprise Investment Strategy Develops "Specific Assets"
Bounded Rationality (Cognitive)	⇒	Organizational Learning Collectivizes "Rationality"
Opportunism (Behavioral)	⇒	Organizational Incentives Overcome "Opportunism"

Figure 6

Organizational Conditions: Evolution of Company and Industry Structures

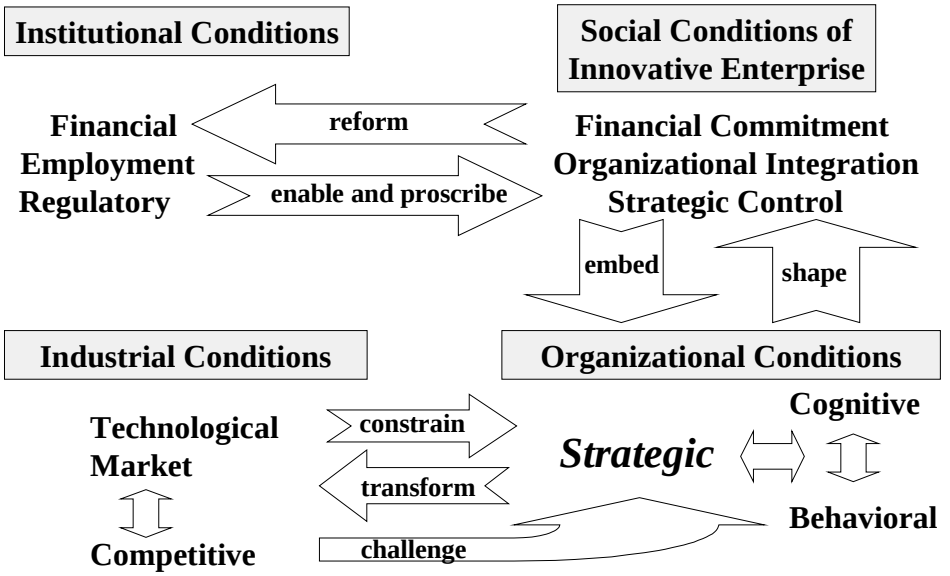


Strategy, Organization, and Structural Change

- How do organizational conditions and industrial conditions interact in the evolution of company and industry structure?
- How do company structure and industry structure interact in determining the evolution of organizational conditions?

Figure 7

Industrial, Organizational, and Institutional Conditions in the Innovation Process



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