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Corporate Governance, Innovative Enterprise, and Economic Development

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Abstract

The notion that good corporate governance means maximizing shareholder value derives from the neoclassical theory of the market economy. I explain why this perspective is highly problematic for understanding the operation and performance of the business corporation and hence the institutions that, for the sake of economic development, should govern it. The main problem is that the market-economy perspective cannot comprehend the process of innovation, including the role of the business corporation. I construct a theory of the innovating firm that, when embedded in comparative-historical analysis, provides a basis for analyzing the relation between corporate governance institutions and economic development.

Keywords: corporate governance, innovative enterprise, economic development

JEL classification: G3, L2, N8, O1

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1 What is corporate governance and why does it matter?

Since the early 1980s 'corporate governance' has become a central issue of policy debate in the developed economies. Emanating especially from the United States and Britain, this debate has focused on both the restructuring of existing business corporations that appear to have lost their value-creating capabilities and the conditions for the emergence of new innovative companies, particularly in new growing industries. In the 1990s the corporate governance debate spread to many other parts of the world as (erstwhile) Socialist and Third World nations sought to create and support the types of business enterprises that would enable them to participate more fully in the market-oriented global economy. The collapse of the former Soviet Union, the emergence of China as an economic power, the stagnation of the Japanese economy, the Asian financial crisis, and the Internet boom and then bust all, in one way or another, made the governance of business corporations a topic of widespread interest and concern.

In terms of content, most of the debate has been about the *mechanisms* of corporate governance; at issue are the types of information about corporate decisions, activities, and performance that the corporation should make public and the types of procedures for taking corrective actions when necessary. From this 'mechanisms' perspective, the debate revolves around questions such as how to make corporate financial reporting more 'transparent' to public shareholders and other stakeholders; what types of people should sit on boards of directors or other oversight bodies to ensure that executives act in the interests of stakeholders; how the rights of minority shareholders can be preserved in cases where majority shareholders exercise allocative control; and what modes of compensation will give executives and directors an interest in engaging in 'good corporate governance'.

It is obviously important to resolve questions concerning the appropriate mechanisms of corporate governance if the practice of corporate governance is to achieve desired ends. But if the desired end is economic development – that is, a process of growth that can permanently raise the standards of living of more and more people over time – then it is necessary to understand the corporate governance *institutions* that, in different times and places, have promoted economic development. Ultimately what is required is a theory of business enterprise as a fundamental building block of a theory of economic development. A focus on the institutions of corporate governance asks why certain rules and norms prevail in a corporate governance regime, including by whom and for whom corporations should be run, and under what conditions these institutions support economic development.

Most participants in the corporate governance debates, including economists, believe, quite mistakenly I shall argue, that they already possess the basic answers to these systemic questions, so that one need focus solely on the mechanisms of corporate governance. According to the conventional corporate governance paradigm, emanating primarily from the United States and, to a lesser extent, Britain, it is overwhelmingly assumed that 'good corporate governance' means 'maximizing shareholder value'. It is this assumption that, whether those concerned with corporate governance are aware of it or not, links the narrow (albeit important) debate on the mechanisms of corporate governance with the much broader and more fundamental debate on the institutions of corporate governance. The assumption that good corporate governance means

maximizing shareholder value leads one not only to use shareholder value as the measure of corporate performance but, relatedly, to focus on certain types of disclosure, oversight, and corrective procedures to the exclusion of other possibilities for influencing corporate behavior and taking corrective action. To understand why the debate on corporate governance must deal with institutions rather than simply mechanisms, we must ask a) what 'maximizing shareholder value' means, and b) why it is conventionally assumed that among all the possible corporate stakeholders – owners, creditors, employees, contractors, taxpayers, or citizens – it is *shareholders* in particular for whom value should be maximized.

The theoretical foundation for the position that good corporate governance means maximizing shareholder value is the neoclassical theory of the market economy, adapted to take into account selected aspects of the reality of an actual corporate economy such as the United States. In the next section of the paper, I shall explain why this theoretical foundation is highly problematic for understanding the operation and performance of the business corporation and hence the institutions that, for the sake of economic development, should govern it. The main problem, I shall argue, is that the market-economy perspective cannot comprehend the process of innovation, including the role of the business corporation in that process. Yet without innovation – defined in economic terms as the generation of higher quality, lower cost products than were previously available given prevailing factor prices – economic development cannot take place. A confrontation with the conventional wisdom concerning corporate governance, therefore, entails a confrontation with the standard theoretical perspective of how a developed economy functions and performs (see Lazonick 2003b).

This confrontation calls for a theory of innovative enterprise that can serve as a foundation for analyzing what types of corporate governance institutions will promote, and what types will undermine, innovation and economic development. In Section Three of this paper, I will show that the standard neoclassical theory of the firm – one that is consistent with the theory of the market economy – is a theory of the *non-innovating* firm, and hence cannot serve as a foundation for an analysis of the types of corporate governance institutions that can promote innovation and economic development. By transforming the assumptions of the standard neoclassical theory of the firm, however, we can construct a theory of the innovating firm that, when embedded in comparative-historical analysis, can provide a basis for analyzing the relation between corporate governance institutions and economic development. As I shall explain in Section Three, this theory of the innovating firm emphasizes the importance for innovation of three social conditions: *strategic control*, *organizational integration*, and *financial commitment*. From the perspective of economic development, a nation requires corporate governance institutions – or what might be called a system of corporate control – that support these three social conditions of innovative enterprise.

In Section Four I outline, in a highly summary and stylized fashion, the systems of corporate control that have prevailed in a number of the developed nations over the past quarter-century or so, and the general implications of these different systems of corporate control for the employment and investment institutions that regulate the supplies of labor and capital to companies, as well as for the innovative performance of the national economies in which these corporations are based. My purpose in this section is to provide a framework, rooted in comparative history, which can guide further analysis of the characteristics of these institutions in different nations and at different times, and their implications for economic development. In the process, I also

demonstrate that there are many distinctive 'varieties of capitalism', characterized by different social conditions and related performance attributes, that can serve as models for economic development.

Section Five concludes this paper with the implications of a theory of innovative enterprise for development policy. I argue that it is futile, and even dangerous, to try to shape corporate governance institutions to promote economic development if one does not understand the social conditions of innovative enterprise on which the processes and outcomes of economic development will ultimately depend. Furthermore, I contend that the relationship between corporate governance institutions and economic development should be understood for the developed nations before a less developed nation that seeks to join the ranks of the rich embarks on an institutional transformation designed to promote economic development. Otherwise such efforts remain vulnerable to the myth of the market economy and the ideology of maximizing shareholder value that builds on this myth. The aims of the theoretical framework presented in this paper are not only to ensure that attempts at institutional change comprehend the realities of economic development but also, in the process, to compel the myth-makers to confront the realities of economic development or, alternatively, keep their ideologies to themselves.

2 The theory of shareholder value and the reality of innovative enterprise

During the 1980s and 1990s the assumption that 'good corporate governance' meant 'maximizing shareholder value' became widespread in the corporate governance debates. The theoretical foundation of this argument is that, in a developed, or 'market', economy, the existence of well-functioning markets in capital, labor, and products ensure the allocation of scarce economic resources to their best alternative uses to achieve the most efficient performance of the economy that is possible. Yet in apparent contradiction to this theory of the market economy, we observe that in developed economies business corporations are repositories of large, and in many cases vast, quantities of resources over which corporate managers, rather than markets, exercise allocative control. For adherents of the theory of the market economy, 'market imperfections' – for example, 'asset specificity' in the work of Oliver Williamson (1985; 1996) – necessitate this managerial control over the allocation of resources, thus creating an 'agency problem' for those 'principals' who have made investments in the firm.[1]

The agency problem derives from two limitations on the human ability to make allocative decisions, one cognitive and the other behavioral. The cognitive limitation is 'hidden information' (also known as 'adverse selection' or 'bounded rationality') that prevents investors from knowing *a priori* whether the managers whom they have employed as their agents are good or bad resource allocators. The behavioral limitation is 'hidden action' (also known as 'moral hazard' or 'opportunism') that reflects the proclivity, inherent in an individualistic society, of managers as agents to use their positions as resource allocators to pursue their own self-interests and not necessarily the interests of the firm's principals. These managers may allocate corporate resources to

1 For a critique of the work of Williamson along the lines of this paper, see Lazonick 1991a: chs 6 and 7; and 2002.

build their own personal empires regardless of whether the investments they make and the people they employ generate sufficient profits for the firm. Or they may hoard surplus cash or near-liquid assets within the corporation, thus maintaining control over uninvested resources, rather than distributing these extra revenues to those who have invested in the company. Or they may simply use their control over resource allocation to line their own pockets. According to agency theory, absent corporate governance institutions that promote the maximization of shareholder value, one should expect that managerial control will result in the inefficient allocation of resources.

The manifestation of a movement toward the more efficient allocation of resources, it is argued, is a higher return to shareholders. But why is it shareholders for whom value should be maximized? Why not create more value for creditors by making their financial investments more secure, or for employees via higher wages and benefits, or communities via more corporate tax revenues? Neoclassical financial theorists argue that among all the stakeholders in the business corporation only shareholders are 'residual claimants'; the amount of returns that they receive, if any, depends on what is left over after all parties who have guaranteed contractual claims have been paid for their productive contributions to the firm.[2] If the firm incurs a loss, the return to shareholders will, in principle, be negative, and vice versa. By this argument, shareholders are the only stakeholders who have an incentive to bear risk by investing in productive resources that may, or may not, generate a more efficient allocation of resources. As residual claimants, moreover, shareholders are the only stakeholders who have an interest in monitoring managers to ensure that they allocate resources in ways that are likely to lead to more efficient resource allocation. Indeed, the argument goes, precisely because public shareholders have no other relation to a company whose shares are traded on a stock exchange other than the fact that they hold its shares, and because, by the same token, they can easily reallocate their financial investments to other companies by selling those shares and buying others, they are deemed to be the participants in the economy who are best situated to reallocate resources to more efficient uses.[3]

If, as this perspective argues, all participants in the firm except shareholders get contractual returns according to their productive contributions, it follows that the maximization of shareholder value is the maximization of value creation in the economy as a whole. The residual value that is created, which may well be negative rather than positive, is the return to shareholders for bearing risk. The agency problem – the fact that public shareholders as the (purported) 'principals' who bear risk have to leave the corporate allocation of resources under the control of managers as their 'agents' – poses a constant threat to this efficient allocation of resources. Within the shareholder paradigm, the stock market represents the corporate governance institution through which the agency problem can be resolved and the efficient allocation of the economy's resources can be achieved. Specifically, the stock market can function as a 'market for corporate control' that enables shareholders to 'disgorge the free cash flow'. As Michael Jensen, a leading academic proponent of maximizing shareholder value, has put it

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2 This critique draws upon O'Sullivan 2000b and 2002, and Lazonick and O'Sullivan 2000b.

3 See O'Sullivan 2002 for a statement of the theory and an extended critique.

> Free cash flow is cash flow in excess of that required to fund all projects that have positive net present values when discounted at the relevant cost of capital. Conflicts of interest between shareholders and managers over payout policies are especially severe when the organization generates substantial free cash flow. The problem is how to motivate managers to disgorge the cash rather than investing it at below cost or wasting it on organization inefficiencies. (Jensen 1986: 323)

How can managers be motivated to 'disgorge the free cash flow'? If a company does not maximize shareholder value, a shareholder can sell his or her shares and, as an individual, reallocate the proceeds to what he or she deems to be more efficient uses. But the sale of shares does not in and of itself release any resources from the inefficient company concerned. It does, however, depress that company's stock price, which in turn facilitates a takeover by shareholders who can put in place managers who are willing to distribute the 'free cash flow' to shareholders in the forms of higher dividends and/or stock repurchases. Better yet as Jensen (1986) argued, reflecting the corporate takeover movement of the 1980s, let corporate raiders use the market for corporate control for debt-financed takeovers, thus enabling shareholders to transform their corporate equities into corporate bonds. Thus corporate managers, whomever they may be, would be 'bonded' to distribute the 'free cash flow' in the form of interest rather than dividends.[4] Additionally, as Jensen and Murphy (1990), among others, contended, the maximization of shareholder value could be achieved by giving corporate managers stock-based compensation, such as stock options, to align their own self-interests with those of shareholders. Then, even without the threat of a takeover, these managers would have a personal incentive to maximize shareholder value by only investing corporate revenues in those 'projects that have positive net present values when discounted at the relevant cost of capital' (Jensen 1986: 323) and distributing the remainder of corporate revenues to shareholders in the forms of dividends and/or stock repurchases.

During the 1980s and 1990s 'maximizing shareholder value' became the dominant ideology for corporate governance in the United States. Top managers of industrial corporations became ardent advocates of this position, and with their stock-based compensation, they reaped ample returns. The 1980s and 1990s witnessed an explosion in executive pay, driven by income from the exercise of stock options. Between 1980 and 1994 the mean value of stock option grants to CEOs of large US corporations rose from $155,037 to $1,213,180, or by 683 percent, while the mean value of their salary and bonus compensation rose from $654,935 to $1,292,290 million, or by 95 percent. As a result, stock options accounted for 19 percent of CEO compensation in 1980, but 48 percent in 1994 (Hall and Leibman 1998: 661). Hence, even before the Internet boom of the last half of the 1990s, top executives of US corporations had become inured to 'maximizing shareholder value'. The sharp increases in stock prices in the boom further enriched these executives. In 2000 the average CEO compensation at the top 200 US corporations by sales revenues was $11.3 million, of which stock options generated 60 percent, restricted stock 11 percent, bonuses 18 percent, and salary 9 percent (Pearl Meyer 2001).

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4 For a critique of these arguments, given the institutions that had governed the corporation in the previous century of US capitalist development, see Lazonick 1992.

Table 1. US corporate stock and bond yields, 1960-2005

Average annual percent change

	1960-69	1970-79	1980-89	1990-99	2000-05
Real stock yield	6.63	-1.66	11.67	15.01	-1.87
Price yield	5.80	1.35	12.91	15.54	-0.76
Dividend yield	3.19	4.08	4.32	2.47	1.58
Change in CPI	2.36	7.09	5.55	3.00	2.67
Real bond yield	2.65	1.14	5.79	4.72	3.60

Notes: Stock yields are for S&P's composite index of 500 US corporate stocks (about 75% of which are NYSE). Bond yields are for Moody's Aaa-rated US corporate bonds.

Source: Updated from Lazonick and O'Sullivan 2000a, using US Congress, *Economic Report of the President 2006*, tables B-62, B-73, B-95, B-96.

During the decade of the 1970s the stock market had languished and inflation had eroded dividend yields. In the 1980 and 1990s, however, with 'maximizing shareholder value' as the new corporate ideology, high real yields on corporate stock characterized the US corporate economy as a whole (Lazonick and O'Sullivan 2000a). As can be seen in Table 1, these high yields came mainly from stock-price appreciation as distinct from dividends yields.[5] These high price yields reflected a combination of three distinct forces at work in the US corporate economy: a) *redistribution* of corporate revenues from labor incomes to capital incomes, mainly by Old Economy industrial corporations, in the form of stock repurchases; b) *innovation*, especially by New Economy companies, that boosted earnings per share; and c) *speculation* by stock market investors, encouraged, initially at least, by stock price increases due to redistribution and/or innovation. Let us examine each of these three sources of an ebullient stock market, and then, from that perspective, return to the question of whether it is valid to argue that maximizing shareholder value maximizes value creation for the economy as a whole.

First, in the 1980s and 1990s Old Economy companies, many of which had their origins in the late nineteenth century, engaged in a process of redistributing corporate revenues from labor incomes to capital incomes. Engaging in what can be called a 'downsize-and-distribute' allocation regime, these companies downsized their labor forces and increased the distribution of corporate revenues to shareholders (Lazonick and O'Sullivan 2000a). This allocation regime represented a reversal of a 'retain-and-reinvest' regime that had characterized the resource allocation decisions of these

5 When a company's stock price increases, its dividend yield – the amount of dividends paid out as a percentage of the stock price – will fall unless the amount of dividends paid out increases proportionately. During the 1990s the amount of dividends paid out by the US corporations increased by an annual average of just over eight percent (notwithstanding an absolute decline in dividends paid out of four percent in 1999, the first decline since 1975), while the payout ratio – the amount of dividends as a percentage of after-tax corporate profits – averaged 57 percent (compared with 39 percent in the 1960s, 41 percent in the 1970s, and 48 percent in the 1980s). The rapid and persistent increases in stock prices, however, countervailed these increases in dividend payouts to maintain dividend yields at low levels relative to both what they had been before the 1980s and 1990s and to stock-price yields during the 1980s and 1990s (US Congress 2005, B-90).

companies in the post-Second World War decades; they had retained corporate revenues for reinvestment in organization and technology, expanding their labor forces in the process. Coming into the 1980s employees – both managerial and shop-floor workers – had expectations, based on over three decades of experience of 'retain-and-reinvest', of long-term employment with these corporations (Lazonick 2004a).

Downsizing enhanced the 'free cash flow' that could be distributed to shareholders. In the early and mid-1980s, this redistribution of corporate revenues often occurred through debt-financed hostile takeovers, favored by the proponents of the 'market for corporate control' such as Jensen, in which downsizing enhanced the ability of corporate managers to service and retire the massive debt that their companies had taken on (see, for example, Shleifer and Summers 1988; Blair 1993). From the mid-1980s repurchases of corporate stock became an increasingly important form of the distribution of corporate revenues. Whereas prior to the 1980s Old Economy companies had distributed revenues to shareholders through quarterly dividend payments, from the mid-1980s these companies also 'created value for shareholders' by means of large-scale and repeated stock buybacks that boosted stock prices. High price yields in the 1980s and 1990s were to some extent a result of this redistribution process.

Second, New Economy companies such as Intel, Microsoft, Cisco Systems, Sun Microsystems, and Oracle experienced significant growth in both revenues and employment during the 1980s and 1990s by means of a 'retain-and-reinvest' allocation regime; they retained corporate revenues, paying little if any dividends, and reinvested them in innovative products and processes. In general both the revenues and employment levels of these companies grew over this period, especially during the 1990s, and these companies were highly profitable (see Lazonick 2006). It was the innovative successes of these companies that resulted in increases in their stock prices. Whereas it can be argued that Old Economy companies raised their stock prices through a redistribution process, New Economy companies did so as a result of an innovation process. The difference was that the innovation process created new value, which, to some extent at least, justified a higher stock price, whereas the redistribution process transferred value from labor incomes to capital incomes, raising stock prices even if no new value was created.

Third, stock-market investors watched what these companies were doing, and when they thought that they could gain from stock price movements, speculated on how long and how high stock prices would rise. The combination of Old Economy redistribution and New Economy innovation provided a solid foundation for sustained stock price increases. But over certain periods (from the fourth quarter of 1985 to third quarter of 1987, and from the first quarter of 1995 to the third quarter of 2000) speculation became an increasingly important factor in the rise of stock prices, with professional insiders, within corporations and on Wall Street, encouraging and generally gaining from this speculation, as there existed, it turned out, a long queue of unprofessional outsiders who bought shares at inflated prices, implicitly assuming that 'greater fools' than themselves remained in line ready to buy shares on the market.[6] At some point, however, the

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6 If, at any point in time, these speculative outsiders had recognized that they themselves had already been previous sellers' 'greater fools', they might have been more concerned about how many still greater fools remained in line to buy their shares. In raising this concern, even less orthodox financial economists were not much help. The 'behavioral' school in financial economics has recognized the

greatest fools were left holding the over-priced shares, as happened in the fourth quarter of 1987 and, more profoundly, from the fourth quarter of 2000. Stock prices fell precipitously, and the speculation that helped to sustain the longest 'bull run' in US stock market history was (for the time being) put to rest.[7]

Over the course of the bull run of the 1980s and 1990s, stock repurchases became an increasingly important mode of distributing corporate cash to shareholders, both absolutely and relative to dividends (Dittmar and Dittmar 2004). In 1984 repurchases represented 13.5 percent of the earnings of US corporations; dividends 35.8 percent. In 1997 repurchases surpassed dividends, and in 1999 repurchases were 35.8 percent of earnings while dividends were 26.3 percent. The real value of repurchases was almost four times higher in 1999 than it had been 15 years earlier. A local peak in repurchases occurred in 1987 and 1988 when many companies – most notably IBM – stepped up their repurchasing activity after the October 1987 stock market crash (Carroll 1987; Maiden 1987). By the late 1990s large-scale repurchases had became a fact of financial life for many New Economy companies as well.

Driving these stock repurchases were not only the desire of these companies to support their stock price but also the dilution of stockholdings from the use of broad-based employee stock option plans (Lazonick 2006). From the late 1930s US corporations had granted stock options to top executives, primarily as a tax dodge. The New Deal had created a highly progressive personal income tax structure, which in the 1940s and 1950s took 91 percent of the marginal income of those, including top executives, in the highest tax brackets (Lazonick 2003a). The main attraction of stock options for these executives was the possibility that the income from them could be construed as capital gains, which were taxed at only 25 percent – a possibility that, after much lobbying,

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importance of stock market speculation as a determinant of stock prices, but has not in general embraced the 'greater fools' theory. For example, in a best-selling book published at the height of the boom, financial economist Robert Shiller (2000) characterized stock market bubbles as 'irrational exuberance'. In that book, Shiller (2000: 18) made the assumption that all players on the stock market, professionals and non-professionals, have access to the same information. Yet, notwithstanding government regulation, the assumption is contradicted by widespread use of inside information by professionals, as revealed for example in the investigations of the New York State District Attorney, Eliot Spitzer, in the aftermath of the Internet crash, as well as in the documents produced in numerous class action lawsuits by shareholders who bought shares and allegedly lost money because of false information provided by professional insiders. Insofar as insiders have the incentive and ability to manipulate stock market prices for their own personal gain, their exuberance is anything but 'irrational'. Under the heading, 'Cultural Changes Favoring Business Success or the Appearance Thereof', Shiller (2000: 22-4) recognized, but in my view understated, the incentive that top corporate executives, as ultimate professional insiders, had to contribute to that speculation, given the importance of stock-based compensation to their pay packages. Ironically, after the crash, Michael Jensen, a leading academic proponent in the 1980s and 1990s of using stock-based compensation to align the interests of managers with shareholders, chastised corporate executives for falling to say 'no' to Wall Street, as, spurred on by the prospect of greater stock-based compensation, they took actions during the boom for the purpose of inflating stock prices (Fuller and Jensen 2002). See also the *Fortune* cover story that appeared in September 2002, entitled: 'They bought. You sold: All over corporate America, top execs were cashing in stock even as their companies were tanking. Who was left holding the bag? You'. (Gimein et al. 2002)

7 The Dow Jones Industrial Average (DJIA) rose by about 500 percent from 1921 to 1929; 950 percent from April 1942 to January 1966; and 1300 percent from July 1982 to August 2000. And during the boom of the late 1990s the NASDAQ index, dominated by New Economy and more speculative stocks, made the rise in DJIA look like a small blip (see Carpenter et al. 2003).

became a reality in the Revenue Act of 1950. From the 1960s, however, high-tech startups based in what would become known as Silicon Valley began to use stock options to lure technical and administrative personnel away from secure careers with established companies, and subsequently as a mode of compensation for competing for these employees among themselves. As a result by the 1980s and 1990s broad-based employee stock options became widespread among New Economy high-tech companies, and in the late 1990s spread to many Old Economy companies throughout the United States and even abroad that had to compete for this highly mobile labor (Lazonick 2003a; Carpenter et al. 2003; Glimstedt and Lazonick 2005). One result was that, while top executives continued to get the lion's share of stock options, a broad base of the high-tech labor force, especially in high-tech industries, acquired an interest in corporate policies aimed at 'maximizing shareholder value'.

But did this financial behavior lead to a more efficient allocation of resources in the economy, as the proponents of maximizing shareholder value claim? There are a number of flaws in agency theory that raise serious doubts about the usefulness of this perspective for analyzing the relation between corporate governance and economic performance. These flaws have to do with a) a failure to explain how corporations came to control the allocation of significant accounts of the economy's resources in the first place; b) how, at any point in time, one measures the 'free cash flow'; and c) the claim that it is only shareholders who have residual claimant status. All of these flaws stem from the facts that agency theory, like neoclassical economic theory on which it is based, is rooted in a theory of the market economy and, as a result, lacks of a theory of innovative enterprise. All of these flaws are, moreover, amply exposed by the history of the industrial corporation in the United States, the national context in which agency theory evolved and in which, first and foremost, it is thought to be applicable.

First, agency theory makes an argument for taking resources out of the control of inefficient managers without explaining how, historically, these corporations became the repositories of such vast amounts of resources over which these managers could exercise control. The fact is that from the first decades of the twentieth century the separation of share ownership from managerial control characterized US industrial corporations (Berle and Means 1932; Chandler 1977). The companies that occupied dominant positions in the US economy coming into the last half of the century were those that had been innovative in the first half. During the post-Second World War decades, however, many of these industrial corporations grew to be too big, especially during the conglomeration movement of the 1960s. Top managers responsible for the allocation of resources to innovative investment strategies became segmented, cognitively and behaviorally, from the organizations that would have to implement these strategies. In the 1970s and 1980s, moreover, many of these US corporations faced intense foreign competition, especially from innovative Japanese corporations characterized by a separation of share ownership from managerial control. What these US corporations required to make an innovative response was corporate governance institutions that would reintegrate strategic decision-makers with the business organizations over which they exercised allocative control. Instead, guided by the ideology of 'maximizing shareholder value' and rewarded with stock options, what these established corporations got were managers whose prime objective was to boost their companies' stock prices, even if it was accomplished by a redistribution of corporate revenues from labor incomes to capital incomes and even if it further undermined the effectiveness of the productive capabilities that these companies had accumulated from the past (Lazonick and O'Sullivan 2000b).

Second, agency theory does not address how, at any point in time, one can judge that managers are allocating resources inefficiently when a firm has to invest in innovation to remain competitive. An innovative investment strategy is inherently uncertain. Any strategic manager who allocates resources to an innovative strategy faces three types of uncertainty: technological uncertainty, market uncertainty, and competitive uncertainty. Technological uncertainty exists because the firm may be incapable of developing the higher quality processes and products envisaged in its innovative investment strategy; if one already knew how to generate a new product or process at the outset of the investment, it would not be innovation. Market uncertainty exists because, even if the firm is successful in its development effort, future reductions in product prices and increases in factor prices may lower the returns that can be generated by the investments. Moreover, the innovative enterprise must access a large enough extent of the product market to transform the fixed costs of developing a new technology into low units costs. Like transforming technology, accessing the market is an integral part of the innovation process, and, at the time when resources are committed to an innovative strategy, it is impossible to be certain, even probabilistically, about what extent of the market will be accessed. Finally, even if a firm overcomes technological and market uncertainty, it still faces competitive uncertainty: the possibility that an innovative competitor will have invested in a strategy that generates an even higher quality, lower cost product. One can state formulaicly, as Jensen does, that the firm should only invest in 'projects that have positive net present values when discounted at the relevant cost of capital'. But anyone who contends (as such a statement does) that, when committing resources to an innovative investment strategy, one can foresee the stream of future earnings that are required for the calculation of net present value knows nothing about the innovation process. It is far more plausible to argue that if corporate managers really sought to 'maximize shareholder value' according to this formula, they would never contemplate investing in innovative projects with their highly uncertain returns (see, for example, Baldwin and Clark 1992).

Third, it is simply not the case that all participants in the corporation other than shareholders receive contractually guaranteed returns from the corporation according to the productive contributions that they make. The argument that shareholders are the sole 'residual claimants' is a deduction from the theory of the market economy that does not accord with the reality of successful economic development. The neoclassical economist assumes that every input into the production process is paid a market price that reflects its productive contribution and that can be specified in a contract. One can assume that such is the case when, in an open, competitive market, one business enterprise purchases a physical commodity as a productive input from another business enterprise. But, as I shall elaborate below, one cannot assume that such is the case when the inputs are made available to business enterprises by the state. Nor can one assume that such is the case when the inputs are made available to the business enterprise in the form of the labor services of employees. Finally, once one recognizes that the innovative enterprise cannot be understood as a 'nexus of contracts', one can ask whether public shareholders actually perform the risk-bearing function that the proponents of agency theory claim they do. In concluding this section of the paper, I shall explain why the basic assumptions of agency theory are contradicted by a realistic analysis of the roles of the state, labor, and shareholders in a business corporation that, by means of innovation, contributes to economic development. The general implication that I shall draw from this perspective is that if one wants to understand the relation between corporate governance institutions and economic development, one needs to

proceed on the basis of *innovation theory* rather than agency theory. Accordingly, Section Three of the paper will sketch out a theory of innovative enterprise, as a prelude to an examination of the 'social conditions of innovative enterprise' in cross-national and historical perspective contained in Section Four.

Any realistic account of the role of the corporation in economic development must take into account the role of the state in making infrastructural investments for the purpose of generating knowledge that, given the levels of financial commitment required and uncertainty of the economic outcomes, no business enterprise would have made on its own. A government that plays this role is called a 'developmental state', a term that became popular in the 1980s to describe the role of the state in Japanese development (Johnson 1982; 1995; Woo-Cumings 1999). Yet, the study of the history of economic development in the twentieth century shows that, in terms of investment in new knowledge with applications to industry, it is the United States that can lay claim to having been the world's foremost developmental state. As a prime example, US dominance in computers, microelectronics, software, and data communications is impossible to explain without recognizing the role of government in making both seminal investments that developed new knowledge and infrastructural investments that diffused that knowledge.[8]

The US government made investments to augment the productive power of the nation through government, corporate, and university research labs that generated new knowledge as well as through educational institutions that developed the capabilities of the labor force of the future. Business enterprises made ample use of this knowledge and capability. While these business enterprises may have had to pay fees for these services – for example, the salary of an engineer whose education was supported in whole or in part by state funds – one would be hard put to show that there existed a nexus of contracts that guaranteed the state a return on these investments for the productive contributions that the outputs of these investments made to the enterprises that used them. In effect, in funding these investments, the state (or more correctly, its body of taxpayers) was bearing the risk that the nation's business enterprises would further develop and utilize this productive capability in a way that would ultimately redound to the benefit of the nation, with the 'return' to the nation in no way contractually guaranteed. In addition, in the name of national economic development, the US government often provided cash subsidies to business enterprises to develop new products and processes or even to start new firms. Sometimes the government built these subsidies into the rates that business enterprises in particular industries could charge as regulated monopolies. And for selected industries, it created these subsidies through tariff protection that permitted firms in these industries time to develop higher quality, lower cost products. The public funded these investments and subsidies through current taxes, borrowing against the future, and by making consumers pay higher prices for services than would have otherwise prevailed.

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8 A list of references on the role of the US government in technology development could fill a book. For a start, see Braun and MacDonald 1982; Smith 1987; Flamm 1987; 1988; Kash 1989; Mowery and Rosenberg 1989; 1993; Hughes 1990; 1998; Ferleger and Lazonick 1993; 1994; Leslie 1993; Mowery and Langlois 1996; Norberg and O'Neill 1996; National Academy Press, 1999; Abbate 2000; Steil et al. 2002; and the references therein.

Multitudes of business enterprises benefited from these investments and subsidies without having to enter into contracts with the public bodies that had financed these investments to remit to them a guaranteed return for the productive contributions that the investments and subsidies supplied. Indeed, by definition, a 'subsidy' lies beyond the realm of a market-mediated contract; for example, one dictionary defines 'subsidy' as 'a grant paid by a government to an enterprise that benefits the public'.[9] That definition leaves open the question of how the enterprises that receive the subsidies are governed to ensure that the public actually benefits, including the extent of the benefits and the forms in which they accrue. There are no easy answers to such questions since, where innovation is involved, it may take decades to generate the benefits of the public subsidy. Without a guaranteed contractual obligation on the part of the enterprises whose revenues are thereby augmented to distribute these benefits to the original investors, political processes, especially those related to public finance, will influence the actual distribution of returns. It is a question of not only how the returns on past government investments and subsidies are distributed but also what type of new government investments and business subsidies are now demanded to *regenerate* the innovation process.[10]

Like the government, workers can – and where the accumulation of knowledge is concerned generally do – also find themselves in the position of having made investments in productive capabilities that they supply to firms without a guaranteed contractual return. In an important contribution to the corporate governance debate, Margaret Blair (1995) argued that, alongside a firm's shareholders, workers should be accorded 'residual claimant' status because they make investments in 'firm-specific' human capital at one point in time with the expectation, but no contractual guarantee, of reaping returns on those investment over the course of their careers. Moreover, insofar as their human capital is indeed 'firm-specific' these workers are dependent on their current employer for generating returns on their investments, with their lack of interfirm labor mobility increasing the risk that they bear. Blair goes on to argue that if one assumes, as the proponents of shareholder value do, that only shareholders bear risk and hence have sole 'residual claimant' status, there will be an underinvestment in human capital to the detriment of not only workers but the economy as a whole.

Blair's general point is correct; workers do make investments in long-lived productive capabilities – that is, human capital – without a contractually guaranteed return, but with the expectation of being able to earn incomes on the basis of those capabilities over the course of their working lives. Such is particularly the case when, as part of a collective effort, they apply their capabilities to engage in organizational learning to develop new

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9 http://dictionary.reference.com/search?q=subsidy

10 The semiconductor industry was a prime recipient of government funding from the late 1940s. Yet even more than a half century later (in March 2005, as I was writing this paper), there were renewed calls from the Semiconductor Industry Association (SIA) for public funding of basic research in the physical sciences to assure continued US technology leadership in the industry. The spokesman for the SIA at a Washington, DC press conference was the CEO of Micron Technology, a leading US semiconductor company, and accompanying him at the press conference were the CEO of Intel, the president of the SIA (himself a former semiconductor executive), and a well-known neoclassical economist. See 'Semiconductor Industry Association says U.S. could lose race for nanotechnology leadership; U.S. standard of living, national security linked to leadership', *Business Wire*, 16 March 2005.

products and processes that, if successful as innovations, will generate high returns for the firms that control those innovations in years, or even decades, to come. It is in this sense that their investments are 'firm-specific';[11] through their involvement in organizational learning processes, they endow the firm with intellectual property without any contractual guarantee that they will be able to appropriate a portion of the returns on that investment if and when such returns accrue. As a result their ability to reap returns on that human capital is at risk if, having made the investment, they are deprived of employment with the firm when the gains from innovation are being reaped. For those who were concerned about the propensity of US corporations in the 1980s and 1990s to 'downsize-and-distribute', Blair's focus in investments on firm-specific human capital provided an apparently logical argument for a 'stakeholder' theory of the firm in which workers as well as shareholders should be viewed as 'principals' for whose benefit the firm should be run.

The problem with the stakeholder argument, as with the shareholder argument, is that it provides no guidance for how the firm should be governed if, in the presence of changes in technology, markets, and competition, it is to remain innovative. While fully accepting Blair's 'stakeholder' amendment to the shareholder argument, a corporate executive who is intent on downsizing his labor force could logically argue that the productive capabilities of workers in, say, their 50s who had made investments in 'firm-specific' human capital earlier in their careers have now become *old* because of competition from equally adept but more energetic younger workers or, alternatively, *obsolete* because of technological change. The executive could then argue that, in making investments in 'firm-specific' human capital in the past, these (now) older workers had taken on the risk-bearing function, and like any risk-bearing investor had to accept the possibility that their human capital would at some point lose its market value.

The workers could respond by arguing that the corporate executive is wrong; that their accumulated capabilities are not old and obsolete, but rather, given a correct understanding of technological, market, and competitive conditions in the industry, remain critical to the innovation process. They might even, as 'principals', accuse the executive, as their 'agent', of acting opportunistically, perhaps because he has stock options that align his interests with shareholders, and that what the proposed downsizing entails is a redistribution of value from labor to capital rather then a restructuring of the workforce for the purpose of innovation. Clearly, even from the workers' point of view, agency theory's concerns with hidden information and hidden action on the part of managers are relevant. The problem is that agency theory provides no guide to analyzing whether or not the executive is in fact acting innovatively or opportunistically because agency theory, like neoclassical theory more generally, has no theory of innovative enterprise.

As for public shareholders, from the perspective of innovative enterprise, what is the logic of the agency theorist's claim that they are 'residual claimants' who bear the risk of investment in the corporate economy? The fundamental problem with this claim is that it entails *a conception of investment that results in superior economic performance that cannot possibly result in innovation*. Investments that can result in innovation

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11 For a critique of the way in which economists have used the concept of 'firm-specific' human capital, and in particular of their inability to specify what is 'firm-specific' about it, see Lazonick and O'Sullivan 2000b.

require the *strategic* allocation of productive resources to *particular processes* to transform *particular productive inputs* into *higher quality, lower cost products* than those goods or services that were previously available at prevailing factor prices. Investment in innovation is a *direct* investment that involves, first and foremost, a strategic confrontation with technological, market, and competitive uncertainty. Those who have the abilities and incentives to allocate resources to innovation must decide, in the face of uncertainty, what types of investments in organizational learning have the potential to generate higher quality, lower cost products. Then they must mobilize committed finance to sustain the innovation process until it generates the higher quality, lower cost products that permit financial returns.

What role do public shareholders play in this innovation process? Do they confront uncertainty by strategically allocating resources to innovative investments? No, as portfolio investors, they diversify their financial holdings across the outstanding shares of existing firms in order to minimize risk. They do so, moreover, with limited liability, which means that they need not necessarily spend any time or effort in actually analyzing the innovative capabilities of the firms whose shares they hold. To be sure, they can rely on someone else whose job it is to do such an analysis, but in doing so they confirm their status as outsiders, and open themselves up to manipulation by insiders; that is, they simply shift the locus of the agency problem from managers to analysts. But even if they are able to evaluate with confidence the innovative investment strategy of any given firm in their investment portfolio, as public shareholders their only recourse if they do not like what they see is to sell their shares (what has long been called the 'Wall Street walk'), which is precisely what the existence of a highly liquid stock market allows them to do.

But for this ability to exit an investment easily, public shareholders would not be public shareholders; they would not be willing to hold shares of companies over whose assets they exercise no direct control. It is the liquidity of a public shareholder's portfolio investment that differentiates it from a direct investment, and indeed makes the public shareholder a totally different economic actor than a private shareholder who, for lack of liquidity of his or her shares, must remain committed to his or her direct investment until it generates financial returns. It is in this sense that the modern corporation entails a fundamental transformation in the character of private property, as Adolph Berle and Gardiner Means (1932) recognized in their classic book on the separation of ownership and control written over 70 years ago. As property owners, public shareholders own tradable shares in a company that has invested in real assets; they do not own the assets themselves.

Indeed, it can be argued, certainly on the basis of US experience (see O'Sullivan 2003a), that the fundamental role of the stock market in the twentieth century has been to transform illiquid claims into liquid claims on *the basis of investments that have already been made*, and thereby separate share ownership from managerial control. Business corporations sometimes do use the stock market as a source of finance for new investment, although it would appear from the research of Mary O'Sullivan (2003a) that this function is most common in periods of stock market speculation when the lure for public shareholders to allocate resources to new issues may be the prospect of quickly 'flipping' their shares to make a rapid, speculative return. Public shareholders want financial liquidity; investments in innovation require financial commitment. It is only by ignoring the role of innovation in the economy, and the *necessary* role of insider control in the strategic allocation of corporate resources to innovation, that agency theory can

argue that superior economic performance can be achieved by maximizing the value of those actors in the corporate economy who are the ultimate outsiders to the innovation process.

As I shall elaborate in the next section, based as agency theory is in the neoclassical theory of the 'optimizing' firm, it provides no framework for analyzing *who*, for the sake of innovation, should exercise strategic control over corporate resource allocation, *what* types of investments in innovative capabilities they should make, and *how* for the sake of a renewal of the innovation process the returns from investments should be distributed (O'Sullivan 2000b). Yet the answers to these 'who', 'what', and 'how' questions are fundamental to any theory of resource allocation in the corporate economy. Studies of the innovation process demonstrate that it is uncertain, collective, and cumulative (O'Sullivan 2000b).

Given the uncertain character of the innovation process, it matters *who* the strategic decision-makers are because their particular abilities and incentives will influence the types of resource allocation decisions that they make. To allocate resources to innovative investment strategies, these strategic decision-makers must have an intimate understanding of the technological, market, and competitive conditions of the industry in which they are involved, and an incentive to confront the uncertainty inherent in the innovation process rather than avoid it. Given the collective character of the innovation process, it matters *what* kinds of investments those who allocate the firm's resources make. As we shall see, the key to innovation is investment in *integrated skill bases* that can engage in organizational learning, and the types of organizations that generate innovation vary across industry and nation as well as, within a particular industry and nation, over time. Finally, given the cumulative character of the innovation process, it matters *how* the returns from prior investments are distributed, both to sustain the financing of innovation processes still in progress and to finance new innovative investment strategies. Given the characteristics of the innovation process, a theory of innovative enterprise requires a framework for analyzing the interactions of strategy, organization, and finance in the generation of higher quality, lower cost products.

3 The theory of innovative enterprise

Strategizing, organizing, and financing in alternative theories of the firm

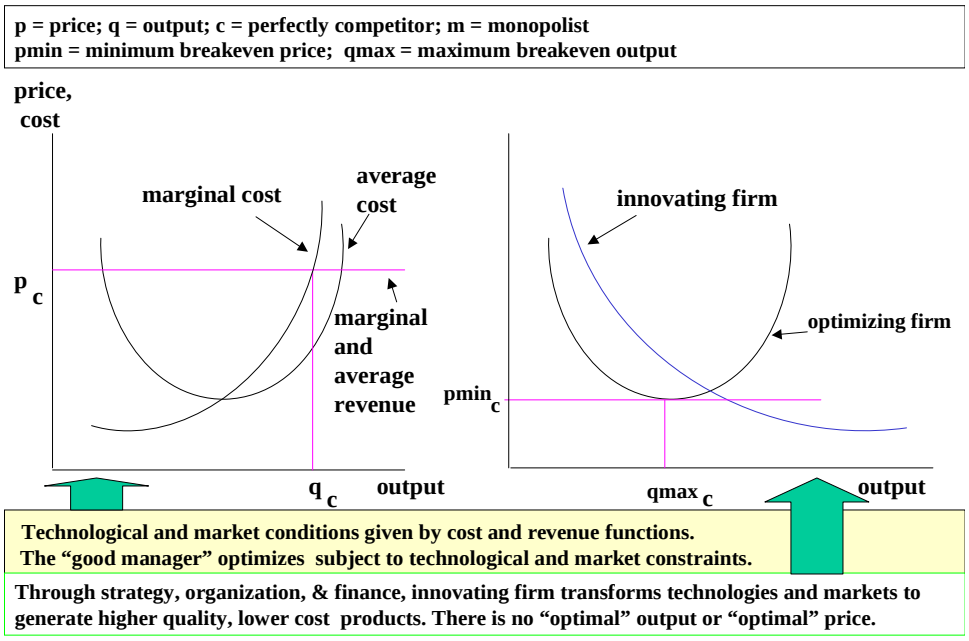
The business enterprise seeks to transform productive resources into goods and services that can be sold to generate revenues. A theory of the firm, therefore, must, at a minimum, provide explanations for how this productive transformation occurs and how revenues are obtained. These explanations must focus on three generic activities in which the business enterprise engages: strategizing, organizing, and financing. *Strategizing* allocates resources to investments in developing human and physical capabilities that, it is hoped, will enable the firm to compete for chosen product markets. *Organizing* transforms technologies and accesses markets, and thereby develops and utilizes the value-creating capabilities of these resources to generate products that buyers want at prices that they are willing to pay. *Financing* sustains the process of developing technologies and accessing markets from the time at which investments in

productive resources are made to the time at which financial returns are generated through the sale of products.

The neoclassical theory of the firm, which can be found in any economics textbook (see the left-hand side of Figure 1), trivializes the content of these three generic activities. *Strategizing* about the industry in which the firm should compete and the quantity of output that the firm should produce is determined by the rule of profit maximization – a rule that is imposed on the firm by given technological and market constraints. *Organizing* the firm to compete in the industry in which it has invested is determined by exogenous production functions and factor prices. The management of the firm reduces to an exercise in 'substitution at the margin' in the choice of its profit-maximizing output. *Financing* the transformation of productive resources into revenue-generating products is non-problematic because the theory assumes that, at each and every point in time, the firm can borrow capital at the prevailing market rate and can sell all of the output that maximizes its profits, covering the cost of capital.

While the neoclassical theory of the firm trivializes the problems of strategy, organization, and finance, the particular formulation of the theory by post-Marshallian economists from the 1920s embodied a number of realistic assumptions about the factors that would influence the relation between the costs of production and the amount of output produced. These realistic assumptions have made the theory credible as a depiction of the way in which an actual firm operates. Analytically, these assumptions have provided the basis for a reasoned account of why the firm might have a U-shaped cost curve that, through the profit-maximization rule, enables it to choose an optimal level of output. The problem is, however, that the *optimizing* firm is not an *innovating* firm; indeed it might well be characterized as an *un-innovating* firm.

Figure 1. Comparing the optimizing and innovating firm



In terms of strategy, the theory of the optimizing firm posits that an 'entrepreneur' chooses the industry in which he wants to compete by allocating resources to any industry in which, because of the exogenous appearance of a disequilibrium condition, there are supernormal profits to be made. The disequilibrium condition disappears as entrepreneurs reallocate resources to this particular industry, and, as long as equilibrium conditions persist across all industries, there will be no incentive for the entrepreneur to shift resources from one industry to another.

There are two assumptions of the neoclassical theory of the firm that limit its ability to understand innovative enterprise. First, the neoclassical theory assumes that *the entrepreneur plays no role in creating the disequilibrium condition* that triggers the reallocation of resources from one industry to another. In the theory of the innovating firm, by contrast, entrepreneurs create new profitable opportunities, and thereby disrupt equilibrium conditions.[12] Second, the neoclassical theory assumes that *the entrepreneur requires no special expertise to compete in one industry rather than another*. All that is required of the entrepreneur is that he follow the principle of profit maximization in the choice of industry in which to compete.[13] In the theory of the innovating firm, however, the entrepreneur's specialized knowledge of the industry in which he chooses to compete is of utmost importance for his firm's ability to be innovative in that industry.

Once the industry has been chosen, the neoclassical theory assumes that there are certain fixed costs, exogenously determined by existing technology and prevailing factor prices, that must be incurred by each and every firm that chooses to compete in the industry. These fixed costs are typically attributed to lumpy investments in plant and equipment, although it is also sometimes recognized that the entrepreneur's salary represents an element of fixed costs. These costs are fixed because they are incurred even if the firm produces no output. As the firm expands its output, the average cost curve slopes downward as fixed costs are spread over a larger volume of output. The limiting assumption here is that *the entrepreneur does not choose the firm's level of fixed costs and the particular productive capabilities embodied in them as part of his firm's investment strategy*. In the theory of the innovating firm, the level of fixed costs manifests strategic decisions to make investments that are intended to endow the firm with distinctive productive capabilities compared with its competitors in the industry (see the right-hand side of Figure 1).

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12 This entrepreneurial disruption of the 'circular flow' was Schumpeter's basic contribution to the theory of the innovating firm in *The Theory of Economic Development* (1934). Over the course of his career, Schumpeter came to see the entrepreneurial function as a collective rather than individual endeavor.

13 In a manner consistent with *neoclassical* theory, Austrians such as Israel Kirzner (1997) define the entrepreneur as one of the first to notice the appearance of disequilibrium conditions somewhere in the economic system. Hence he is among the first to reallocate resources from one use to another to take advantage of the existence of supernormal profits during the fleeting period during which these supernormal profits exist. His reallocation of resources to capture these supernormal profits begins the process of reducing them to normal levels, thus re-establishing equilibrium conditions. But the Austrians make no attempt to explain why disequilibrium conditions in the first place; their 'entrepreneur' is in effect an arbitrageur, who has little in common with the Schumpeterian entrepreneur whose actions *create* disequilibrium conditions, and who Schumpeter (1965) recognized could have motives other than profits and could even be a representative of the state.

Given the firm's fixed costs, the entrepreneur purchases that quantity of complementary variable inputs at prevailing factor prices in accordance with the technological requirements of the amount of output at which profits are maximized. Thus variable costs per unit of output are added to the fixed costs per unit of output to yield total unit costs, with the average cost curve mapping these total unit costs for different levels of output. If variable costs were to remain constant as output expands, the average cost curve would slope downwards continuously (although at a declining rate) as fixed costs are spread over more units of output.

At this point, however, the neoclassical theory makes a critical assumption that causes the average cost curve to change direction and slope upwards, thus yielding the well-known U-shaped cost curve. The assumption is that the addition of variable factors of production to the firm's fixed factors of production results in a declining average productivity of these combined factors (that is, the firm's technology, which is also the industry's technology). In deriving the U-shaped cost curve, neoclassical theorists give two quite plausible reasons why average productivity declines as output expands. Both reasons assume that the key variable factor is labor. One reason is that as more variable factors are added to the fixed factors, increasingly crowded factory conditions reduce the productivity of each variable factor as, for example, workers continuously bump into one other. The other reason is that as more workers are added to the production process, the entrepreneur, as the fixed factor whose role it is to organize productive activities, experiences a 'control loss' because of the increasing number of workers that he has to supervise and monitor.

Hence organization – in this case the relation between the entrepreneur as manager and the work force that he employs – becomes central to the neoclassical theory of the firm. Within the theory of the optimizing firm, the constraining assumption is that *the entrepreneur passively accepts this condition of increasing costs, and optimizes subject to it as a constraint*. In sharp contrast, in the theory of the innovating firm, the experience of increasing costs, as shown on the left-hand side of Figure 2, provides the firm's strategic decision-makers with an understanding of the limits of the *initial* investment strategy, and with that information they make additional new investments for the strategic purpose of *taking control* of the variable factor that was the source of increasing costs.[14] An innovating firm would not take a condition of overcrowding or control loss that results in increasing costs as a 'given constraint', but rather would make investments in organization and technology to change this condition. In effect, for the sake of improving its capability of developing and utilizing productive resources, the firm makes *strategic* investments that transform variable costs into fixed costs, which the firm must now try to transform into low unit costs.

What is the role of finance in the theory of the optimizing firm? A firm needs to finance fixed-cost investments because, by definition, the returns from these investments are generated over time. The theory of the optimizing firm posits that, at any given point in time, the firm can sell all the output that it wants according to a known industry demand schedule. Hence, in theory, there are no risks entailed in the financing of investments over the period of time that it takes to amortize the investments. The cost of capital is built into the firm's cost structure, and simply reflects the market price of finance.

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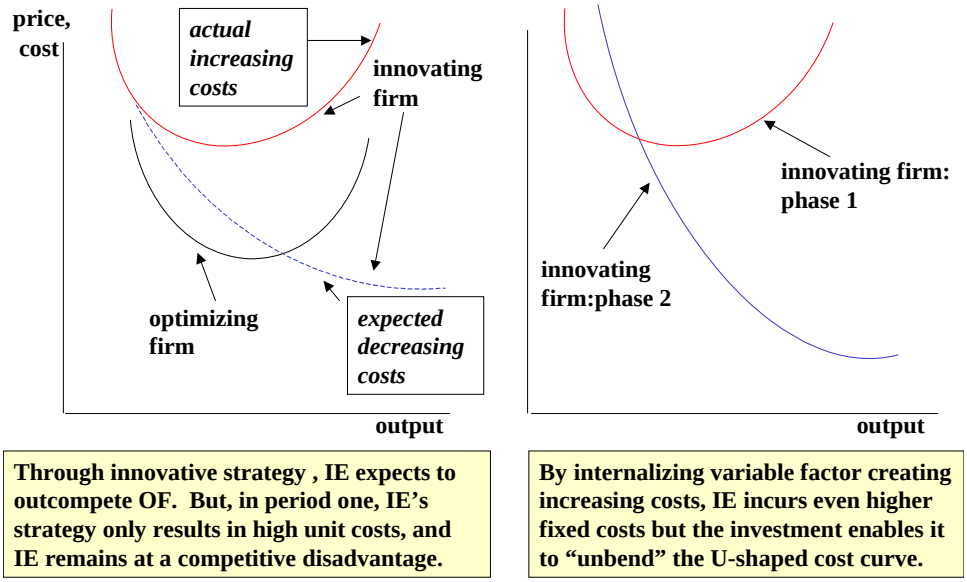
[14] For an elaboration of this argument, see Lazonick 1991a: ch. 3; and 1993.

Figure 2. Innovative strategy and the reshaping of the cost curve



Neoclassical theorists have recognized the adjustment problem that faces an industry when there is a reduction in demand. With market prices depressed, some firms should exit the industry. But given the assumption that all firms in the industry have identical cost structures, it is not clear why some firms would drop out of the industry, leaving other firms to enjoy the restoration of 'normal' profits. Rather all firms in the industry, viewing their fixed costs as *sunk* costs, continue to produce at the profit-maximizing level as long as the market price at least enables them to cover their variable costs. Under such conditions of 'cut-throat competition', firms in effect live off their existing investments while they lack the prospective returns to justify the financing of new investments (see Reynolds 1940 for a classic article).

In contrast, in the theory of the innovating firm, the uncertainty inherent in fixed costs is central to the analysis rather than being a by-product of *ad hoc* concessions to reality. The theory of the innovating firm assumes that the investments that the firm makes must be developed and utilized over time, as the firm transforms technologies and accesses markets, before returns from those investments can be generated, or indeed before the rate of return can even be known. The problem is not, as in the theory of the optimizing firm, whether the prevailing return on investment provided by existing technological and market conditions will continue in the future. Since the return on investments depends on the extent of the market that the innovating firm actually attains, a return on investment *does not even prevail in the present*, that is, at the time when the investments in innovation are made. Investments in innovation must be made despite the existence of technological, market, and competitive uncertainties – discussed in the previous section of this paper – concerning prospective returns. The optimizing firm may calculate, on the basis of prior experience, the risk of a deterioration of current market conditions, but it has no way on contemplating, let alone calculating, the uncertainty of returns for conditions of supply and demand that, because innovation is involved, have yet to be created.

The fact, moreover, that the optimizing firm will only finance investments for which an adequate return already exists creates an opportunity for the innovating firm to make

innovative investments that, if successful, can enable it to outcompete optimizing firms. Indeed, in the future optimizing firms may find that the cause of the 'poor market conditions' that they face is not the result of an exogenous shift in the industry demand curve but rather the result of competition from innovating firms that have gained competitive advantage while their own managers happily optimized (as indeed the economics textbooks instructed them to do) subject given technological and market constraints.

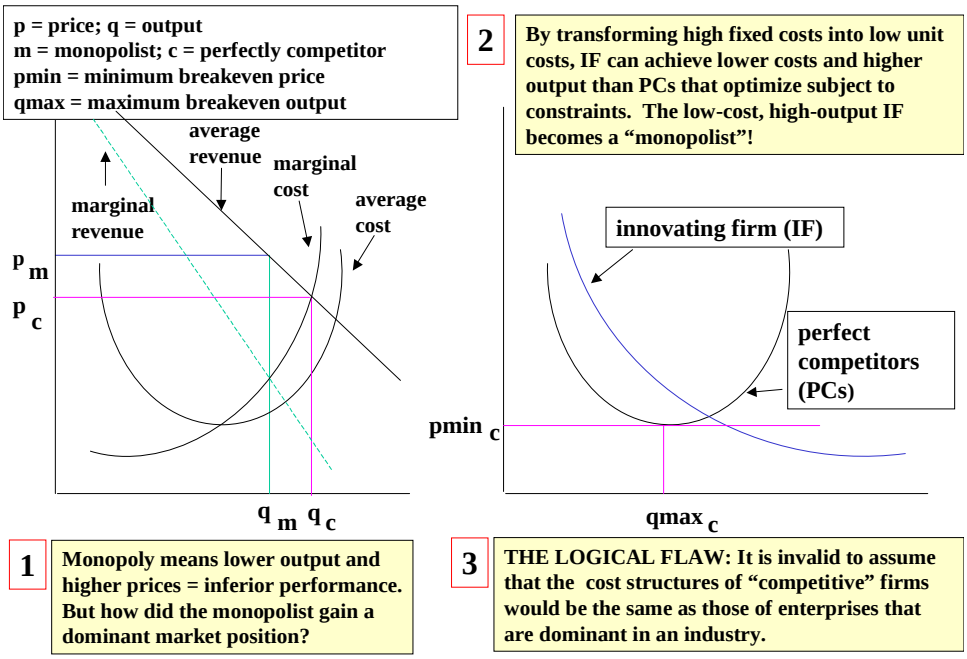
The monopoly model and the innovating firm

Are the theories of the optimizing and innovating firm, therefore, inherently in conflict with one another? Certainly they describe two very different types of firm behavior; one type makes change and is dynamic, while the other type ignores change and is static. But from an intellectual point of view, as I shall demonstrate, the static theory of the optimizing firm can serve as a point of departure for a dynamic theory of the innovating firm. One 'simply' drops the optimizing assumptions by allowing the innovating firm to make investments to overcome technological and market conditions that its optimizing competitors accept as given constraints. That point of departure, however, then requires one to adopt an entirely different methodology for studying the allocation of resources in an economy – a methodology that that I call 'historical transformation' in contrast to constrained optimization (see Lazonick 2002b). When employing a historical transformation methodology, theory ceases to be a formula for deducing optimal outcomes; rather it becomes an iterative intellectual process that distils the essence of what we already know and thereby provides systematic focus to the discovery of what we need to know.

Over the past century or so, neoclassical economists have chosen not to move in this direction (for some reasons why, see Lazonick 1991a and 1991b). Instead they have preferred to remain within the realm of constrained optimization in their search for equilibrium conditions of output and price. Rather than compare the conditions that govern the allocation of resources in optimizing firms and innovating firms, they have compared the optimizing firm operating under conditions of 'perfect competition' with the optimizing firm operating under conditions of 'monopoly'. The existence of the monopoly model has provided the theoretical foundation for the contention, deeply embedded in public policy discourse, that optimization under conditions of perfect competition results in the best possible allocation of resources. From this perspective, economists advocate anti-monopoly policies that rely upon market competition to resolve problems that arise in the efficient allocation of resources.

Within the framework of the theory of the optimizing firm, the condition of monopoly results in lower industry output and higher industry price than would prevail under the condition of perfect competition (see the left-hand side of Figure 3). The comparison of constrained optimization under conditions of perfect competition and monopoly contains, however, *a fundamental flaw*. The problem is *not* with the internal logic of the constrained optimization model *per se*, be it in its competitive or monopoly form. Rather the problem is with the logic of *comparing* the competitive model with the monopoly model within the constrained-optimization framework.

Figure 3. The flaw in the monopoly model



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 conditions. 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 (according to a perfectly elastic demand curve) and that in the other case the firm is so large that it can only sell more output at a lower price (according to a downward sloping demand curve), there is absolutely nothing in terms of the structure or operation of the firm that distinguishes the perfect competitor from the monopolist! So how would monopoly ever emerge under such conditions?[15] For a discipline that prides itself on its

15 The now-standard comparison of perfect competition and monopoly within the theory of the optimizing firm was elaborated by the followers of Alfred Marshall, building on Books V and VI of *Principles of Economics*, first published in 1890 and revised in eight editions up to 1920. Yet Marshall (1961: 484-5) himself recognized that a situation where one firm dominated an industry would not necessarily yield inferior economic outcomes than an industrial structure based on perfectly competitive firms. As he put it explicitly (with my emphasis): 'The monopolist would lose all his monopoly revenue if he produced for sale an amount so great that its supply, as here defined, was equal to its demand price: the amount which gives the maximum monopoly revenue is always considerably less than that. *It may therefore appear as though the amount produced under a monopoly is always less and its price to the consumer always higher than if there were no monopoly. But this is not the case*. For when the production is all in the hands of one person or company, the total expenses involved are generally less than would have to be incurred if the same aggregate production were distributed among a multitude of comparatively small rival producers. They would have to struggle with one another for the attention of the consumers, and would necessarily spend in the aggregate a great deal more on advertising in all its various forms than a single firm would; and they would be less able to avail themselves of the many various economies which result from production on a large scale.

use of logical analysis, the comparison between monopoly and perfect competition represents an enormous logical error. It is an error that, in *Capitalism, Socialism, and Democracy*, prompted Joseph Schumpeter (1950: 106) to state:

> 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, the strategy that looks so restrictive when viewed in the individual case and from the individual point in 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.

Of course, economists have long argued that *natural monopoly* characterizes some industries, as exemplified by electric utilities. 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 serving a particular market area. But, if that is the case, then the comparison of output and price under natural monopoly 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 'perfect competition' comparison to demonstrate the inefficiency of monopoly. Recognizing the irrelevance of the competitive alternative under certain technological and market conditions, 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 will enable the delivery of such products to consumers. The analysis of the conditions for realizing such long-term projections concerning the evolving relation of supply of and demand for such products requires, a theory of the innovating firm that can transform technological and market conditions, not a theory of the optimizing firm that takes these conditions as given constraints.

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 innovating firm that transforms technological and/or market conditions (see Figure 1). To do so, the theory of innovative enterprise must permit 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

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In particular they could not afford to spend as much on improving methods of production and the machinery used in it, as a single large firm which knew that it was certain itself to reap the whole benefit of any advance it made. *This argument does indeed assume the single firm to be managed with ability and enterprise, and to have an unlimited command of capital – an assumption which cannot always be fairly made. But where it can be made, we may generally conclude that the supply schedule for the commodity, if not monopolized, would show higher supply prices than those of our monopoly supply schedule; and therefore the equilibrium amount of the commodity produced under free competition would be less than that for which the demand price is equal to the monopoly supply price*'. Marshall (1981: 485n) added in a footnote: 'Something has already been said ([Book] IV, [Chapters] XI, XII; and [Book] V, [Chapters] XI), as to the advantages which a single powerful firm has over its smaller rivals in those industries in which the law of increasing return acts strongly; and as to the chance which it might have of obtaining a practical monopoly of its own branch of production, if it were managed for many generations together by people whose genius, enterprise and energy equalled those of the original founders of the business'.

innovative enterprise is to explain how, by generating output of a higher quality and/or lower cost, a particular enterprise can differentiate itself from its competitors and emerge as dominant in its industry.

Unlike the optimizing firm, the innovating firm 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. Indivisible technology or the 'entrepreneur' as a fixed factor (typical assumptions, as we have seen, in the neoclassical theory of the optimizing firm) does not dictate this 'fixed-cost' strategy. Rather, the fixed-cost strategy results from the assessment by the firm's strategic decision-makers of the quality and quantity of productive resources in which the firm must invest to *develop* higher quality processes and products than those previously available or that will be developed by competitors. 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 advantage over its competitors and emerge as dominant in its industry.

Such development of productive resources, when successful, becomes embodied in products, processes, and people with superior productive capabilities than those that had previously existed. But the high fixed costs that such investments entail mean that in and of themselves these investments place the firm at a competitive *disadvantage* until such time that, through these investments, it can transform the technologies and access the markets that can generate returns. An innovative strategy that can eventually enable the firm to develop superior productive capabilities may place that firm at a cost disadvantage because such strategies tend to entail higher fixed costs than the fixed costs incurred by rivals that choose to 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 will entail higher fixed costs than those incurred by the optimizing firm if the innovation process requires the *simultaneous development* of productive resources across a broader and deeper range of integrated activities than those 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 that is 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.

The high fixed costs of an innovative strategy create the need for the firm 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 innovating firm 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, take increasing costs as a given constraint, the innovating firm 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 Figure 2).

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 incrementally at the going factor price 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 innovating firm 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 innovating firm succeeds in this transformation, it in effect 'unbends' the U-shaped cost curve that the optimizing firm takes as given (see Figure 2).[16] By shaping the cost curve in this way, the innovating firm creates the possibility of securing competitive advantage over its rivals.

As indicated in Figures 4a and 4b, the dynamics of the innovation process depend on the evolution of not only product costs but also product demand. Indeed, the two are interdependent because the attainment of low unit costs depends on the extent of the market that the firm accesses, and the extent of the market that the firm is able to access depends on the productive capabilities that its develops. At a point in time there exists a *potential* demand for a good or service that is dependent on both the incomes and wants of buyers. The innovative firm, however, must *access* these markets, a process that generally entails investments of considerable size and duration in sales forces, distribution and servicing facilities, advertising, and branding. These investments, which add to the fixed costs of the innovative investment strategy, are necessary because of the need to inform and convince potential buyers that the product is in fact (given their wants) 'higher quality' than alternative goods or services that could satisfy those wants. These investments in accessing markets can shape the demand curve for the firm's product by increasing the quantity of the product that buyers will demand at a given price. To some extent and degree, this demand will become 'dedicated' as buyers come to view the firm's product as higher quality relative to those of competitors; that is, buyers will be willing to pay a premium for the firm's brand. Market investments can also shape the price elasticity of demand for the firm's product, as the buyers' perception of its higher quality makes them less willing than they would have otherwise been to reduce the quantity demanded with an increase in price.[17]

The dynamics of the innovation process can enable the innovating firm to capture progressively a number of market segments based on different income levels of buyers (see Figures 4a and 4b). Especially at the initial stages of the innovation process, the

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16 For a fuller theoretical elaboration of this process of sustained innovative transformation, see Lazonick 1991a: ch. 3; and 1993.

17 The notion that a firm can allocate resources to seek to influence market demand for its product was the key insight of Edward Chamberlin in his 1933 book, *The Theory of Monopolistic Competition*. But Chamberlin did not seek to construct a theory of the innovating firm. He simply argued that through advertising expenditures, the firm could shift outward the demand curve that it faces, thus permitting it to charge higher prices. To do so, however, the firm's cost curve shifts upward so that the firm does not increase supply. As Chamberlin (1956, 68) argued, 'the price is inevitably higher and the sale of production inevitably smaller under monopolistic competition than pure competition'. See Lazonick 1991a, 165-8 for a critique of Chamberlin's model.

Figure 4a. Accessing market segments: product innovation

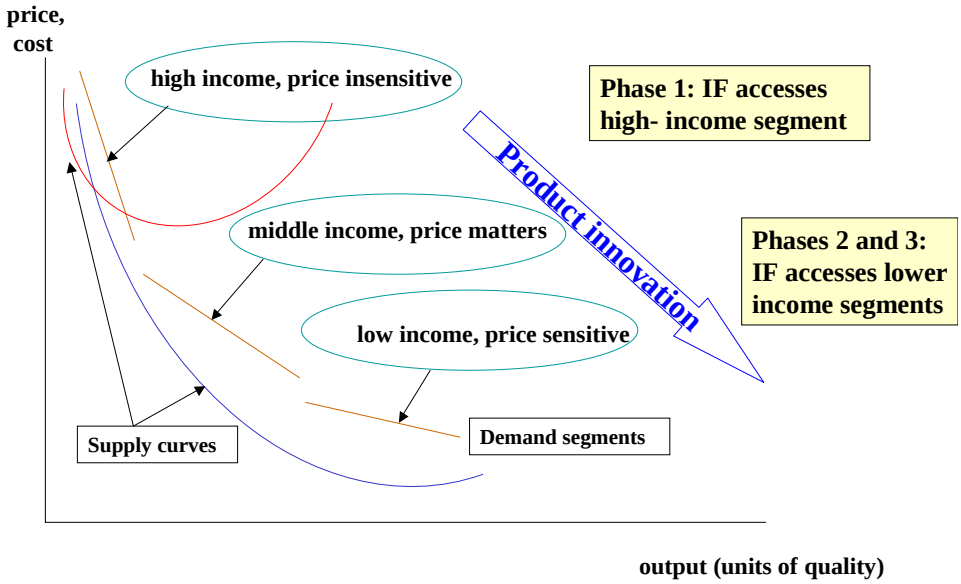
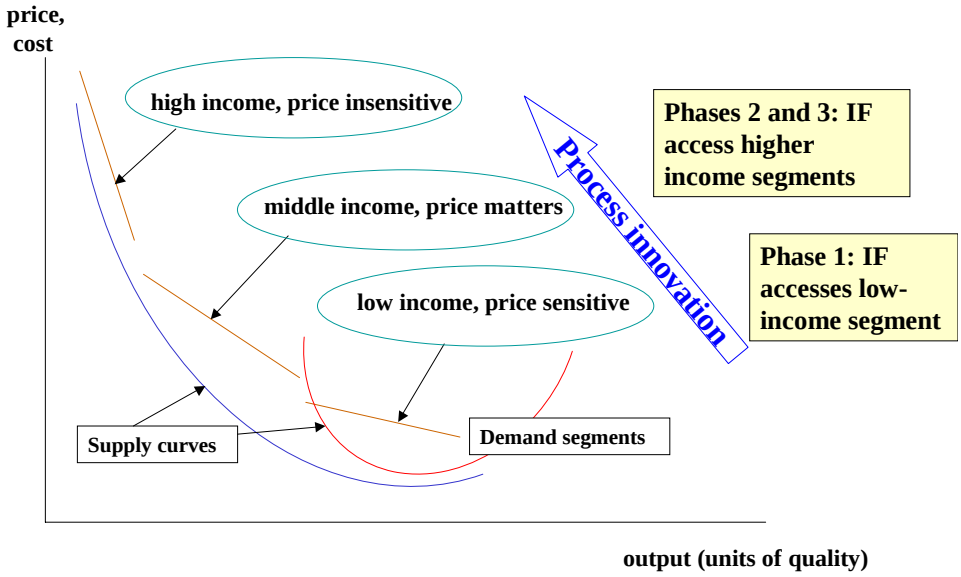


Figure 4b: Accessing markets: process innovation



innovating firm may not have sufficiently developed its capabilities to gain access to all of these market segments simultaneously. Cumulatively, however, the ability of the innovating firm to access one market segment may provide a foundation on which it can develop capabilities to access other market segments.

As a general rule, product innovation will proceed from the higher income segments to the lower income segments (see Figure 4a), while process innovation will proceed in the other direction (see Figure 4b). By meeting demand for a new product in the high-income market in the early stage of the innovation process, the firm generates revenues that help sustain the process while, through the iterative investment process that I described earlier, learns how to mass produce and mass market, thus gaining access to buyers who are lower income and, hence, more price sensitive. Innovation in consumer

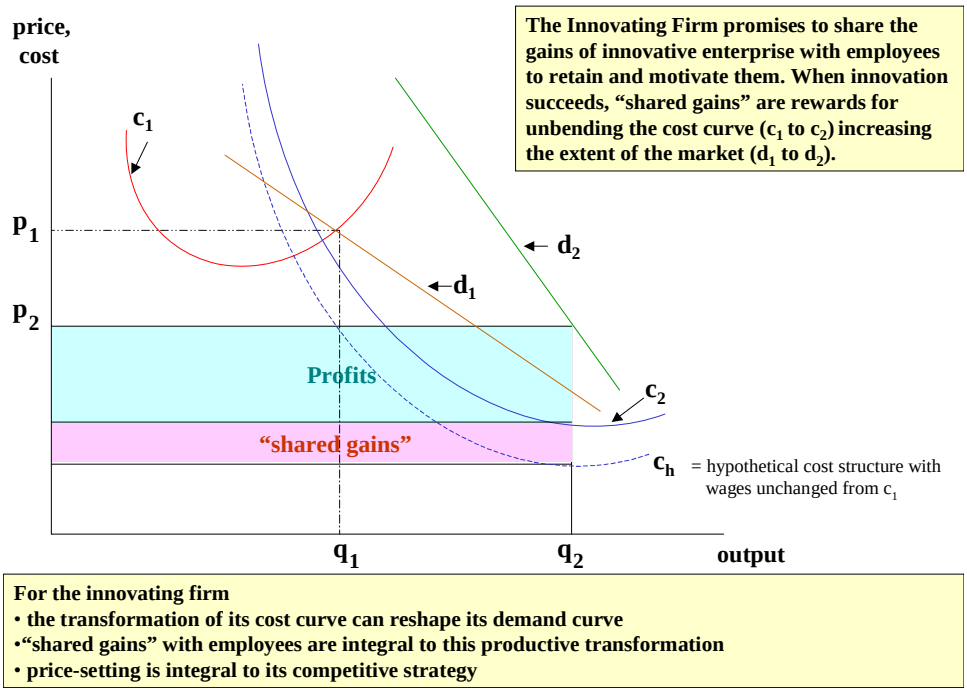
electronics provides a number of examples from calculators in the 1970s to plasma television screens in the 2000s of the progression from higher income to lower income segments, and from product innovation to process innovation. Alternatively, an innovating firm may seek to capture existing mass markets through process innovation that, if it can attain a sufficient extent of the market, makes *existing* products lower cost. In this case, as illustrated in Figure 4b, the innovative strategy will target lower income markets in the first phase. In subsequent phases, however, the innovating firm will seek to move into higher income segments of the market that can afford higher quality products by adding new product features to the advantages it has already gained through process innovation. Japanese entry and growth in automobiles from the 1950s (first in the Japanese markets and then from the 1970s in global markets) provides an excellent example of this progression.

The innovating firm generates revenues when, as a result of developing and utilizing productive resources, it can offer buyers a product of a quality that they want at a price that they are willing to pay. What then determines output and price in a theory of innovative enterprise? The answers are not straightforward because the innovating firm's pricing strategy and its investments designed to shape market demand are endogenous to the innovation process itself (see Spence 1981). The innovating firm will have a strong interest in increasing the extent of the market to which it has access. Greater market share increases the learning experience of the innovating firms, while it helps to prevent rivals from gaining access to buyers not only at present but also in the future as buyers become customers who repeat their purchases of, and upgrade their demand for, the innovating firm's products (see Christensen 1997).

The revenues (and not just the profits) that the innovating firm generates can be critical to maintaining its organization intact. When the innovating firm generates revenues, it has financial resources that can be allocated in a number of ways. If the gains from innovation are sufficient, the firm's revenues create the possibility for self-financing. The firm may leverage this financing with bonded and bank debt, depending on its relations with the financial sector and its need for finance. For the innovating firm, financial resources not only fund new investment but also enable the firm to keep its 'learning' organization intact. Indeed, as illustrated in Figure 5, the gains from innovation create the possibility of enhancing the remuneration of existing employees to motivate superior performance. Once the process is completed, it may be that, as a result of these internal rewards, the firm's wage bill is higher than those dictated by labor markets. In fact, however, the gains that it has shared with its employees may have been critical inducements to gain their cooperation in implementing its innovative investment strategy. What the labor market might view as the firm's high wages are, in dynamic perspective, both sources and outcomes of its competitive advantage.

In contrast, therefore, 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 innovating firm becomes dominant by transforming the industry cost structure, shaping market demand, 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 changing technological and market conditions rather than accepting them as constraints on its activities, the innovating firm, that is, can outperform the 'optimizing' firm in terms of both output and cost.

Figure 5. Interdependent dynamics of supply and demand in a theory of innovative enterprise



Unlike the optimizing firm, the innovating firm 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 innovating firm's ability to transform the high-fixed costs of its innovative investment strategy – a strategy that if economies of scale are not attained places the firm at a competitive *disadvantage* relative to the optimizing firm – into the low unit costs that give it competitive *advantage*. Yet when the innovative strategy is successful, the innovating firm 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, stockholders, and, through taxation, governments. The innovation process, that is, can potentially overcome the 'constrained-optimization' trade-offs between consumption and production in the allocation of resources as well as between capital and labor, and even between enterprise and society, in the allocation of returns. It is for this reason that innovation forms the foundation of economic development.

Social conditions of innovative enterprise

As discussed at the end of the last section of this paper, empirical research into the characteristics of the innovation process reveals that it is *uncertain*, *collective*, and *cumulative* (O'Sullivan 2000b). The outcome of the process cannot be predicted when investments are made, and the transformation of investments into innovation cannot be done by one person alone and cannot be done all at once (Penrose 1959; Best 1990: 125). A strategy to overcome uncertainty requires a collective and cumulative learning process. In the theory of innovative enterprise, the role of strategy is to confront uncertainty, the role of organization is to generate collective learning, and the role of finance is to sustain cumulative learning. Innovation is, therefore, a social process,

supported in certain times and places by what can be called 'social conditions of innovative enterprise'.

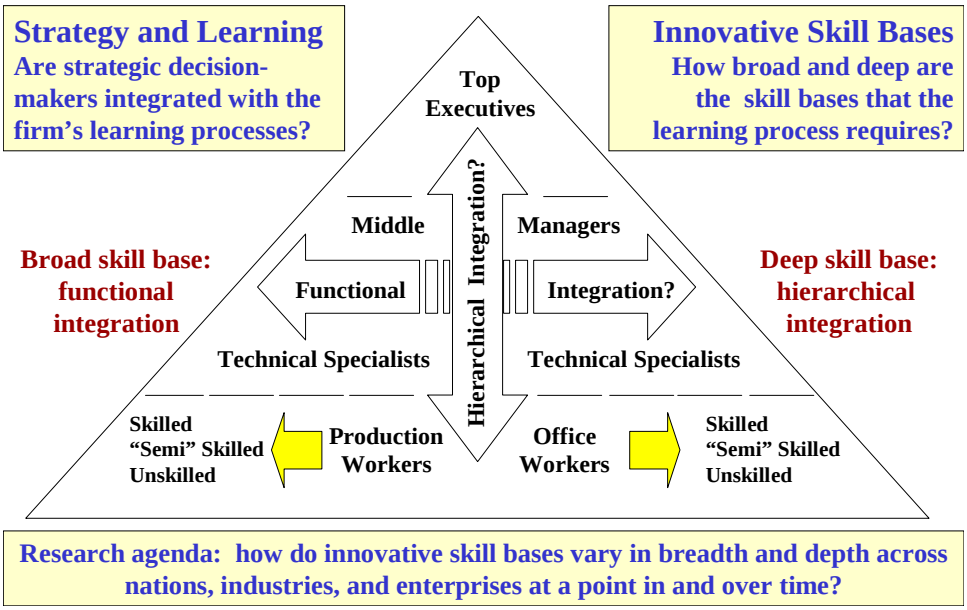
The theory of innovative enterprise permits us to identify three social conditions that can transform strategy, organization, and finance into innovation, and thus support the process of economic development. The social conditions of innovative enterprise manifest themselves in social relations that are central to the development of the economy. In the remainder of this section of the paper, I will define these social conditions, and in the next section I will show how they differ across nations characterized by distinctive economic institutions for governing the allocation of resources, employing labor, and financing investment.

The social condition that can transform strategy into innovation is *strategic control*: a set of relations that gives decision-makers the power to allocate the firm's resources to confront the technological, market, and competitive uncertainties that are inherent in the innovation process. For innovation to occur, those who occupy strategic decision-making positions must have both the abilities and incentives to allocate resources to innovative investment strategies. Their abilities to do so will depend on their knowledge of how the current innovative capabilities of the organization over which they exercise allocative control can be enhanced by strategic investments in new, typically complementary, capabilities. Their incentives to do so will depend on the alignment of their personal interests with the interests of the business organization in attaining and sustaining its competitive advantage.

The social condition that can transform organization into innovation is *organizational integration*: a set of relations that creates incentives for people to apply their skills and efforts to organizational objectives. The need for organizational integration derives from the developmental complexity of the innovation process – that is, the need for organizational learning – combined with the imperative to secure high levels of utilization of innovative investments if the high fixed costs of these developmental investments are to be transformed into low unit costs. Modes of compensation (in the forms of promotion, remuneration, and benefits) are important instruments for integrating individuals into the organization. To generate innovation, a mode of compensation cannot simply manage the labor market by attracting and retaining employees. It must be part of a reward system that manages the learning processes that are the essence of innovation; the compensation system must motivate employees as individuals to engage in collective learning. This collective learning, moreover, cumulates over time, thus necessitating financial commitment to keep the learning organization intact.

The social condition that can transform finance into innovation is *financial commitment*: a set of relations that ensures the allocation of funds to sustain the cumulative innovation process until it generates financial returns. What is often called 'patient' capital enables the capabilities that derive from collective learning to cumulate over time, notwithstanding the inherent uncertainty that the innovation process entails. Strategic control over internal revenues is a critical form of financial commitment, but such 'inside capital' must often be supplemented by external sources of finance such as stock issues, bond issues, or bank debt that, in different times and places, may be more or less committed to sustaining the innovation process.

Figure 6. Strategy, organization, and the skill base in the theory of innovative enterprise



The social conditions of innovative enterprise perspective asks how and under what conditions the exercise of strategic control 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. The perspective emphasizes the role of human agency in determining whether and how the enterprise accumulates innovative capability, and thus adds an explicitly social dimension to an understanding of 'dynamic capabilities' that stresses the interaction of asset positions, organizational processes, and evolutionary paths in the innovative enterprise (see Teece 2003). Specifically, *strategic control* determines how strategic decision makers choose to build on 'asset positions'; *organizational integration* determines the structure of incentives that characterize 'organizational processes' that can transform individual actions and individual capabilities (including those of strategic managers) into collective learning; and *financial commitment* determines whether the enterprise will have the resources available to it to persist along an 'evolutionary path' to the point where its accumulation of innovative capability can generate financial returns.[18]

Of central importance to the accumulation and transformation of capabilities in knowledge-intensive industries is the *skill base* in which the firm invests in pursuing its innovative strategy (see Figure 6). Within the firm, the division of labor consists of different functional specialties and hierarchical responsibilities. At any point in time a firm's functional and hierarchical division of labor defines its skill base. In the effort to generate collective and cumulative learning, those who exercise strategic control can choose how to structure the skill base, including how employees move around and up the enterprise's functional and hierarchical division of labor over the course of their careers. At the same time, however, the organization of the skill base will be

18 For applications, see Carpenter et al 2003; Lazonick and Prencipe 2005.

constrained by both the particular learning requirements of the industrial activities in which the firm has chosen to compete and the alternative employment opportunities of the personnel whom the firm wants to employ. The innovative enterprise requires that those who exercise strategic control be able to recognize the competitive strengths and weaknesses of their firm's existing skill base and, hence, the changes in that skill base that will be necessary for an innovative response to competitive challenges. These strategic decision-makers must also be able to mobilize committed finance to sustain investment in the skill base until it can generate higher quality, lower cost products than were previously available

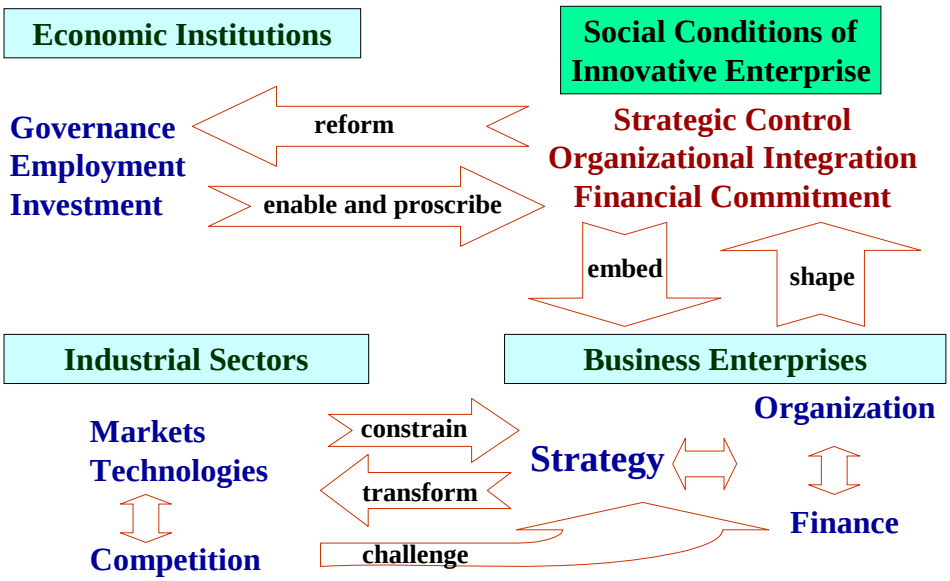
In cross-national comparative perspective, as will be shown in the next section of this paper, the skill base that enterprises employ to transform technologies and access markets can vary markedly even in the same industrial activity during the same historical era, with different innovative outcomes. Precisely because innovative enterprise depends on social conditions, the development and utilization of skill bases that occur in one institutional environment may not, at a point in time at least, prevail in another institutional environment. Moreover, even within the same industry and same nation, dynamic capabilities that yielded innovative outcomes in one historical era may become static capabilities that inhibit innovative responses in a subsequent historical era.

4 Economic institutions and innovative enterprise

If one accepts that business enterprises are social structures that are in turn embedded in larger (typically national) institutional environments, a theory of innovative enterprise must itself be embedded in a model of the relations among *industrial sectors*, *business enterprises*, and *economic institutions* that can support the processes that can transform technologies and access markets to generate products that are higher quality and/or lower cost than those that had previously existed. Figure 7 provides a schematic perspective of the interactions among sectors, enterprises and institutions in shaping the social conditions of innovative enterprise. First, I shall explain the interactions depicted in this diagram, and then I shall turn to a summary of the variation in social conditions of innovative enterprise across the largest developed nations in the last decades of the twentieth century.

Innovation differs across industrial sectors in terms of the technologies that are developed and the markets that are accessed. In the theory of the optimizing firm, business enterprises take technologies and markets as given: they constrain the 'strategy' of the business enterprise to be like that of each and every other firm in the industry. In the theory of the innovating firm, in contrast, enterprise strategy transforms technology and markets. In doing so, strategy confronts technological uncertainty – the possibility that an innovative investment strategy will fail to develop higher quality products or processes – and market uncertainty – the possibility that the strategy will fail to access a large enough extent of the market to transform the high fixed costs of developing these products and processes into low unit costs. But, as indicated in lower part of Figure 7, the innovating firm must also confront competitive uncertainty – the possibility that even if the firm is successful in transforming technology and accessing markets to develop higher quality, lower cost products than were previously available, competitors will do it better and cheaper.

Figure 7. Social conditions of innovative enterprise



The rise of new competition poses a challenge to the innovating firm. It can seek to make an innovative response or, alternatively, it can seek to adapt on the basis of the investments that it has already made by, for example, obtaining wage and work concessions from employees, debt relief from creditors, or tax breaks or other subsidies from the state (see Lazonick 1993). An enterprise that chooses the adaptive response in effect shifts from being an innovating to an optimizing firm. How the enterprise responds (as depicted in Figure 7) will depend on not only the abilities and incentives of those who exercise strategic control but also the skills and efforts that can be integrated in its organization and the committed finance that, in the face of competitive challenges, can be mobilized to sustain the innovation process.

If and when innovation is successful in a particular nation over a sustained period of time, the types of strategic control, organizational integration, and financial commitment that characterize the nation's innovating firms will constitute distinctive social conditions of innovative enterprise. Why, one might ask, would the social conditions of innovative enterprise exhibit similar characteristics across firms in a nation, particularly when they are engaged in different industries? Or, to put the question differently, why would not the social conditions of innovative enterprise be the same for all firms in all industries across all nations? The answer to both questions, as depicted in Figure 7, is that historically nations differ in their institutions. At any point in time these institutions both enable and proscribe the activities of firms, while over time distinctive elements of these institutions become embedded in the ways in which firms function. Of particular importance in influencing the social conditions of innovative enterprise are *economic* institutions related to *governance*, *employment*, and *investment*. Through a historical process, the strategic, organizational, and financial activities of a nation's innovative enterprises shape the characteristics of these economic institutions, but these institutions also exist and persist independently of these enterprises as part of the 'social fabric' – the rules and norms of the nation applicable to economic activity that find application in the social relations of that nation's firms.

Governance institutions determine how a society assigns rights and responsibilities to different groups of people over the allocation of its productive resources and how it imposes restrictions on the development and utilization of these resources. Employment institutions determine how a society develops the capabilities of its present and future labor forces as well as the level of employment and the conditions of work and remuneration. Investment institutions determine the ways in which a society ensures that sufficient financial resources will be available on a continuing basis to sustain the development of its productive capabilities. These economic institutions both enable and proscribe the strategic, organizational, and financial activities of business enterprises, thus influencing the conditions of innovative enterprise that characterize social relations within any given firm at any point in time. As these business enterprises succeed at innovation, they may reshape the conditions of innovative enterprise; for example, their strategic decision-makers, acting collectively, may take steps to reform these institutions to suit the new needs of their enterprises.

This highly schematic perspective, therefore, posits a dynamic historical relation between organizations and institutions in the evolution of the social conditions of innovative enterprise. To go beyond this schema requires the integration of the theory of innovative enterprise with comparative research on the evolution of the conditions of innovative enterprise in different times and places. To study the innovative enterprise in abstraction from the particular social conditions that enable it to generate higher quality, lower costs products is to forego an understanding of why a firm became innovative in the first place and how its innovative capabilities may be rendered obsolete. A comparative-historical analysis enables us to learn from the past and provides working hypotheses for ongoing research (for an explication of this integrative methodology, see Lazonick 2002b; for a comparative-historical synthesis of the innovative firm, see Lazonick 2004c).

For a first example of such a working hypothesis, the comparative-historical experience of innovative enterprise suggests that, contrary to a common belief that has persisted since the late nineteenth century, the form of firm ownership is not the critical issue for understanding the type of strategic control that supports innovative enterprise. Critical are the abilities and incentives of those managers who exercise strategic control. Whether they are majority owners of the firm, state employees, or employees of publicly listed companies, one needs to know where and how these strategic managers gained the experience to allocate resources to the innovation process, and the conditions under which their personal rewards have depended on the firm's innovative success.

Second, the most fundamental, if by no means the only, source of financial commitment for the innovating firm is to be found in those revenues that are generated by the firm itself. Retentions form the foundation of corporate finance (Myers and Majluf 1984; Corbett and Jenkinson 1997; O'Sullivan 2003a). The use of bank finance to leverage internal funds in providing financial commitment requires close relations between financial institutions and innovating firms, as for example in the Japanese model. In certain times and places, the stock market can provide some well-positioned firms with financial commitment. But as an investment institution, the major role of the stock market is to provide liquidity to productive investments that have already made, not commitment to finance new productive investments. It enables owner-entrepreneurs and venture capitalists to cash out of their investments in startup companies, and it enables households to diversify their savings portfolios so that they can (hopefully) tap into the yields of the stock market without having to devote time and effort to understanding and

monitoring the innovative capabilities of the companies that have listed their equities on it.

Third, while strategic control and financial commitment are essential to innovative enterprise, it is organizational integration that determines the innovative capability that a firm actually possesses. The types of organizational integration that result in innovation vary across industries and institutional environments as well as over time. The hierarchical and functional divisions of labor that, when integrated into learning processes, have generated innovation in the past cannot necessarily be expected to do so in the future when faced with changes in technology, markets, and competition – changes that to some extent successful innovation in itself brings about.

In a theory of innovative enterprise, strategy, finance, and organization are interlinked in a dynamic process with learning as an outcome. To fully comprehend innovative enterprise, there is a need to understand the actual learning processes: the relation between tacit knowledge and codified knowledge, between individual capabilities and collective capabilities, and between what is learned at a point in time and how that learning cumulates over time (see Lazonick and O'Sullivan 2000b). The prevailing social conditions of innovative enterprise provide the context for those learning processes, shaping the types of learning that are attempted, the extent to which these processes are sustained, and the ways in which people interact both cognitively and behaviorally in the learning process. The influence of the social context is manifested by the functional and hierarchical integration of skill bases that can vary dramatically across industries and institutional environments as well as over time (Lazonick 2004c).

The US Old Economy model[19]

We can begin a comparative analysis of these different social conditions of innovative enterprise by taking as our 'benchmark' case the US Old Economy business model, the dominant business model in global competition of the post-Second World War decades (see Figure 8). A basic characteristic of this business model was the separation of share ownership and managerial control. The existence of well-developed stock markets, most notably the New York Stock Exchange (NYSE), had during the first decades of the century resulted in the fragmentation of shareholding, leaving career managers in control of the allocation of corporate resources. In principle, boards of directors representing the interests of shareholders monitored the decisions of these managers; in practice, incumbent top executives chose the outside directors and were themselves members of the board. Shareholders could challenge management through proposals to the annual general meeting, but over the course of the twentieth century a body of law evolved that enabled management to exclude stockholder proposals that dealt with

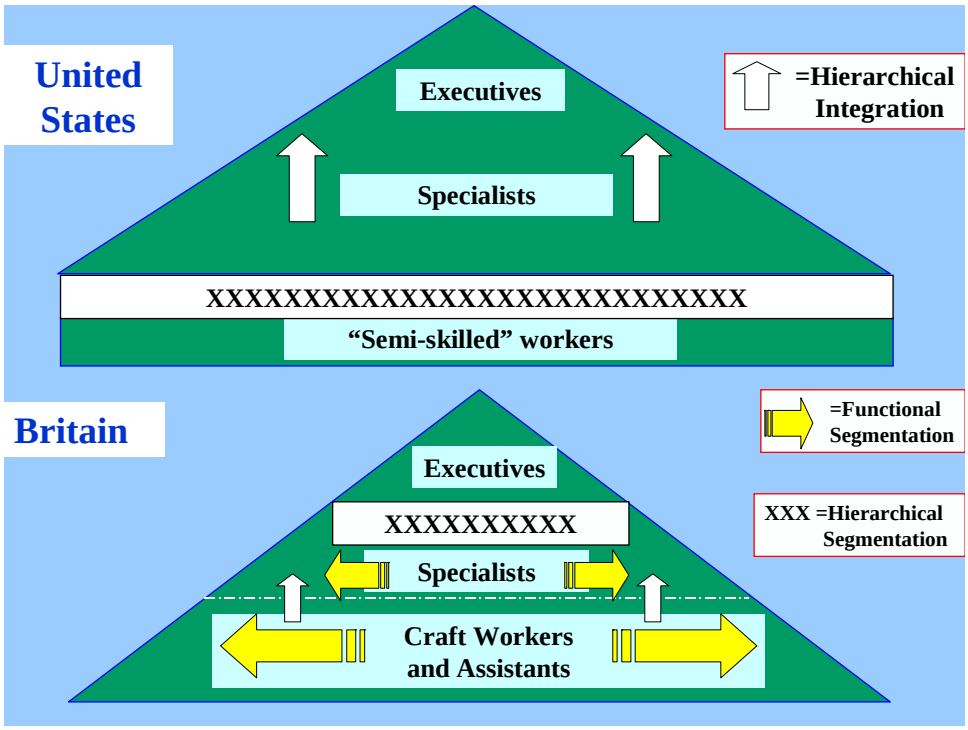
19 There are extensive literatures on a wide range of topics that inform the characterizations of the various national business models presented below. Except where quoting directly or using specific data rather than reference each particular argument throughout the text, for each business model I provide the reader with a list of the core references on which I have drawn (including previous papers of mine that in turn contain the relevant bibliographic references). For the US Old Economy business model these references include Noble 1977; Mowery and Rosenberg 1989; Chandler 1990: Hughes 1990; Lazonick 1990: chs 7-10; 2002a; 2004a; Brody 1993; Rosenberg and Nelson 1994; Hounshell 1996; and O'Sullivan 2000a: chs 3-6; and 2003a.

normal business matters (for example, acquisitions or downsizings) as distinct from social issues (for example, sex discrimination or corporate pollution).

What motivated top managers to act in the interests of the organizations rather than themselves were general norms of business behavior that derived from the fact that, having spent their careers with the companies that they came to head, top executives saw themselves as 'organization men'. Their own career success depended on the success of the enterprise as a whole. In the immediate post-Second World War decades the salaries of top executives of US corporations remained constrained by the hierarchical salary structures of the managerial organizations over which they presided. Already in the 1950s, however, top executives of these companies were receiving stock options, a mode of compensation that, as I shall elaborate below, was ultimately destructive of the organizational integration of those in positions of strategic control.

The Old Economy US business model worked effectively to generate innovation when executives who exercised strategic control were integrated with an organization of administrative and technical specialists who engaged in the development and ensured the utilization of the company's productive resources. These 'organization men' were on career paths along which they moved up and around a particular corporate hierarchy, with the possibility, even if not the high probability, of themselves rising to top executive positions. These cohesive managerial structures encouraged the functional integration of the capabilities of administrative and technical specialists, contributing to the world's most formidable systems of mass production.

Figure 8. US Old Economy and British business models compared



At the same time, however, a distinctive feature of the US Old Economy model was the organizational segmentation between, in the upper part of the hierarchy, salaried managers, in whose training and experience the corporation made heavy investments, and, in the lower part of the hierarchy, so-called 'hourly' workers who, while they often spent their entire working lives with one company, were considered to be interchangeable commodities in whose capabilities the company had no need to invest.[20] Salaried managers entered these corporations with higher education degrees from a well-funded, government-supported system whose curricula had historically been shaped by the needs of business corporations for technical and administrative personnel. Hourly workers entered these corporations with high school diplomas that generally reflected mediocre educations.

Nevertheless, union representation, seniority hiring and firing, overtime pay, the need of corporations for reliable even if low-skilled workers to tend mass production processes, and the success of the Old Economy model combined to enable these hourly workers to receive good pay and benefits. As a rule, however, the hourly worker could over the course of his or her working life at best hope to rise to the rank of foreman, a salaried position that (as was the case for all salaried employees) denied these supervisors the right to be represented in collective bargaining but was generally dead-end in terms of any further career mobility up the managerial hierarchy. Meanwhile a central preoccupation of salaried managers in the post-Second World War decades was to develop skill-displacing automated technologies so that in 'the factory of the future' their companies could dispense with the employment of hourly workers whom they viewed as being undereducated, underskilled, and overpaid.

The US Old Economy corporation received considerable financial support from government programs for technology development in areas such as aerospace, computers, and biotechnology. The development of the productive potential of these government investments relied on corporate research capabilities, but, given the size and duration of the investments involved, even the largest and most successful business corporations would not have been able or willing to finance them on their own. Retained earnings formed the financial foundation for the investments that the corporations did make; in the 1960s and 1970s corporate taxes were about 39 percent of corporate profits (including inventory valuation and capital consumption adjustments), dividends were about 25 percent, and retentions about 36 percent. When corporations needed additional investment financing, they issued corporate bonds at favorable rates that reflected conservative debt-equity ratios. Bank loans were used almost exclusively for working capital. Companies made only limited use of the stock market as a source of investment funds.

As I discuss below, during the 1970s and 1980s, the US Old Economy model began to falter in the face of Japanese competition that integrated shop-floor workers into the processes of organizational learning. In addition, the internal cohesion of the managerial organizations of US corporations weakened, particularly as corporations grew bigger and diversified into many different lines of business. The conglomerate movement of

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[20] Non-salaried employees were classified as 'hourly' (or 'non-exempt') workers because of the stipulation of the National Labor Relations Act that emerged from the New Deal era that required employees who were paid an hourly wage 150 percent of that wage if they worked longer than the normal working hours. The overtime work of salaried personnel is exempt from this provision.

the 1960s segmented top executives from the rest of the managerial organization. Increasingly, moreover, an integrative hierarchical reward structure ceased to regulate the pay of top executives, who embraced wholeheartedly the ideology of maximizing shareholder value as their boards bestowed on them ever more generous stock option awards. At the same time, in the high-tech industries, younger professional, technical, and administrative personnel became much less dependent on the pursuit of careers within Old Economy hierarchies as the creation of new firms based on a 'New Economy' business model provided them the possibility of using interfirm mobility to pursue alternative career paths.

The British model[21]

While the power of US Old Economy business model declined during the last two decades of the twentieth century, it occupied a position of global dominance in the post-Second World War decades. The innovative power of the US Old Economy model was particularly evident when placed in competition with the much more hierarchically and functionally segmented business model that prevailed in Britain. Coming into the twentieth century, Britain had been the world leader in GDP per capita before it was surpassed by the United States. In 1932-1935, with the US mired in the Great Depression, Britain once again emerged briefly with the world's highest GDP per capita, and then (among the large economies) remained second to the US until the beginning of the 1970s when it was overtaken first by France and then Western Germany and Japan. From the late 1960s to the present Britain's GDP per capita has been about 70 percent of that of the United States (Maddison 2004).

As an industrial nation that been the 'workshop of the world' in an era of proprietary capitalism, Britain was slow to make the transition to managerial capitalism. Although coming into the post-Second World War period, Britain had a presence in all of the major consumer and capital goods industries, ranging from steel to cars and from machine tools to electronics, its companies generally failed to remain competitive in global markets. As depicted in Figure 8, a prime reason was the organizational segmentation that characterized the British business model. Top executives of major British companies tended to be segmented from the rest of the organization, and technical specialists tended to be functionally segmented from one another.

The hierarchical segmentation of top executives hampered their ability to invest in organizational capabilities in response to innovative challenges. The historical origins of this segmentation can be found in the interaction between the control of British industrial enterprises and the structure of British society during the first half of the twentieth century. Families remained in the control of British firms, and yet, as leading industrialists, they did not constitute an elite social class that could reshape Britain's economic institutions to support the new requirements of innovation enterprise. British industrialists of the late nineteenth and early twentieth centuries were generally middle class, with their home bases in the industrial districts of the Midlands and the North. Large accumulations of wealth in Britain were in the hands not of these industrialists

21 This section draws on Hannah 1983; Elbaum and Lazonick 1986; Sorge and Warner 1986; Lazonick 1986; 1990: ch. 6; Daunton 1992; Chandler 1990; Walker 1993; Dore et al. 1999; Owen 1999; Coates 2002, Vol. III, Part II; Cheffins 2004; Francks et al. 2004.

but of financiers based in the City of London. Using upper-class educational institutions as means of entry and marriages as instruments of merger, wealthy financiers joined with the old landowning elite (many of them grown recently wealthy through rising land values) to form a new aristocracy. The wealth of this restructured upper class was not, as was increasingly the case in the United States and Germany, based on the application of science to industry and the resultant profits from technological innovation. Rather, the bases of wealth in financial activities were social connections and acquired reputations. Hence the importance for ultimate economic success of family connections and associations made at elite educational institutions – the ancient universities of Oxford and Cambridge as well as public schools such as Eton and Harrow.

Lacking industrial roots, the aristocracy who controlled these elite institutions during the era of the second industrial revolution had no need for an educational system that developed technologists. They valued the study of science as a branch of sophisticated knowledge but had no interest in its application to industry. Indeed they positively resisted the notion that a concern with technology had any place in an elite education; its function was to set them apart from middle-class industrialists, not to bring them in closer contact with them. By the same token, successful industrialists who accumulated sufficient fortunes to join Britain's upper class had little interest in challenging the anti-technology bias of Britain's elite educational system. As individuals, they wanted to elevate their social standing, not transform British social institutions. As Donald Coleman (1973) put it in a well-known essay, successful British industrialists sought to become 'gentlemen' rather than 'players'.

In seeking to move up the social hierarchy, successful industrialists did not abandon industry for finance; barriers to entry into finance and related pursuits were high precisely because of the centrality of social connections and reputation to the success of the financial enterprise. Rather control over an established industrial enterprise remained the foundation of their material wealth and the most assured means of passing it on to their heirs. Throughout the first half of the twentieth century, they handed control over their businesses to their sons and sons-in-law, thus perpetuating the relation between ownership and control. In many industries, mergers among family firms led to a decline of the ownership stake of any single family in many major British companies. Now, however, an amalgam of family firms, each with its own minority stake, occupied, and in effect divided, positions of strategic control in these companies, as family members continued to dominate the boards, including executive director positions. In an era in which the 'managerial revolution' professionalized positions of strategic control in not only in the United States but also Germany and Japan, the managers of major British enterprises remained by almost all accounts amateurs.

The larger owner-controlled firms that had to go beyond family members to recruit higher-level managers gave preference to graduates of Oxbridge. A study of the career mobility of British industrial managers done in the mid-1950s found that the most advantageous educational qualification was an arts degree from Oxford or Cambridge (Acton Society Trust 1956, 8, 128). By the 1960s, the emphasis had turned toward science degrees from the elite universities. But scientists and engineers from provincial universities remained second-class citizens within industrial enterprises, with little if any prospect of rising from the specialist to executive level. Given this hierarchical segmentation, societies of chemical and electrical engineers set their own qualifications for university graduates to enter their professions. In contrast, in the United States corporate involvement with the university system itself set the professional standards

for these specialists. The result in Britain was a functional segmentation among technical specialists that impeded organizational learning within enterprises.

The problem of functional segmentation extended to the shop floor where craft workers jealousy guarded their realms of craft control. In machine-based industries there was some hierarchical mobility of craft workers to specialist positions, but this mobility only served to reinforce the hierarchical segmentation of craft control from corporate control and functional segmentation among technical specialists. These shop-floor workers were more highly skilled than their US counterparts, but they used these skills to preserve their craft prerogatives embodied in 'custom and practice'. Meanwhile, given the weakness of British managerial organization, those who exercised strategic control over British industrial firms made little attempt to develop shop-floor skills as part of an innovative investment strategy, as was being done for example in Germany and Japan. Recognizing the barriers that craft demarcations posed to raising productivity, during the 1960s many companies sought to reorganize their production processes by granting wage increases to groups of workers in exchange for the elimination of craft rules. Studies of these experiments in 'productivity bargaining' found that the result was often a proliferation of *new* craft rules created by groups of workers who would then agree to drop these rules in exchange for higher pay.

This segmented structure of business organization remained in place in Britain during the post-Second World War decades. In the 1950s and 1960s a hostile takeover movement as well as nationalizations challenged the persistence of family control. As a defense against takeover, incumbent managers often increased dividends payments, while in the aftermath of a successful takeover, new management often did the same. One result was that, notwithstanding the relatively poor performance of British industrial companies, their dividend payout ratios were high relative to those in other developed nations, including the United States. Indeed, in the 1950s and 1960s, relatively high dividend yields induced institutional investors such as pension funds and insurance companies to allocate considerable proportions of their portfolios to corporate equities. Britain's financial community, centered in the City of London, remained much more concerned with reaping the returns from the investments that British business corporations had made in the past than with providing these companies with financial commitment for innovative investment strategies that could generate new sources of returns in the future.

Government monetary policies during the Thatcher era of the 1980s pushed British industry to the wall, and thus helped to resolve its competitive shortcomings by forcing many firms organized along the British model to shut down. Subsequently Japanese and Korean companies revived the British industrial base by setting up plants in Britain to serve as platforms for exports to European markets. Run according to distinctive business models imported from their own countries, these foreign direct investments have enjoyed considerable success, in the process helping to bring modern management methods to Britain.

The Japanese model[22]

In the 1970s and 1980s the Japanese business model directly confronted the US Old Economy model, as depicted in Figure 9. In the post-Second World War decades, US managerial corporations dominated in international competition in a wide range of high technology industries. Many of these corporations had been accumulating innovative capabilities from the late nineteenth century. During the depressed years of the 1930s, even those US industrial corporations that cut back production and employment dramatically nevertheless continued to invest in R&D and enhance their innovative capability. Within the new structure of cooperative industrial relations that emerged out the conflicts of the depression years, US industrial corporations were able to take advantage of the post-Second World War boom to re-establish themselves as the world's pre-eminent producers of consumer durables such as automobiles and electrical appliances and related capital goods such as steel and machine tools. With the help of US government research support and contracts, US companies also became the leaders computer and semiconductor industries.

Then in the 1970s and 1980s Japanese companies challenged the US industrial corporations in the very industrial sectors in which even as late as the 1960s US corporations seemed to have held insurmountable competitive advantage. Building on the development of innovative capabilities in their home market during the 1950s and 1960s, Japanese companies gained competitive advantage over US companies in industries such as steel, memory chips, machine tools, electrical machinery, consumer electronics, and automobiles. Initially, as Japanese exports to the United States increased rapidly in the last half of the 1970s, many observers attributed the challenge to the lower wages and longer working hours that prevailed in Japan. By the early 1980s, however, with real wages in Japan continuing to rise, it became clear that Japanese advantage was based on superior capabilities for generating higher quality, lower cost products.

Three business institutions – stable shareholding, permanent employment, and main bank lending[23] – provided the social conditions for Japan's remarkable success. Stable shareholding ensured that the top managers of Japanese industrial corporations would possess the strategic control required to make innovative investments in industries in which in the 1950s there was no inherent reason to believe that they would ultimately be successful in international competition. Permanent employment enabled the companies involved to put in place a new model of hierarchical and functional integration that enabled them to engage in collective and cumulative learning in ways that their international competitors could not. Main bank lending supplied these companies with a level of financial commitment that permitted them to both grow rapidly and sustain the innovation process until they could generate returns first on home and then on foreign product markets. Let us look briefly at how these institutions evolved and became

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22 This section draws on Hadley 1970; Yonekawa 1984; Abegglen and Stalk 1985; Cusumano 1985; Gordon, 1985; Dore 1986; 1987; 1990; 2000; Clark and Fujimoto 1991; Aoki and Dore, 1994; Okimoto and Nishi 1994; Lazonick 1995; 1998; 1999; Sako and Sato 1997; Morikawa 2001; as well as many references cited therein.

23 These institutions are more generally called 'cross-shareholding', 'lifetime employment', and 'the main bank system', respectively. For reasons that will be noted in this discussion, and which are elaborated in Lazonick 2005b, these terms are misleading.

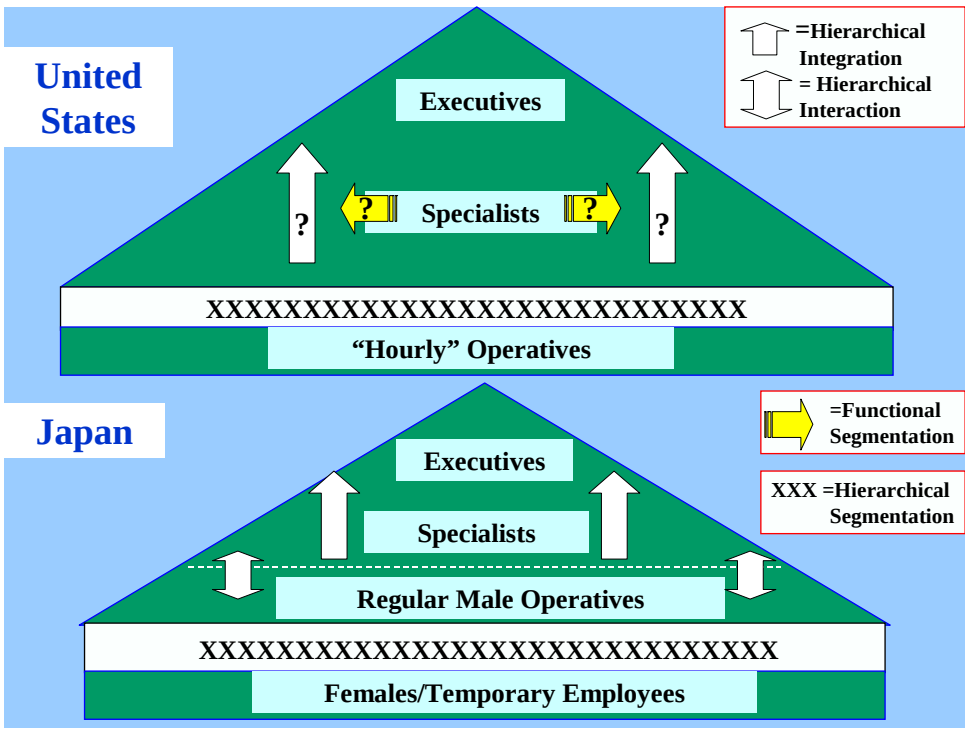
embedded in the functioning of the Japanese industrial enterprise in the post-Second World War decades.

In 1948 the Supreme Commander for the Allied Powers – the occupation authority in Japan – began the dissolution of the *zaibatsu*, the giant holding companies that had dominated the Japanese economy from the Meiji era of the late nineteenth century to the Second World War. The dissolution process not only dispossessed the families that owned the *zaibatsu* but also removed from office the top management layers of the *zaibatsu* holding companies and major affiliated companies. Taking over control of strategic decision-making in Japan's industrial enterprises were 'third-rank executives', primarily engineers who were plucked from the ranks of middle management to take leadership positions of companies that had no alternative but to find new uses for their accumulated capabilities in non-military markets.

The control exercised by these young and ambitious executives was by no means secure. There was a fear that stockholders, almost 70 percent of whom were individuals, might join forces to demand the traditional control rights as owners. To invest in the capabilities of their companies, enterprise managers needed to maintain as much control as possible over the allocation of corporate revenues. But the undeveloped state of the companies subsequent to the dissolution of the *zaibatsu* and the structure of public shareholding left Japanese enterprises vulnerable, if not to takeovers, then to debilitating demands from outside interests for the distribution of their earnings if and when such earnings should appear.

To defend themselves against demands for 'shareholder value' by these outside interests, the community of corporate executives engaged in the practice of cross-shareholding. Banks and industrial companies took equities off the market by holding each other's shares. Increasingly, business relations among companies, be they industrial

Figure 9. US Old Economy and Japanese business models compared



or financial, became cemented by cross-shareholding arrangements, with a company that had closer relations with another company being more likely to hold larger amounts of that company's shares, up to the legal maximum of five percent of shares outstanding (or ten percent in the case of holdings by insurance companies). Over time, as business relations among financial and industrial enterprises changed, the web of cross-shareholding became more intricate so that *mutual* shareholding between two companies ceased to be an important feature of the system; what became important was the entire system of stable shareholding. The institution of stable shareholding is not based on contractual relations but rather has been sustained by the willingness of the entire Japanese business community to accept that one company does not seek its own advantage by selling its shareholdings of another company to public shareholders.[24]

Japanese companies have routinely given their proxy votes to the managers of the companies whose shares they hold. To reduce the possibility for outside shareholders to press their demands on management, virtually all companies listed on the Tokyo Stock Exchange have held their annual general meetings of shareholders at the same time on the same day – the last Friday in June at 2:00pm, with the meetings lasting on average, over the course of the 1990s, 28.37 minutes (Hilary and Oshika 2003: 41). Nevertheless, until the government cracked down on the practice in the mid-1990s, *yakusa*, members of Japanese organized crime, routinely extorted bribes from Japanese top managers in return for promises not to ask embarrassing questions at the shareholders' meeting, and, with the bribe having been paid, to intimidate anyone else in attendance who might be thinking of doing so.

By 1955, according to its broadest, and most relevant, definition as stock in the hands of stable shareholders who would not unilaterally sell their shares on the market, stable shareholding represented 25 percent of outstanding stocks listed on the Tokyo Stock Exchange, and by 1960 it had risen to about 40 percent. It declined slightly in the early 1960s, but after the opening up of Japanese capital markets in 1964, when Japan joined OECD, the business community, fearing foreign takeovers, took steps to increase stable shareholding. It surpassed 60 percent in 1975, and remained above that figure until 2000, peaking at 67.4 percent in 1988. During the recessionary years of the 1990s, there was a gradual decline of stable shareholdings to 62 percent in 1998 and then a sharp drop to 57 percent in 2000. Financial institutions, burdened by mountains of non-performing loans and compelled to realize the value of their shares to restore capital-adequacy ratios, accounted for the vast majority of the sell-offs while foreigners accounted for almost all of the increase in the proportions of all outstanding shares held.[25]

From the 1950s corporate managers used the strategic control that stable shareholding protected to build organizations characterized by functional and hierarchical integration (see Figure 9). Critical to this organization-building, however, were the investments in

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24 When in financial distress, a company might raise cash by selling some of its stable shareholdings to other companies at the going market price but with an understanding that the shares would be repurchased, also at the going market price, if and when its financial condition improved.

25 In March 2000 foreigners held 13.2 percent of outstanding shares, up from 4.2 percent in 1990 and 10.0 percent in 1998. By 2004 that share is said to have increased to about 18 percent, but, inexplicably, since 2000, the Tokyo Stock Exchange, which beginning in 1949 had annually updated the series on shareholdings by type of holder, has not reported these figures.

an educated labor force that the Japanese government had made since the last decades of the nineteenth century. In the decades after the Meiji Restoration of 1868, the primary and secondary education of the entire population was raised to a high level. Simultaneously, a transformation of the system of higher education generated a growing supply of university graduates who entered industry. In addition to paying them well, the companies often incurred the considerable expense of sending these highly educated employees abroad for varying lengths of time to acquire industrial experience.

As a result, in the aftermath of the Second World War, Japanese companies could draw on a sizable supply of highly educated and experienced engineers and managers. Many Toyota employees, for example, had accumulated relevant technological experience over the previous decades working for the enterprise group when it was Japan's leading producer of textile machinery. In addition, the automobile industry was able to attract many engineers who had gained experience in Japan's aircraft industry before and during the war.

Before the war, moreover, many Japanese companies had integrated foremen into the structure of managerial learning so that they could not only supervise but also train workers on the shop floor. Whereas in the United States, the foreman, as 'the man in the middle', served as a buffer between the managerial organization and the shop floor, in Japan the foreman was an integrator of managerial and shop-floor learning. From the late nineteenth century, a prime objective of US managerial learning had been to develop machine technologies that could dispense with the skills of craft workers. In contrast, with an accumulation of such craft skills lacking in Japan, the problem that had confronted technology-oriented managers from the Meiji era had been to develop skills on the shop floor as part of a strategy of organizational learning that integrated the capabilities of managers and workers.

The rise of enterprise unions in the early 1950s both reflected and enhanced the social foundations for the hierarchical integration of shop-floor workers. During the last half of the 1940s, dire economic conditions and democratization initiatives gave rise to a militant labor movement of white-collar (technical and administrative) and blue-collar (operative) employees. The goal of the new industrial unions was to implement 'production control': the takeover of idle factories so that workers could put them into operation and earn a living. As an alternative to these militant industrial unions, leading companies created enterprise unions of white-collar and blue-collar employees. In 1950 under economic conditions rendered more severe by the Occupation's anti-inflationary polices, companies such as Toyota, Toshiba, and Hitachi fired militant workers and offered enterprise unionism to the remaining employees. The post-Korean War recession of 1953 created another opportunity for more companies to expel the militants and introduce enterprise unionism.

Foremen and supervisors were members of the union, as were all university-educated personnel for at least the first ten years of employment before they made the official transition into 'management'. Union officials, who were company employees, held regularly scheduled conferences with management at different levels of the enterprise to resolve issues concerning remuneration, work conditions, work organization, transfers, and production. The continued and rapid expansion of the Japanese economy in the high-growth era ensured that enterprise unionism would become an entrenched Japanese institution.

The most important achievement of enterprise unionism was 'lifetime employment', a system of permanent employment that, while not contractually guaranteed, gave white-collar and blue-collar workers employment security to the retirement age of, first, 55; from the 1980s, 60; and from the late 1990s at a growing number of companies, 65. This employment security both won the commitment of the workers to the company and gave the company the incentive to develop the productive capabilities of its workers. The system did not differ in principle from the organizational integration of professional, technical, and administrative employees that was at the heart of the US managerial revolution, except in one extremely important respect. Unlike the United States where there was a sharp segmentation between salaried managers and hourly workers, Japanese companies of the post-Second World War decades extended permanent employment to both white-collar and blue-collar personnel, thus providing a foundation for the hierarchical integration of shop-floor workers into a company-wide process of organizational learning.

Top managers had ultimate control over strategic investments, and technical specialists designed products and processes, typically on the basis of foreign technology. But, given these managerial capabilities, the unique ability of Japanese companies to transform technology acquired from abroad to generate new standards of quality and cost depended on not only the abilities of their engineers but also the integration of shop-floor workers into organizational learning processes. Through their engagement in processes of cost reduction, Japanese shop-floor workers were continuously involved in a more general process of improvement of products and processes that, by the 1970s, enabled Japanese companies to emerge as world leaders in factory automation – by the early 1990s the stock of robots in Japanese factories was about seven times the US figure. Also of great importance was the ability of Japanese manufacturers to eliminate waste in production; by the late 1970s, for example, Japan's competitive advantage in television sets was not in labor costs or even scale economies but in a savings of materials costs. This productive transformation became particularly important in international competition in the 1980s as Japanese wages approached the levels of the advanced industrial economies of North America and Western Europe and, especially from 1985, as the value of the yen dramatically strengthened. During the 1980s and 1990s, influenced by not only Japan's export performance but also the impact of Japanese direct investment in North America and Western Europe, many Western companies sought, with varying degrees of success, to implement Japanese high-quality, low-cost mass-production methods.

During the 1980s, most Western analyses of the sources of Japanese competitive advantage focused on the hierarchical integration of the shop-floor worker into the organizational learning process. By the early 1990s the emphasis shifted to the role of 'cross-functional management', 'company-wide quality control', or 'concurrent engineering' in generating higher quality, lower cost products. The hierarchical integration of engineers with shop-floor workers fostered the functional integration as specialized engineers engaged in teams to solve practical manufacturing problems.

Much of the discussion of functional integration focused on its role in 'new product development' in international comparative perspective, with the US managerial corporation based on the Old Economy business model performing quite poorly in competition with the Japanese. The evolution of the semiconductor industry provides a vivid example of the competitive power, but also possibly the limits, of Japanese organizational integration. From the late 1970s the Japanese mounted a formidable

competitive challenge to US producers in dynamic random access memory (DRAM) chips, forcing most US companies, including Intel, to withdraw from the market after 1985. Already a powerhouse in semiconductors before the Japanese challenge, Intel re-emerged even stronger in the 1990s as the leader in microprocessors, a product in which it was the pioneer in the early 1970s and for which during the 1980s it secured the franchise for the IBM PC and the subsequent IBM clones.

Organizational integration was critical to the Japanese challenge in DRAMs. In a comparative study of Japanese and US semiconductor manufacturing Daniel Okimoto and Nishi (1994, 193) argued that '[p]erhaps the most striking feature of Japanese R&D in the semiconductor industry is the extraordinary degree of communication and 'body contact' that takes place at the various juncture and intersection points in the R&D processes – from basic research to advanced development, from advanced development to new product design, from new product design to new process technology, from new process technology to factory-site manufacturing, from manufacturing to marketing, and from marketing to servicing'. They contrasted the organization of Japanese semiconductor manufacturing with that in the United States, where design engineers had the glamour jobs and manufacturing engineers were viewed as 'second-class citizens'.

Value added in microprocessors is in product design that determines the use of the product. Value added in semiconductors is in process engineering that reduces defects and increases chip yields. By the 1980s Japanese companies such as Fujitsu, Hitachi, and NEC were able to achieve yields that were 40 percent higher than the best US companies. Central to this advantage was the development of advanced semiconductor manufacturing technology, itself the result of the organizational integration of engineers into manufacturing activities and interactive learning with equipment suppliers. In 1987, fearful that it would become totally dependent on the Japanese for semiconductor manufacturing equipment, the US Semiconductor Industry Association launched the manufacturing technology research consortium, Sematech, with support from the US Department of Defense and exemption from the antitrust laws on the grounds that national security was at risk.

More generally, and contrary to conventional wisdom, in terms of support for technology development, it was the United States government, not the Japanese government, that was the more formidable 'developmental state'. Indeed, as I shall elaborate below, the US New Economy business model, of which a Silicon Valley company such as Intel is an exemplar, would never have emerged without massive government investments in the post-Second World War decades in the electronics industry. In contrast, it was in the realm of finance, not technology, that the Japanese state played a developmental role by structuring the banking system as an investment institution to fund the high-speed growth of industrial enterprises during the postwar decades. While stable shareholding gave corporate managers strategic control over the allocation of profits in the post-Second World War decades, even with low payout ratios corporate retentions were grossly insufficient to finance the capital requirements of Japanese companies in the era of high-speed growth. Using retentions as a foundation, most of the financial commitment of Japanese companies came from bank loans, with the companies' debt-equity ratios often at 3:1 and at times higher. In borrowing these funds, each major industrial company had a 'main bank' whose job it was to convince other banks to join it in making loans to the company and to take the lead in restructuring its client company should it fall into financial distress.

During the 1980s many economists both in Japan and the West who looked to agency theory to understand the Japanese firm, incorrectly identified the 'main bank system' as *the* central institution of corporate governance (see Aoki and Patrick 1994). They contended that the main bank system enabled financial interests as principals – in the Japanese case the banks rather than shareholders – to monitor the behavior of managers as agents. In funding the growth of Japanese companies, however, the Japanese banks were relatively passive agents of government development policy, with 'overloans' being made by the Bank of Japan to its member banks for providing highly leveraged finance to growing industrial companies. The Japanese banks never had any significant capabilities to monitor these companies, as evidenced by the their rush to make speculative loans during the Bubble Economy of the late 1980s and their persistent bad-debt burdens since the bubble burst in 1990. Japanese banks, that is, played a critical role in providing financial commitment, but no significant role in the exercise of strategic control.[26]

What then ensured that the top executives of Japanese companies would exercise strategic control for the benefit of their companies rather than for their own personal gain? It was not the board of directors, which in Japan was almost entirely made up of inside executives, and indeed functioned more as a body for bestowing honorific positions on ageing top managers than as for corporate decision-making or oversight. As in the US Old Economy model at its innovative peak, the behavior of Japanese top managers was regulated by the cohesive organizations over which they presided, and in particular by the institution of permanent employment with the responsibility for maintaining the competitiveness of the company that it entailed. Over time, norms of corporate behavior evolved in Japan that no top executive could defy. Even though permanent employment is not a contractual relation at the level of the firm, under the 'doctrine of abusive dismissal', courts have demanded that employers demonstrate, subject to strict criteria, 'a business need' for layoffs, and in the last half of the 1990s judges ruled that dismissals were unjustified in 80 percent of the cases brought before them (Ouchi 2002). By way of contrast, in the late 1980s, in the wake of a rash of corporate downsizings, the US labor movement had to wage a difficult, but ultimately successful, battle to get the US Congress to pass a law requiring a company to give workers in plants with 100 or more employees 60-day notice that the facility was going to be closed.

Business models: variety and change

The comparison of the British, US, and Japanese business models coming into the last decades of the twentieth century makes it clear that, among the rich nations, economic institutions have varied markedly. Indeed, once one explores the distinctive characteristics of the social conditions of innovative enterprise that define a business model, one finds a large number of distinctive 'varieties of capitalism', not just on a global scale but also in close proximity to one another in Western Europe. As I show below, among the large Western European economies, two business models could not be more different than those that characterize the German and French economies. To make our analytical lives even more complicated, the business models that characterize

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26 Hence my use of the more modest term 'main bank lending' rather than the more grandiose term 'main bank system' to describe this institution.

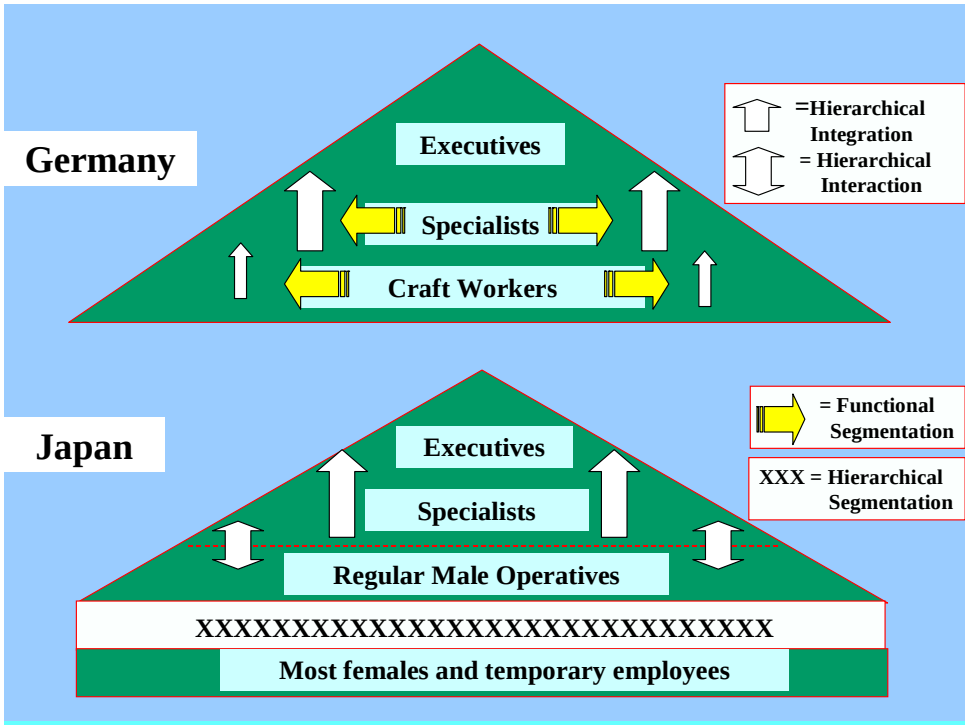
a national economy are subject to change. Nowhere over the past half century has such change been more evident than in the United States, where by the end of the twentieth century a New Economy business model had replaced the Old Economy model, particularly in the high-technology sectors of the economy.

In what follows, I briefly sketch out the main characteristics of the German and French business models in terms of strategic control, organizational integration and financial commitment. Then I will conclude this section of the paper by outlining the distinctive characteristics of the US New Economy business model that in the late 1990s captured the attention of its competitors based in other developed nations. In an age of globalization, many observers believed that Western Europe and Japan would have to transform themselves to conform to this new American challenge. In fact, as I shall argue, in the conclusion to this paper, convergence has been anything but complete.

a) The German model[27]

As depicted in Figure 10, the German model that evolved in the decades after the Second World War was characterized by a high degree of hierarchical integration, but considerable functional segmentation. The top executives of high-tech German firms are generally scientists or engineers who acquired their positions through careers within the company. They develop and implement their enterprise strategies through managing boards (*Vorstand*) made up of inside executives, while these strategies must gain the

Figure 10. German and Japanese business models compared



27 This section draws on Maurice et al. 1986; Sorge and Warner 1986; Jürgens et al. 1993; Herrigel 1996; Streeck 1997; Cooke and Morgan 1998: ch. 4; Casper et al. 1999; O'Sullivan 2000a: chs 7-8; 2003; Coates 2002, Vol. II, Part III; Jürgens et al. 2002; Franck and Opitz 2003; as well as many references cited in these works.

approval of supervisory boards (*Aufsichsräte*). Since the early 1950s, German companies have been governed by a system of codetermination (*Mitbestimmung*) that includes employee representation on the supervisory board as well as the right to elect work councils (*Betriebsäte*) to engage management at the enterprise and plant levels. In companies with more than 2000 employees, the seats on the supervisory board are shared equally between shareholder and worker representatives, with the chairman of the board being a shareholder representative who can exercise a tie-breaking vote. Employees exert more direct, and arguably greater, influence over a company's investment activities through works councils, which participate in decisions related to issues of remuneration, work conditions, and labor allocation, and have the right to receive information concerning the firm's investment strategy and financial condition.

In German companies, both shop-floor and managerial employees, are well-educated and trained, with entry into the world of employment typically being via a three-year 'dual apprenticeship system' through which workers receive a combination of formal education and on-the-job training in a particular specialization. This skill-formation system is controlled at the regional level through the collaboration of employer and employee associations as well as relevant government ministries. Larger employers contribute disproportionately to funding the apprenticeships, thus in effect subsidizing the training of employees for regional small and medium sized firms.

A great strength of German industry in the post-World War decades was the regional accumulation of skilled labor that supported symbiotic production in enterprises of different sizes, so that the ability to produce high-quality goods resided in both large managerial corporations and the smaller *Mittelstand* within the regional economy. A prime example of such a region was Baden-Württemburg, home to companies such as Robert Bosch, the Mercedes division of Daimler-Benz, and Porsche, and with a *Mittelstand* sector that focuses on engineering and metalworking, especially for the automobile industry. The leading firms in the regions played an important role in structuring the innovative contributions of medium-sized suppliers, while collective support for regional innovation came from financial and technology institutions organized by regional and municipal governments, non-profit organizations, and business associations.

As a result of its governance and employment institutions, German production workers have possessed high levels of skill. In developing and utilizing these skills over the course of their careers, even shop-floor employees often have had the opportunity of moving up the company hierarchy through their area of specialization into the managerial ranks. Thus one has found in German companies a high degree of hierarchical integration of employees within an area of specialization, a mode in integration that is conducive to the production of high quality, even if high cost, products. During the post-Second World War decades, this mode of organizational integration, which differed markedly from the US system of hierarchical segmentation between managers and workers, provided the foundation for Germany's global leadership in high-quality manufacturing.

By relying on career-long functional specialization as a mode of hierarchical integration, however, the German business model fostered functional segmentation that left its mechanical and electrical engineering companies vulnerable to competitive challenges from more organizationally integrated rivals. In the first half of the 1990s, however, the Japanese were able to build on their advances in process innovation in the

automobile and machine tool industries to move from the lower ends of the markets, in which they had already confronted US hegemony in mass production, into higher quality luxury car and precision machine tool markets where they matched the Germans in quality and beat them in cost (see Figure 10). The result was, in 1993-94, a crisis in these sectors in Germany, with dramatic reductions in employment and attempts, with some success, to learn from the Japanese. At the same time, however, Germany was burdened by the needs to integrate East Germany, whose industry possessed far less productivity into the unified nation.

In both developing its productive capabilities and responding to these challenges, West German firms had secure control over their internal revenues, which formed the foundation of their financial commitment. The institutional foundations for that financial commitment went back to the late nineteenth century when the 'Great Banks' had functioned as venture capitalists to German industry. The banks lent money to promising industrial firms and then, if and when these firms were well-established, floated 'bearer' shares in the firms among wealthy bank customers in order to enable the firms to pay back the bank loans. These bank customers in turn deposited the shares with the banks that then became the 'bearers' of these shares with the right to exercise the votes attached to them. In this way, the banks continued both to fund the growth of German firms and to protect them from outsiders who might try to lay claim to corporate revenues. The banks have exercised this protective role and kept themselves informed on the investment strategies of the companies concerned by having members on their supervisory boards. Nevertheless, compared with the high debt-equity ratios that characterized Japanese industrial enterprises in their era of high-speed growth, German firms have been able and willing to grow with much more conservative debt burdens, making them much less dependent on bank borrowing than their Japanese competitors.

b) The French model[28]

The case of France provides yet another distinctive 'variety of capitalism' characterized by unique social conditions of innovative enterprise (see Figure 11). Of all of the major developed economies, the economic development of France was, in the last half of the twentieth century, the most explicitly state-led. In the decades after the Second World War France constructed a national innovation system based on national research laboratories (*CNRS – Centre Nationale de Recherche Scientifique*) and the state championing of a number of industrial corporations capable of transforming that research into military and commercial products. In particular, state-led efforts focused on the aeronautics, electronics, nuclear, space, and telecommunications sectors, with military expenditure playing an extremely important role.

Linking the state sector and the industrial firms has been a power elite, deliberately and openly created by the state, whose origins can be traced back to the Napoleonic era. At an early age through a national competition, the future leaders of French government and business gain admission to one of the '*grandes écoles*', most notably *Ecole Polytechnique* for engineers and *Ecole National d'Administration* (ENA) for managers.

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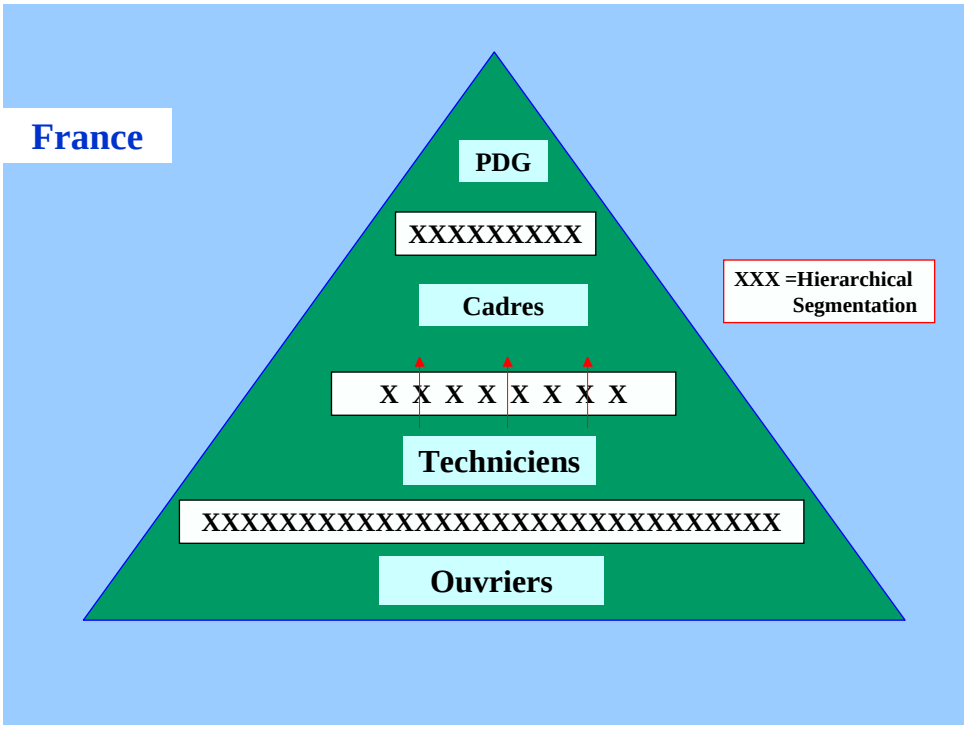
28 Maurice et al. 1986; Chesnais 1993; Schmidt 1996; Boyer 1997; Fridenson 1997; Freyssenet 1998; Goyer 2001; Hancké 2001; Jürgens et al. 2002; Franck and Opitz 2003; O'Sullivan 2003b; 2005.

Figure 11. The French business model



Within their broad areas of specialization, these elite students subsequently enter the labor force as members of a 'grand corps' through which they maintain links with one another over the course of their careers. Engineers may enter industry directly but many Polytechniciens and Enarques spend the first portion of their careers in the civil service before entering, through a process known as '*pantouflage*', business enterprises as high-level executives. In 1990 45 percent of the *PDGs* (*Président-directeur générals*) of 200 largest French corporations had come through this system.

The existence of this power elite was critical in aligning business-government relations in the massive restructuring of high-tech industry that was undertaken by the French state in the 1980s and early 1990s. The Mitterand nationalization program in 1982-83 led to massive amounts of public funds being invested in the modernization of a number of capital-intensive, high-technology companies, including, among others, Compagnie Générale d'Electricité in electrical equipment, Rhône-Poulenc in chemicals, Saint-Gobain-Pont à Mousson in glass, paper, and metals, and the combination of Sacilor and Usinor in steel. With the government typically assuming 100 percent ownership and with members of the *grand corps* in key executive positions, the state exercised strategic control and provided financial commitment to restructure these nationalized companies to compete globally.

Subsequently, beginning in 1986, a number of the nationalized companies were privatized. To ensure that strategic decision-making in the privatized firms would remain under the control of the French elite, French companies agreed to enter into a system of cross-shareholding that created a *noyau dur* (hard core) of stable shareholders. Although in the late 1990s, as discussed below, there was considerable unraveling of this cross-shareholding, the system of recruiting top executives of major French companies remains intact. That system also means, however, that, as depicted in Figure 11, there is a segmentation in terms of organizational learning between these top executives and the rest of the business organization. As Patrick Fridenson has put it:

'Most French top managers have no direct experience of shared work with either other managers or workers' (1997: 219-20). Given their elite positions, however, these top executives tend to be mission-oriented, giving employees a clear understanding of the objectives of the enterprise and an assurance that the resources will be mobilized to carry out those goals. It is probably for this reason that French companies have been particularly innovative in carrying out big projects in areas such as transportation and communication.

Given the way in which top managers of French industrial enterprises have been recruited, the middle managers, or *cadres*, who design a company's products and oversee its operations, have little if any possibility of rising to the top of the companies in which they pursue their careers. In the high-tech sector, these middle managers tend to have engineering degrees with a theoretical orientation toward solving problems within well-defined systems. Below the *cadres* in the enterprise hierarchy are *techniciens*, whose education (a two-year technician diploma) and experience enable them to solve practical industrial problems, and who have traditionally had little opportunity for upward mobility to the cadre ranks (although channels for movement up the hierarchy opened somewhat in the 1990s).

Segmented from the *techniciens* are semi-skilled and unskilled production workers, or *ouvriers.* France entered the post-Second World War decades with a domestic population that was still rural and with a large colonial presence. As French industry expanded in the postwar decades, it drew upon this unskilled labor force for shop-floor work. These workers had a low level of unionization, but were often very militant. One mode of stemming this militancy was the granting of wage concessions. In his study of the evolution of the car manufacturer, Renault, during the post-Second World War decades to the mid-1990s, Michel Freyssenet (1998: 374) shows how, in response to shop-floor conflict, between about 1980 and 1990, 'unskilled' workers disappeared from Renault plants as they were reclassified as 'skilled' workers, even without any change in the content of their work, so that they could qualify for higher wages. In the corporate restructuring of the 1980s and 1990s, early retirement schemes, funded by the government eased a large proportion of these workers out of the labor force. More recently, the numbers of shop-floor workers has been further reduced in the major corporations through outsourcing. At the same time, these companies have been upgrading the skills of younger workers, supported by a concerted state effort to increase the proportion of the school-age population who receive the *baccalauréat*, the certificate that permits high-school graduates to continue in higher education.

As for financial commitment, France has perhaps the most explicitly state-backed system of bank finance of industrial enterprises. As already mentioned, in the 1980s the state took critical enterprises that needed restructuring under its direct ownership and control, and then financed that restructuring as a prelude to reprivatizing these companies on a more globally competitive basis. The fact that the unraveling of the cross-shareholdings of these privatized corporations in the last half of the 1990s resulted in foreign institutional investors buying up significant amounts of shares of French companies had led some observers to argue that French companies have become dependent on foreign capital, with a consequent loss of strategic control (see Goyer 2001; Hancké 2001: 330). But, as recent research by O'Sullivan (2005) has shown, the influx of foreign investors was in response to an ebullient stock market, in part fostered by the willingness of the French corporate elite to permit a more widespread distribution of their companies' shares. French corporations took advantage of the rising stock

market to use their stock as a currency to acquire foreign companies as part of strategy of global expansion. In some cases, the stock was used directly as the acquisition currency; for example, in the United States where many of the acquisitions were done using American Depository Receipts (ADRs) that permitted the acquired companies to be paid in a stock-based currency denominated in US dollars, while in other cases, the rising stock market facilitated the floating convertible bonds for acquisition purposes. As O'Sullivan points out, the unraveling of cross-shareholdings left French companies more vulnerable to outside challenges to strategic control. These corporate strategies were not, however, dictated by a dependence on global capital markets for finance. Rather French companies pursued these strategies to become increase their presence in the global economy and sought to make use of capital markets, both in France and abroad, toward that end.

c) The US New Economy model[29]

During the 1970s and 1980s while Japanese enterprises were challenging established US managerial corporations in many industries in which they had been dominant, there was a resurgence of the US information and communications technology (ICT) industries, providing the foundation for what by the last half of the 1990s became known as the 'New Economy'. Historically, underlying the emergence of the New Economy were massive post-Second World War investments by the US government, in collaboration with research universities and industrial corporations, in developing computer and communications technologies.

By the end of the 1950s, this combined business-government investment effort had resulted in not only the first generation of computers, with IBM as the leading firm, but also the capability of imbedding integrated electronic circuits on a silicon chip, with Fairchild Semiconductor and Texas Instruments in the forefront of creating the technology that would become the standard of the semiconductor industry. Through the early 1960s the US government provided virtually all of the demand for semiconductors. From the second half of the 1960s, however, a growing array of commercial opportunities for electronic chips induced the creation of semiconductor startups. A new breed of venture capitalist, many with prior managerial or technical experience in the semiconductor industry, backed so many semiconductor startups clustered in the region around Stanford University that by the early 1970s the district was dubbed 'Silicon Valley'. Innovation in semiconductors, and especially the development of the microprocessor – in effect a computer on a chip – created the basis for the emergence of the microcomputer industry from the late 1970s, which in turn resulted in the enormous growth of an installed base of powerful 'hosts' in homes and offices that made possible the Internet revolution of the 1990s.

Intense, and often informal, learning networks that transcended the boundaries of firms contributed to the success of Silicon Valley. Like the British industrial districts that Alfred Marshall had described a century earlier, there is no doubt that, in Silicon Valley, 'the mysteries of the trade…were in the air'. But in its strategy, organization, and finance, the New Economy business model (see Figure 12) that emerged in Silicon

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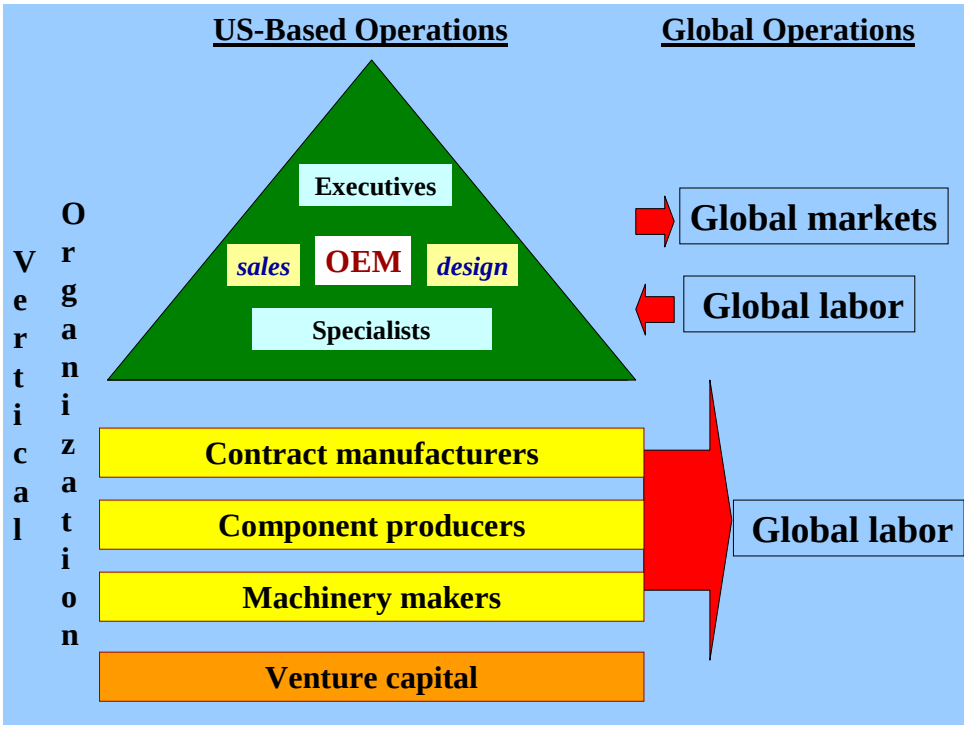
29 This section draws upon Lazonick 2005a, and references therein.

Figure 12. The US New Economy business model



Valley differed significantly from the Marshallian industrial district. Those who have exercised strategic control have been professional managers, typically with engineering backgrounds. Organizational learning occurred across firms, as AnnaLee Saxenian (1994) has stressed, but it also, and I would argue more fundamentally, occurred within firms that integrated skill bases of highly educated personnel, enabling some particularly innovative enterprises such as Hewlett-Packard, Intel, Sun Microsystems, Oracle, and Cisco Systems that grew to employ tens of thousands of employees to drive the development of the region. In the early stages a firm's growth, venture capital provided the committed finance for these learning enterprises, and through its success in Silicon Valley from the 1960s venture capital evolved into an industry in its own right.

The founders of New Economy firms have typically been engineers who have gained specialized experience in existing firms, although in some cases they have been university faculty members intent on commercializing their academic knowledge. While some of these entrepreneurs have come from existing Old Economy companies, where it was often difficult for their new ideas to get internal backing, New Economy companies themselves became increasingly important as sources of new entrepreneurs who left their current employers to start new firms. Typically the founding entrepreneurs of a New Economy startup sought committed finance from venture capitalists with whom they shared not only ownership of the company but also strategic control. Besides sitting on the board of directors of the new company, the venture capitalists would generally recruit professional managers, who would be given company stock along with stock options, to lead the transformation of the firm from a new venture to a going concern. This stock-based compensation gave these managers a powerful financial incentive to develop the innovative capabilities of the company to the point where it could do an IPO or private sale to an established company. But, both before and after making this transition, their tenure with, and value to, the company depended on their managerial capabilities, not their fractional ownership stakes.

Key to making this transition from new venture to going concern is the organizational integration of an expanding body of technical and managerial 'talent'. What came to be known as 'broad-based' employee stock option plans became an important mode of compensation, usually as a partial substitute for cash salaries, for a startup to attract these highly mobile people and retain their services. The underlying stock would become valuable if and when the startup did an IPO or private sale to a publicly listed company, thus enabling the startup's privately held shares to be transformed into publicly traded shares. Shortening the expected period between the launch of a company and an IPO was the practice of most venture-backed high-tech startups of going public on the NASDAQ exchange (founded in 1971), with its much less stringent listing requirements than the Old Economy NYSE. If and when the firm did an IPO or was acquired by another publicly listed company, the venture capitalists could sell their shareholdings on the stock market, thereby exiting from their investments in the firm, while entrepreneurs could also transform some or all of their ownership stakes into cash. With the company's stock being publicly traded, employees who exercised their stock options could easily turn their shares into cash.

During the 1980s and 1990s the liberal use of stock as a compensation currency, not only for top executives as had been the case in Old Economy companies since the 1950s, but also for a broad base of non-executive personnel became a distinctive feature of New Economy firms. For example, Cisco Systems, which grew from about 200 employees at the time of its IPO in 1990 to 38,000 employees in 2001, awarded stock options to all of its employees, so that by 2001 stock options outstanding accounted for over 14 percent of the company's total stock outstanding. Since Cisco did hardly any of its own manufacturing – another distinctive characteristic of many New Economy 'systems integrators' – the people in the skill base to whom these options were awarded were almost all highly educated employees who were potentially highly mobile on the labor market.

Besides using their own stock as a compensation currency, during the 1990s some New Economy companies grew large by using their stock, instead of cash, to acquire other, smaller and typically younger, New Economy firms in order to gain access to new technologies and markets. Cisco mastered this growth-through-acquisition strategy. From 1993 through 2004 Cisco made 94 acquisitions valued in nominal terms at almost $39 billion, over 96 percent of which was paid in the company's stock rather than cash. In 1999 and 2000 alone, Cisco did 44 percent of its acquisitions at a cost of 69 percent of the total value (in nominal dollars) expended in the 1993-2004 period, with over 99 percent paid in stock.

At the same time Cisco conserved cash by paying no dividends, a mode of financial commitment that also distinguished New Economy from Old Economy companies. As a result, Cisco's astonishing growth in the 1990s occurred without the company taking on any long-term debt. Nevertheless, with the bursting of the New Economy bubble from mid-2000, Cisco spent billions of dollars repurchasing its own stock to support its sagging stock price. Even during the boom, when stock prices were rising, the extent to which New Economy companies issued stock to make acquisitions and compensate employees meant that some of them spent billions of dollars on stock repurchases. For example, from 1997 through 2000 Intel repurchased $18.8 billion in its own stock while paying out $1.2 billion in dividends, and Microsoft repurchased $13.4 billion while paying out $800,000 in dividends. By way of comparison, R&D spending over these same four years was $14.2 billion at Intel and $11.2 billion at Microsoft.

As in the cases of Intel, Microsoft, and Cisco, by the end of the twentieth century a number of New Economy companies had grown to be formidable growing concerns. In 2003 the top 500 US-based companies by sales included 20 ICT firms founded no earlier than 1959 that had been neither spun off from nor merged with an Old Economy firm. These 20 companies had revenues ranging from $41.4 billion for Dell Computer to $3.4 billion for Gateway, with an average of $11.9 billion. Their headcounts ranged from 79,700 for Intel to 7,400 for Gateway, with an average of 35,100. Nine of these 20 companies were based in Silicon Valley, another two in Southern California, and the other nine in eight states around the United States.

Innovative New Economy companies have tended to grow large by upgrading and expanding their product offerings within their main lines of business, and thus far at least have not engaged in the indiscriminate diversification into unrelated technologies and markets that characterized, and ultimately undermined the performance of, many leading Old Economy companies in the 1960s and 1970s. At the same time, New Economy companies have become less vertically integrated than Old Economy companies because equipment manufacturers such as Cisco, Dell, and Sun Microsystems have focused their investment strategies on activities that require organizational learning in their core competencies, while outsourcing activities that, as is the case with semiconductor fabrication, are too expensive and complex to be done in-house, or, alternatively, as is the case with printed circuit board assembly, have become routine. Some of the largest ICT companies in the United States are upstream electronics components suppliers, most of which, in terms of the social conditions of innovative enterprise, can be classified as New Economy firms. The world's five largest contract manufacturers – Flextronics, Solectron, Sanmina-SCI, Celestica, and Jabil Circuit – to whom equipment manufacturers outsource the mass production of printed circuit boards and other components, employed a total of 266,000 people at the end of 2003.

A main competitive advantage of the leading contract manufacturers is their ability to relocate production processes that have become cost-sensitive and routine to lower wage global locations. Indeed, in the 1960s and 1970s, well before the rise of the contract manufacturers as an outsourcing option for OEMs, growing Silicon Valley companies took the lead in offshoring more routine production processes, especially to Asia. While strategy and learning remained centered in the United States, the New Economy business model was able to tap into a global labor supply. During the 1980s and 1990s growing numbers of foreigners, especially from Asia, obtained graduate degrees in science and technology from US universities, and then entered the US labor force, often obtaining immigrant status as permanent residents. Additionally, during the 1990s large numbers of foreigners gained production experience in US high-technology industries under non-immigrant visa programs. The H-1B program enables a non-immigrant whose skills are purportedly unavailable in the United States and has at least a bachelor's degree (the most notable exception being fashion models) to work in the United States for up to six years. Seventy percent of H-1B visa holders have science or technology degrees, and two-fifths to one half come from India (the next largest national group is from China, at less than ten percent). The L1 visa program permits a company with operations in the United States to transfer foreign employees to the United States to acquire work experience, with no limitation of time. In 2001, there were an estimated 810,000 people on H-1B visas in the United States, and possibly as hundreds of thousands of highly educated people on L1 visas. Many have continued to work in the United States by obtaining permanent resident status, but most have

returned to their native countries with valuable industrial experience, that can be used to start new firms and, more typically, to work as technical specialists for indigenous or foreign companies.

This reverse migration that converts a 'brain drain' into a 'capability gain' is similar to the return of high-tech personnel to South Korea and Taiwan in the 1980s and 1990s to help develop their industrial economies. The availability of this highly educated and experienced global labor supply is a prime reason for a step increase in the 2000s in offshoring by US companies to Asia, especially to India and China, and the fact that this offshored activities increasingly require not only routine work but also organizational learning that was previously only carried out in the United States.

5 Implications for understanding corporate governance and economic development

In 1967 the French journalist, Jean-Jacques Servan-Schreiber's best-selling *Le Défi Américain* [*The American Challenge*] warned European nations of the need to unify to avert the dominance of their economies by US corporate power. In the same year, on the other side of the Atlantic, the US economist John Kenneth Galbraith, published his best-selling *The New Industrial State*, in which he assumed that the prevailing US business model had achieved a degree of dominance that was impervious to external threat. Both Servan-Schreiber and Galbraith were acute observers of contemporary reality, whose books on US corporate power in the immediate post-Second World War decades deserved the wide readership that they achieved. Both books raised important questions about the relation between corporate governance institutions and economic development in the developed economies. Neither book, however, provided an accurate guide to the future of corporate governance and performance. Their authors did not foresee how the US business model that prevailed in the 1960s would itself be challenged in the decades to come, in part because of its own internal weaknesses and in part because of more powerful business models emanating from abroad. Neither author, for example, envisioned the impending rise of the Japanese as powerful corporate competitors, but in this oversight in the late 1960s they were hardly alone.

In historical retrospect, as outlined in this paper, we can now see that in the post-Second World War decades there were a number of contending business models in the process of evolution in the developed national economies. During this postwar reconstruction period, corporations based in these different nations had, to a greater or lesser extent, privileged access to their growing domestic markets. Increasingly in the 1970s and 1980s, however, these different business models competed head-to-head on global markets, and by no means with equivalent capabilities. The distinctive social conditions of innovative enterprise that characterized these different business models go some way in explaining national competitive performance in globalized industries such as automobiles, electronics, and machine tools circa 1980. In this competition, on the basis of the organizational capabilities that I have depicted in Figures 8 through 11, Japan emerged as the *high-quality, low-cost* producer; Germany as the *high-quality, high-cost* producer; the United States as the *low-quality, low-cost* producer, and Britain as the *low-quality, high-cost* producer, with France somewhere in the middle of this group in terms of quality and cost (see Lazonick and O'Sullivan 1996; 1997).

If one wants to understand the evolution of 'varieties of capitalism' that are in competition with one another, one needs a framework for analyzing the social conditions of innovative enterprise.[30] At a minimum, the application of such a framework, as has been done in the paper, should make one cautious of the use of dichotomous classifications such a 'liberal market economies' and 'coordinated market economies' (see Hall and Soskice 2001) that lump together nations such as the United States and Britain on one side, and Germany and Japan on the other. By the same token, I would argue that if one wants to understand the fundamental institutional differences that distinguish these developed economies from one another, one must analyze them first and foremost as *corporate* economies rather than as *market* economies (see Lazonick 2003b).

If only because of global competition, the business models that I have described in this paper have all undergone change, and we can expect that they will continue to do so. The deficiencies of the British business model, for example, meant that it did not in any significant way survive to the end of the 20th century, although that nation still copes with the governance, employment, and investment institutions that are a legacy of the past prevalence of a hierarchically and functionally segmented business model. As I have also argued, the dominant US business model has undergone dramatic change; in 2005 one can argue that the evolution of the New Economy business model has had such a profound impact on US governance, employment, and investment institutions that the Old Economy business model, insofar as it exists, is an anachronism; a statement that for lack of understanding of the evolving New Economy business model and a (related) inability to foresee the future, I would not have made a decade ago notwithstanding the fact that I understood that the innovative capacity of the 'Chandlerian' managerial enterprise was in decline (compare Lazonick 1994 and 2006).

During the Internet boom of the late 1990s, when the notion of the 'New Economy' came into vogue, the US business model, including the ideology of maximizing shareholder value, became attractive to policy-makers in the 'social market economies' of Europe as well as in Japan (Lazonick 1999; Lazonick and O'Sullivan 2000b). Previously Europeans had associated the US Old Economy model with decline, manifested by relentless downsizing and growing income inequality. In contrast, they saw the New Economy model as a generator of innovation and development. There began to be talk about convergence of business models of the developed economies toward the US 'ideal', by which what was generally meant was a business model governed by the principle of maximizing shareholder value.

Although infatuation with this mantra was short-lived in Japan (see Lazonick 1999; Dore 2000), it had staying power in Europe, even convincing some proponents of European social market institutions that US and British pension and mutual funds would starve European companies of investment capital if they failed to take immediate steps to boost their stock prices. As in the United States, many European executives imbibed the shareholder view of the world because they envied their US counterparts for their freedom of action in corporate restructuring and their rich rewards from stock-based compensation. Ultimately European companies adapted certain elements of the New Economy business model such as (on a more constrained level than in the United States)

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30 For two excellent collections of papers on the burgeoning 'varieties of capitalism' debates, see Coates 2002 and Whitley 2002.

stock-based compensation, the use of stock to acquire other companies (particularly in the French case), and outsourcing of routine activities (see Carpenter et al. 2003; Glimstedt and Lazonick 2005). In terms of the basic social conditions of innovative enterprise, however, the German, French, and Japanese business models have remained intact (see O'Sullivan 2003b and 2005; Lazonick 2005).

What then are the implications for developing nations of the perspective that I have presented on corporate governance, innovation, and economic development, based as that perspective is on the comparative-historical experiences of the developed nations. While there exist important problems in structuring corporate governance institutions to promote further economic development in the developed economies, the real test of this approach depends on what guidance it can provide to developing economies. In my view, however, it makes no sense to advise developing economies on the path to development unless one can be sure that that advice is based on the reality, not the ideology, of how the rich got rich.

If one agrees that innovation is fundamental to economic development, then the perspective that I have presented provides a response to the neoclassical contention that state intervention and subsidies to industry can only undermine the economic progress of the developing nations, not advance it. We know from the work of Ha-Joon Chang (2002) that neoclassical ideology has been instrumental in 'kicking away the ladder' of industrial policy that the developed nations have themselves climbed to become rich to deny developing nations from scaling the same heights. The theory of innovative enterprise that I have presented in this paper provides the microfoundations for countering the neoclassical argument. In effect, the dynamics of the innovating firm that are depicted in Figures 1 and 2 explain why in the face of established international competition, tariff protection, or some other type of subsidy, may be necessary to transform the high fixed costs of a innovative strategy into low unit costs (see also Lazonick 1993). It also explains why the success or failure of tariff protection will depend on the social conditions of innovative enterprise.

Applied to a developing nation, the theory of the innovating firm depicted in Figures 1 and 2 is none other than the infant-industry argument. Within this framework, tariff protection provides the firms that constitute a national industry with a form of *financial commitment* while they are engaging in what can be called 'indigenous innovation' (see Lazonick 2004b), and have yet to transform the high fixed costs of that innovation strategy into low unit costs. But financial commitment in and of itself does not, and cannot, ensure the success of an innovative investment strategy. Given the financial commitment provided by tariff protection, it matters *who exercises strategic control and what types of investments in organizational learning they make.* Arguments for the efficacy of tariff protection, and other forms of subsidy, for developing economies need to specify the business model that will combine strategic control, organizational integration and financial commitment to generate innovation as a foundation for economic development.

The variety of innovative business models in the developed economies, both at a point in time and over time, suggests that there is no single model of innovative enterprise that will necessarily achieve success in any particular national context. Rather, as emphasized previously, the theory of innovative enterprise provides a framework for empirical research that can firstly identify the conditions of innovative enterprise germane to any particular social context, and then analyze how these conditions in fact

support the innovation process in particular firms in particular industries in particular eras. Such an approach is precisely the one that was taken by the late Qiwen Lu in his pioneering book, *China's Leap into the Information Age* (2000). Lu identified the role of the Chinese state in providing the knowledge infrastructure for innovative enterprise, and the role of strategic control, organizational integration, and financial commitment in the evolution of four major indigenous Chinese computer electronics companies. Lu's work fits with the approaches by Martin Bell and Keith Pavitt (1993), Linsu Kim (1997), John Mathews and Dong-Sung Cho (2000), Mike Hobday (2001), and Dieter Ernst (2002) among others who have addressed the question of indigenous innovation. This type of research shows that policy debates ignore at their peril the role of innovative enterprise in economic development. If there is one enduring lesson that the developing nations can learn from the developed nations, that would be it.

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