INNOVATION, CORPORATE ORGANISATION AND INDUSTRY POLICY: WILLIAM LAZONICK ON THE FIRM AND ECONOMIC GROWTH

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In two recent books and several articles, William Lazonick has examined the proper industry policy for countries during periods of significant innovation. On the basis of the historical development of Britain, the USA and Japan, he concludes that successful innovation requires the establishment of large, vertically-integrated firms that are able to manoeuvre flexibly because their workers are willing and able to cooperate with change. Although Lazonick's arguments are persuasive in many respects, they are based on assumptions of future developments that are not necessarily correct. In particular, large firms may not be the best vehicles for the development and implementation of innovation. Moreover, increasingly 'intelligent' machines may erode the need for a flexible workforce, much as happened with the advent of Fordism in the early decades of the twentieth century. As a result, nations should be wary of committing themselves to centralised and uniform policies when the nature of the problem is still uncertain.

Keywords: innovation, industry policy, flexible organisation, William Lazonick.

INTRODUCTION

Over the past two decades, many economists have become increasingly aware that the role of institutions must be incorporated into any realistic analysis of economic life. The formal modelling of institutional behaviour is still rudimentary, but the traditional descriptive treatment of institutions has now been largely replaced by analyses that draw on common microeconomic tools of supply and demand.[1] The resultant new approaches to the role of institutions are not homogeneous and represent the convergence of a number of schools of economic thought. While some of these are relatively new, others bear a pedigree of many generations. Thus, although the source of inspiration varies, it ranges from Adam Smith, Karl Marx, and Alfred Marshall, to Austrian economists such as Friedrich Hayek and the transaction cost school of economists associated with Ronald Coase and Oliver E. Williamson.[2]

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William Lazonick has been one of the most active of the neo-institutionalists over the past fifteen years. In two large books[3] and a string of articles (some of the more recent of which will be cited below), Lazonick has produced a blend of economic history, the history of economic thought, and an admixture of modern economic theory to analyse the role of the firm in capitalist economic development. His very ambitious aim has been both to explain the past and to provide guidelines for policies to promote innovation and growth in the future.

Lazonick's disillusionment with neo-classical economics began as an undergraduate student of economic development at the University of Toronto in the mid 1960s and continued through periods of graduate study at the London School of Economics and the University of Geneva. He objected primarily to the lack of realism in static models that hold technology exogenous. As he has put it, "When I left LSE in the summer of 1969, I was confident that I understood what conventional economics was all about. But I had also become aware that I knew very little about how an actual capitalist economy worked. In other words, I had come to the realization that understanding economics and understanding the economy were not necessarily the same endeavors." Subsequently, as a Ph.D. student at Harvard, he became interested in economic history and wrote a dissertation on the British cotton textile industry that is critical of Marx while remaining sympathetic to the general Marxian approach.[4] Although his armoury now includes weapons drawn from diverse sources, Lazonick's basic outlook retains strong elements of late 1960s radicalism including a belief that planned outcomes are likely to be superior to those generated by markets.

VALUE-CREATION AND INSTITUTIONAL DEVELOPMENT

Because of the way in which he has organised his ideas, it is not always easy to determine the overall outline of Lazonick's position. In part this arises from the way in which he has chosen to sprinkle his propositions throughout two distinct but closely related books rather than presenting a single, compact statement. Lazonick's style of attack also gets in the way of clarity, as he often devotes more space to criticising the positions of other writers than he gives to his own alternative views. Throughout his work, he demonstrates an almost obsessive desire to differentiate his work from that of others and to show at length why seemingly similar ideas coming from other economists are, in fact, incorrect whereas he has found the key to understanding the role of the modern corporation in capitalist economic development.

Nevertheless, it is possible to distil Lazonick's ideas into a coherent story, even though this sometimes entails setting aside the multitudinous qualifications that he offers for almost every statement. Starting with insights from his study of the British, and later the American and Japanese, cotton industries, Lazonick has developed a theory that is based on a number of premises that directly contradict some of the basic assumptions of neo-classical microeconomics:

1. Equilibrium is neither the normal state in which markets find themselves nor is it necessarily the state towards which markets tend, as the Austrians believe. Lazonick instead takes the position (which is also common amongst writers on corporate strategy) that equilibrium is an undesirable state because it connotes stasis and is therefore the antithesis of the conditions required for growth and development.
2. Technology can and should be manipulated by businesses and governments to promote growth.
3. Organisational form is a central determinant of economic performance. However, it is not always true that, as Alfred D. Chandler, Jr. tells us, "structure follows strategy". To the contrary, Lazonick believes that firm structure establishes a framework in which certain strategies are feasible and others are not. Therefore, if firms are to evolve in an environment of technological change, they must first make sure that they are organised in ways that facilitate the generation and assimilation of new technologies. On a higher level, national governments must adopt industry policies to encourage firms to organise themselves for change.
4. Lazonick believes strongly that growth is a process in which history matters. This is true not only in the sense that there is path dependency, but also in the general sense that history teaches lessons that can lead to better decisions in the future. As a consequence, useful economic theory needs to be grounded in a thorough understanding of historical development.

These deviations from orthodoxy do not mean, however, that Lazonick has thrown overboard the entire corpus of conventional economic theory. He accepts the usefulness of factor and goods markets, and the operations of Marshall's scissors firmly underpin his analysis. Equally importantly, he rejects important aspects of counterculture economics. The most striking aspect is his acceptance of the overall efficiency of capitalism and capitalist firms as bases for future growth and prosperity. From Lazonick's standpoint, low growth rates in some capitalist countries do not derive so much from faulty institutional structures as from inadequacies in the way in which these institutions are managed. He believes that, if businessmen and governments had only digested the lessons of history, they would know how to use their institutional legacy more productively.

Despite his dislike of most neo-classical economics, Lazonick is hardly operating in an intellectual vacuum. As he acknowledges repeatedly in his writings, Lazonick's own views rest on four major props. Basically, he provides an amalgam of ideas drawn from Joseph Schumpeter, Marx, Chandler, and Marshall. Although Marx in perhaps closest to Lazonick's heart, and Chandler exerts the strongest influence over his view of the future, the place to begin a discussion of Lazonick's theory is with Schumpeter.

As a believer in growth and innovation as the keys to economic development, Lazonick has accepted Schumpeter's contention that a positive, indeed a central, role is played by those who disturb existing equilibria by introducing important technological or organisational changes that upset existing economic practices. But such innovations do not take full effect instantaneously. They take time to mature for various reasons that include the need for learning on the part of innovating organisations, difficulties in convincing people of the value of new arrangements, and resistance from entrenched interests that could be adversely affected by change and therefore feel threatened by the prospect of a Schumpeterian "gale of creative destruction".

Lazonick stresses that innovation is not a matter of technology alone. He emphasises that in modern economies production does not result from the activities of machines or labour in isolation; rather, it is the *interaction* of people and machinery that generates production. Hence the ability of a firm to gain advantage from technological or organisational change depends on the ability of management to induce *effort* from the workforce. In order to make it rational to invest in an improvement, at least enough effort[5] has to be elicited from labour to allow the increased productivity resulting from an innovation to be sufficient to cover its cost. This point, which holds as well in neo-classical or transaction cost analyses,[6] is reinforced by Lazonick's adherence to the labour theory of value.[7] Machinery may enhance the productivity of labour, but he holds that, in the last analysis, it is human effort that creates the value from which wages, profits and investment capital are all derived.

Because of the central place of labour in value-creation,[8] one of the most important roles for management is to construct a mentality amongst workers that makes them willing to accommodate innovations so that the expected high productivity transpires. This may be accomplished through coercion, but the use of sustained force is often impracticable in modern economies. Broadly speaking, the way in which management generally elicits sufficient effort to justify an innovation is by sharing the resulting higher productivity with the workforce. But managers often need to provide more than rewards; they must also be willing to train workers in the skills appropriate to a new technology.

While the payment of higher wages is one common way of distributing the proceeds of change and securing the consent of the workforce, there are other tools that management can use. The most important of these involves the creation of what Lazonick calls "good jobs". "Good jobs" are those that offer stable employment and a career ladder. Workers who have an ensured opportunity to benefit from long-term improvements in productivity will not feel threatened by innovation and are more likely to accept change than are workers whose jobs may be at risk.

Finally, in Lazonick's analysis the amount of investible funds available to a firm is a function of its success in eliciting effort from its workforce. Any surplus that a firm earns results directly from labour productivity. Therefore, in order to finance new or replacement investment and research and development (and to provide for profits and for the wages for the managers, themselves), management must offer its workers enough incentive to maximise the surplus that remains after other expenses have been met. In essence, Lazonick has married Marx to Schumpeter by contending that innovation will only succeed when labour power has been harnessed effectively.

Lazonick assumes that the dynamic sector of the economy is characterised by high fixed costs that can take several forms. In addition to expenditure on plant and equipment, firms can incur high R and D and advertising or marketing costs which are then capitalised. Moreover, Lazonick treats training expenses as a fixed cost that firms bear themselves.[9] In order to amortise these high fixed costs, firms need to take several kinds of action, most of which Lazonick derives from the work of Alfred D. Chandler, Jr.[10] The most important of these steps are first, to maintain high levels of throughput in order to reduce carrying charges and mitigate the effects of obsolescence on highly-capitalised operations; and, secondly, to hedge against risk by integrating vertically. As Chandler has shown, market-based operations can carry risks that may be diminished through the assimilation of upstream or downstream activities within the firms.[11]

Lazonick goes well beyond a consideration of the implications of high fixed costs, however, by (again in common with Chandler) investing largeness *per se* with vital positive attributes. Most neo-classical economists, including the transaction cost school associated with Oliver Williamson, contend that vertical integration is only justified in cases of market failure — when, for example, asset specificity coexists with bounded rationality and opportunism.

But Lazonick contends that organisations perform *positive* functions because the implementation of strategies requires systematic co-ordination of assets and activities. As significant innovation is held to be a strategic activity, Lazonick believes that the rate of technological change is reduced when there is a high degree of vertical specialisation in a production chain. This is because managers providing coordination in an integrated firm are in a better position to recognise and act upon potentially beneficial innovations than are the managers of individual functional units that interact through markets.

Lazonick's reasons for believing that organisations are superior to markets are both cognitive and behavioural. In a cognitive sense, organisations devoted to specific purposes can more easily direct information where it is needed than can firms operating blindly in response to market signals that they may or may not receive or be in

a position to interpret correctly. Thus vertical integration can reduce search costs for information on innovations and increase the chance that messages will be delivered where needed. Behaviourally, organisations are also better than markets because they can order people to do whatever is necessary to implement innovation — assuming, of course, that the organisation also takes the steps necessary to elicit sufficient effort from the workforce.

Marshall is also invoked for his discussion of internal returns and of the market-based activities that are still required in a world of large organisations. Lazonick believes that cooperation amongst firms is a more important ingredient of successful change than is competition and that Marshallian industrial districts, in which many firms are clustered together and can cooperate as well as compete, have the advantage of approximating the virtues of bigness and vertical integration even when firms remain small.[12]

By now, it will be clear that the sort of ideal firm that Lazonick envisages is far from a textbook capitalist enterprise even though it operates for profit, buys at least some of its inputs in factor markets, and sells at least part of its output in goods markets. What Lazonick does in effect is to turn some of the characteristics that John Kenneth Galbraith deplores in *The New Industrial State* into virtues. Large capitalist firms do not have to cultivate a disregard for the public interest, as Galbraith would have it, if they are to defend their enormous investments in plant and equipment. For Lazonick, such firms are (or at least ought to be) public trusts, run by professional managers whose purpose is to represent the interests of all the stakeholders by supplying efficient co-ordination. If this is done properly — if value-creation is maximised — then it is possible to divide the firm's surplus intelligently among workers, owners, investment in innovative products and the managers themselves. All groups benefit because proper management of the workforce elicits enough effort to permit innovation and growth to proceed within individual firms and across the economy as a whole. Lazonick is therefore highly critical of practices such as management buy-outs[13] because he see owner/managers as potential disasters who will distribute an unsatisfactorily high share of a firm's surplus to their private purses at the expense of workers, capital investment and, ultimately, the economy in general.

Lazonick also locates the modern firm within its national context. Robert Reich's prediction[14] of a world dominated by truly trans-national firms that employ highly-trained "symbolic analysts" wherever they can be found has no appeal for Lazonick. He contends that nations have distinct institutional arrangements that significantly affect the ability of firms to compete internationally. Hence, referring specifically to the United States, he believes that what is required to joust more efficiently with Japanese or European competitors is a national industry

policy that would stimulate the value-creation activities of American firms. Desirable measures would include the encouragement of industrial concentration to promote a higher rate of innovation by allowing firms to take advantage of the visible hand of managerial co-ordination, as well as government action to improve the quality of human capital by stimulating investments in education and training by both the government and firms.[15]

Although Lazonick devotes nearly seven hundred pages in his two major books (and still more in later articles) to developing his discussion of the place of the firm in modern capitalist economies, in crucial places his argument is reduced to assertion. An idea of how he proceeds is conveyed by his use of historical examples.

THE FIRM IN HISTORY: AN HISTORICAL PROGRESSION?

Lazonick points the way to the future through an analysis of the development paths of three countries in different eras: Britain in the late eighteenth and nineteenth centuries; the USA, in the late nineteenth and twentieth centuries; and Japan since the Second World War. In all three cases, he detects the evolution of management practices that allowed firms to elicit high levels of labour effort so that they could derive significant value-creation from the latest technologies. For Britain and the United States, however, the institutional arrangements for labour management that developed during their periods of greatest relative performance proved difficult to change and, as a result, impeded the efficient adoption of further innovations as technological paradigms moved on. But as the course of institutional evolution has been clear, Lazonick contends that it is still possible for firms and nations to read the lessons of history and make the adaptations needed to compete successfully in the innovating world economy of the present and future.

According to Lazonick, by the late nineteenth century British firms had lost the ability to pursue innovative strategies because they continued to use organisational forms and managerial techniques developed in the early period of industrialisation at the beginning of the century. During the industrial revolution, the owner/managers of British factories had found it expedient to rely heavily on skilled mechanics and semi-skilled machine operatives. These groups not only possessed technical knowledge that the owners frequently lacked, but they could be counted on to a large extent to work without detailed supervision and to oversee the activities of their subordinates. These pioneering firms were often too small, however, to command the financial resources needed for capital-intensive investment as technology changed towards the end of the century. And even when they had the means to acquire modern equipment, British managers were frequently incapable of eliciting support for innovation from technical specialists and workers. Both of these groups tended either to withhold effort altogether in the face of change or to co-opt new methods in such a way as to severely reduce

the benefits that might have been derived if there had been greater cooperation between owners and their workers.

Lazonick contends that, in order to counteract these problems, British managers would have had to offer "good jobs" to a higher proportion of the workforce, thereby trading assurances of job security for at least some of their workers in return for greater effort when innovations were introduced. But British firms continued to restrict security to a very small proportion of workers and as a result were forced to undertake *adaptive* rather than *innovative* approaches to technological change by the beginning of the twentieth century. As long as the unions countered innovations with restrictive work practices, it was unlikely that firms would be able to elicit enough labour effort under new arrangements to justify increased investments in expensive new techniques. As the owners of many established British firms were unable to break away from old labour management practices, the economy as a whole failed to modernise as fast as it should have.

For the United States, Lazonick repeats the familiar Chandlerian account of a move to large firms run by professional salaried managers in the late nineteenth and early twentieth centuries. The adoption of highly-capitalised technologies in the United States was facilitated by both the nature of the technologies and the labour control policies adopted by American firms. Taylorist and Fordist technologies largely eliminated the role of skilled workers in many production processes and thus their ability of block innovation. Also, salaried American managers were more generous in the distribution of "good jobs", which were initially extended to technical specialists and assembly line workers in large firms, many of whom were happy to remain ununionised.

At the end of the 1920s, however, conditions began to change when the sharp downturn in production at the beginning of the Depression led American employers to abandon their guarantees of stable employment, especially for lower grades of workers.[16] As a result, workers became disillusioned with their firms and, with government support, formed powerful unions. "Good jobs" were henceforth restricted to engineers and other technical personnel as well as to the managers, themselves. From that point, American managers lost their ability to elicit the ready effort of shopfloor workers in support of innovation. In addition, training became more problematical as employers were increasingly reluctant to make investments in learning for workers who might refuse to contribute enough effort to make innovation worthwhile. This, combined with a decline in support for public education, has rendered it difficult for American employers to use workers flexibly. According to Lazonick, American employers now face obstruction when attempting to innovate in much the same way as British firms did earlier in the century, leading to a similar loss of international economic leadership.

Large Japanese firms and *keiretsu* networks provide the final stage of Lazonick's story and serve as models for future developments elsewhere. Increases in the rate of innovation and in the degree of technical sophistication needed to master change have led to greater stress being placed on organisational flexibility. In Lazonick's opinion, neither British nor American firms can meet the changes posed by innovation in the foreseeable future because they are not well equipped organisationally to capture new developments and they do not have the ability to elicit the flexibility of effort from their workers that modern technologies require. Japanese firms, on the other hand, are well prepared in both respects.

In his recent discussion of *The Competitive Advantage of Nations* by Michael E. Porter,[17] Lazonick indicates why he feels that *keiretsu* and Japanese industry policy are conducive to economic success.[18] Porter's thesis is that firms are more likely to be successful in international markets if they face strong competition in their domestic markets. Lazonick acknowledges the importance of domestic economic conditions for international competitive success but turns Porter's argument around by claiming that competitive strength derives from skills honed through domestic *cooperation* rather than competition. In support, he cites the operation of firms in the "Third Italy" as well as Japanese examples. In Italy, government-supported producer cooperatives allow small firms to share resources in areas in which distinctive competitive competences are not involved. In Japan, cooperation is achieved in several ways. Large firms may be diverse enough in themselves to generate innovation across a wide spectrum of fields. When an individual firm has not covered an important area, however, it may be possible to gain access to new technologies through other members of its *keiretsu*. Finally, government initiatives sponsored by departments such as MITI encourage cooperation amongst direct competitors. American firms lack the latter two types of network support and are in fact legally prohibited from cooperating in many cases. Furthermore, the locus of innovation in America is frequently in small firms that lack the complementary resources to fully develop their ideas and, as a consequence, find that the benefits of their breakthroughs are appropriated by large firms either in the US or abroad.

The employment practices of large Japanese firms are also better suited, in Lazonick's opinion, to attracting the effort of workers. In Japan, all members of the "permanent" workforce have "good jobs", which makes it rational for firms to invest in worker skills and for workers to accept innovations that offer little risk of displacement but will lead to greater prosperity for themselves and their firms. This higher level of on-the-job training is built on the results of a superior educational system to create workers who are better able than their American counterparts to cope with change in the short and long runs.

THE LIMITS OF ECONOMIC AND HISTORICAL ANALYSIS

On the basis of these three case studies, Lazonick has discerned an historical progression that he uses as the basis for policy recommendations for future development. Over the past two centuries, he finds, productive units have become steadily larger because of the growth of economies of scale in production, marketing, research and development and other areas. They have also become increasingly capital intensive. While in the late nineteenth and early twentieth centuries capital was used to replace skilled labour, in recent decades higher levels of workforce skill have again been needed to run and maintain the newest types of equipment. Both increasing scale and increased capital intensiveness have raised important issues for management by greatly increasing the complexity of many firms. One result has been the familiar Chandlerian solution of attempting to reduce risks through vertical integration.

Lazonick, however, places greater emphasis than Chandler on the importance of labour management. As value-creation is rooted in labour effort, the ability of firms to compete rests heavily on their ability to get workers to cooperate in establishing high levels of productivity. This cooperation is particularly vital, and particularly hard to gain, when there are significant innovations. If sufficient effort is not forthcoming, innovations will not pay off for firms. One way of securing effort, and therefore validating innovation, is by sharing the results with the workers. This can be done in various ways, but the most important is through the granting of "good jobs" with high levels of security and a ladder for advancement. When workers have "good jobs", both they and their employers have more to gain from innovation and they are thus more willing to invest in the equipment and training necessary to make innovation pay.

The way to a better future for capitalist firms is clear to Lazonick. The trends towards larger corporate size, as characterised first by the growth of capital-intensive vertically integrated firms after 1870 and more recently by the success of large Japanese firms, will continue because these firms have an advantage in the generation and collation of technological knowledge. And the need for well-trained and compliant workers to operate new technologies flexibly means that firms must extend the range of workers who are eligible for "good jobs" if they are to be internationally competitive. But, since the basis of firm strength is nationally-based, governments must provide policies that encourage their firms to achieve the size, access to innovative research and labour policies that are needed for success in the economic environment of the foreseeable future.

Lazonick's argument offers a clear scenario that is plausible in many respects, but his conclusions and the way in which he reaches them offer a number of challenges to his readers. For economists, one of the most

significant aspects of Lazonick's work is the way in which he goes beyond traditional neo-classical categories. Large sections of *Business Organization and the Myth of the Market Economy* are given over to critiques of other writers including Austin and Joan Robinson, Edward Chamberlin, Ronald Coase, Oliver Williamson, Harvey Leibenstein and virtually the entire Chicago School as well as Marx, Schumpeter and Marshall. His arguments are frequently insightful, as in his criticism that the transaction cost analysis of Williamson neglects the fact that much strategic behaviour is offensive rather than defensive as firms manoeuvre to gain advantage over competitors rather than respond negatively to market failure. Lazonick often overstates his case, though, by launching sweeping attacks that confuse propositions put forward for purposes of theory-building with the actual perceptions that the economists had of the way in which the world operates. We are told, for example, that "Chamberlin had no conception ... that ... nonmarket relations might be central to dynamic process that results in innovation and competitive advantage — as indeed they were central in U.S. industrial history."[19] Likewise, we learn that Coase "had no conception of the development of organizational capability or of its implications for the development and utilization of productive processes."[20] These examples, which could be multiplied many-fold, reveal Lazonick's impatience not only with analysis that, in his view, addresses the wrong questions, but with formal analysis in general. Despite the inclusion of a few simple diagrams, Lazonick prefers to proceed more like a burbling brook in his own analysis. He flows from issue to issue, sometimes by assertion, sometimes by demonstration. When he finds a rock in his path, however, he tends to flow over or around it and is seldom detained for long — unless the rock happens to be some (frequently defunct) economist who can be used as an Aunt Sally.

This way of treating other economists is, of course, frequently unfair because he alleges that statements made to fit the constraints of a given local system represent the views that their authors actually hold of the world. Casual empiricism suggests, however, that when put to the test most economists have no trouble distinguishing between the precepts of, for instance, a structure-conduct-performance model and the factors that managers must in fact face in running their firms.[21] Lazonick refuses to be tightly constrained by the imperatives of a model of his own work, a practice which offers advantages as well as disadvantages. As Edith Penrose has pointed out, the Theory of the Firm was actually intended to be a theory of price and production, with its assumptions chosen to illuminate these aspects of economic behaviour.[22] The underlying assumptions are very useful for this purpose, but once it is realised that they are theory-specific, then there is no reason why a theory intended to expose some other problem should not start afresh, with a different set of assumptions where they are useful. Lazonick has done this by including various types of behaviour that are realistic in the

context of explaining the role of capitalist firms in modern economic development. By ranging freely and including concepts from the business strategy and organisational behaviour literatures, he is able to bring together factors that might not otherwise be juxtaposed and would certainly not be found in a pre-1985 neo-classical economic analysis. For example, his presentation of the factors involved in eliciting effort and the role of "good jobs" explains worker motivation in ways that go well beyond economic incentives by indicating that workers may be willing to make sacrifices to keep control over non-economic aspects of their work environments.

Nevertheless, some reservations are in order. In many respects, Lazonick's analysis bears some of the stigma of the narrow economistic approach that he has criticised in others. For example, many of the basic psychological underpinnings remain as rudimentary as in conventional economics. Much of his reasoning for asserting the superiority of large firms as innovators is based on principles underlying the communication of information and learning. These factors have been widely canvassed in the organisational behaviour literature in relation to innovation, but Lazonick does not consider the findings even though most of them are consistent with the microeconomic framework that he relies on. Nor does he consider the economic literature on learning by authors such as Spence and Stiglitz.[23] If he had, he would have been able to enrich his analysis and in some cases replace assertion with argument. On the other hand, he would have had to face up to a variety of findings that differ from his own even though they are based on similar assumptions.

Another set of problems arises from Lazonick's use of historical data and the extrapolations that he makes from past trends. He contends that an historical approach to development is preferable to the pared-down methodology of conventional economists who have sacrificed much of the explanatory complexity of reality to produce "an economic theory that is not bound by time and place..."[24] But it is a fundamentally ahistorical procedure to project future developments on the basis of past, or even current, trends. Each experience occurs within its own context and the patterns outlined by Lazonick are essentially compressions of the experiences of many institutions (firms or industries) within their own environments. Not only is there reason to believe that the context of future developments will be different from that of the past, but there will be a variety of different contexts within which future firms and industries will be developing simultaneously. Even if one accepts Lazonick's critique of conventional economics, the fact remains that immersion in historical complexity will not, in itself, lead to good predictions if the conditions pertaining in the past were dissimilar to those of the future.

One way of assessing the vision that Lazonick presents is to look at an alternative vision based on different historical experiences. On the

basis of evidence from Continental Europe dating back to the nineteenth century, Michael Piore, Charles Sabel and Jonathan Zeitlin have argued that economies based on skilled craftsmen are able to produce standards of living as high as those produced by giant vertically-integrated firms of the type that Lazonick endorses.[25] It is clear that Lazonick and Piore, Sabel and Zeitlin are all correct in the sense that both large and small firms have thrived historically and continue to exist. But neither set of examples precludes the other because different industries are involved. In certain industries such as iron and steel, automobile manufacturing and some branches of chemicals, economies of scale proved so strong that small firms were virtually wiped out in the first half of the twentieth century. Chandler, and by extension Lazonick, have probably overestimated the importance of these industries.[26] In many other cases, economies of scale were limited, although increases in productivity may nevertheless have been great. In these latter industries, which include some branches of machinery manufacture, clothing and retailing, small, highly-competitive firms have been able to retain strong positions. Thus, if history is a guide to the future, then either the Lazonick or the Piore and Sabel scenario is feasible.[27]

INNOVATION AND CORPORATE ORGANISATION

Is there, in the end, any good reason to accept Lazonick's analysis despite its various attractive aspects? There is considerable evidence that suggests that the future may be less uniform and more complex than Lazonick argues.

Chandler's observations, which form the foundation for Lazonick's organisations of the future, are based on the experiences of mature firms operating in markets in which the rate of growth of sales is declining. The imposition of the visible hand is very largely a defensive measure for Chandler, involving the rationalisation of existing operations and protection against risks posed by suppliers and customers. In these industries, the main patterns of product and process technologies have been decided *before* horizontal and vertical consolidation occurs, and subsequent technological change is incremental and adaptive.

In addition, Lazonick's contention that Chandlerian or similar firm structures are also most conducive to innovative environments rests on a belief that the generation and dissemination of knowledge occurs most frequently when research efforts are clearly focused and channels of information are well marked. But in the uncertain environments that characterise innovative situations, knowledge is often generated in multiple locations and firms may condemn themselves to following the wrong development trails if they are restricted to the use of innovations developed in-house. Therefore, while it may well be true that it is easier to bring together the efforts of experts on diverse topics if they all work within the same organisation, it does not follow that these people will have the best solutions to the problems at hand. This is illustrated by

the experiences of the European Community in trying to promote strength in computer technology by forming a consortium of the largest producers in the EC. After a short period, these producers began to concentrate more of their resources on joint ventures and other agreements that they had reached individually with American and Japanese computer firms than they devoted to the consortium. Although this has been criticised,[28] it is not hard to understand that firms felt that it was more important to become tied into networks overseas, where the most important developments were occurring, than to restrict their energies to dealing with local firms, none of which was on the leading edge or likely to contribute to new breakthroughs.

This does not mean, of course, that Lazonick-type firms might not offer some advantages, especially in the implementation of new technologies. Large firms have a better chance than smaller ones of appropriating the benefits arising from innovation because they can often supply internally the other inputs required to market new products successfully. Furthermore, systemic change tends to proceed by analogy. After having been developed for one purpose, innovations may then be applied to a very wide range of uses that were never envisaged, let alone intended, by their originators. This has occurred with steam power, electrification, and more recently with semi-conductors.[29] Large and diverse organisations may be able to accelerate the spread of change by making faster connections between an innovation and its various uses than would occur in a network of smaller, less diversified firms that pick up their information through undirected market channels.

However, the actual generation of innovative concepts under conditions of extreme uncertainty, in which product and process technologies are still evolving and the nature and size of markets have yet to be determined, may well be conducted most efficiently by large numbers of teams working independently and producing a rapid stream of ideas for the market to test. Independence does not mean isolation, however, and development may be enhanced by geographic concentrations of firms working on similar problems as in Silicon Valley. As Lazonick has pointed out, these variations on Marshallian industrial districts can duplicate many of the advantages arising from more formal types of cooperation, including the provision of advanced training networks, while still retaining multiple channels of inspiration.

From this, it seems that Lazonick's large and centralised firms are only one of several forms of organisation that may speed innovation and growth.[30] Depending on the nature of the problem under consideration, the stage of the product life cycle, the availability of external information channels and many other factors, small, independent firms operating in industrial districts, more formal networks as in "Third Italy", joint ventures, or other organisational arrangements may also be the most efficient ways of generating innovation and growth.

This is a message that is as important to governments when formulating industry policies as it is to individual private-sector producers.

A final question concerns whether the development of flexible technologies necessarily requires multi-skilled workers who are more compliant and willing and able to learn new jobs than typical workers in modern Britain or America are often thought to be. Much of the computer-based technology in recent decades has reduced the amount of skill necessary to perform tasks. Both hardware and software are coming more user-friendly and the range of inexpensive programs is increasing daily. People with few skills can now perform tasks involving calculation or design that, until a few years ago, would have required the use of trained programmers and a detailed knowledge by the user of the underlying theory. Moreover, as Ames and Rosenberg have pointed out, machinery may be integrative in the sense of automatically and progressively moving from stage to stage of a process with little or no human intervention.[31] Computer-assisted technologies are especially appropriate for integrating tasks because they can be programmed to make judgements as to the appropriate interfaces between stages that reduce or eliminate the need for knowledge on the part of operatives. If current trends towards integrative equipment continue — and there is every reason for machinery makers to try to ensure that they do — then the increased range of human skills now associated with flexible manufacturing may turn out to be a transitory stage as production techniques veer back in the direction of Fordism.

In investigating alternatives to market channels for bringing about innovation, Lazonick has brought valuable insights to a question of great importance in a world of slow productivity growth and wide-spread international economic rivalry. The issues on which he has focused highlight areas which are in need of urgent attention and which, as in the case of policies for education and training, are unlikely to be resolved without increased governmental attention. Nevertheless, even though his arguments are plausible, he proceeds largely through assertion disguised as argument. In the end, he has been unable to shake his belief in the value of planning and centralisation despite widespread changes in both the technological and economic environments that have, if anything, increased the need for multiple sources for the generation of innovative concepts and multiple channels of dissemination of information.

NOTES AND REFERENCES

1. Nevertheless, modelling is becoming increasingly common. See, for example, the articles in the *Journal of Evolutionary Economics.*
2. A sample of the various approaches is given in Richard N. Langlois (ed.), *Economics as a Process: Essays in the New Institutional Economics*, Cambridge, Cambridge University Press, 1986.
3. *Competitive Advantage on the Shop Floor,* Cambridge, Ma,. Harvard University Press,1990 and *Business Organization and the Myth of the Market Economy,*

Cambridge, Cambridge University Press, 1991. More recently, a collection of Lazonick's articles has been published *(Organisation and Technology in Capitalist Development*, Aldershot, Edward Elgar, 1992), but the content of most of these has been incorporated into the other two books.

4. Lazonick describes his intellectual development in 'Presidential Address', *Business and Economic History*, 20, 1991, pp.1-13.
5. Additional effort is not always called for since many innovations are, of course, labour saving. However, if the workforce dislikes an innovation, perhaps because they believe it will lead to reduced employment, they may refuse to cooperate at all or may sabotage its introduction in more subtle ways.
6. For example in Paul L. Robertson and Lee J. Alston, 'Technological choice and the organisation of work in capitalist firms', *Economic History Review*, 45, 2, May, 1992, pp.330-349.
7. Lazonick explains his version of the labour theory of value in the appendix to *Competitive Advantage*, 'The basic analytics of shop-floor value creation', pp.333-352.
8. Lazonick uses "value-creation" to approximate the meaning of both "productivity" and "output".
9. This treatment of training expenses is central to Lazonick's paper on "Learning and the dynamics of international competitive advantage", which was presented to the Conference of the International Joseph A. Schumpeter Society, Kyoto, 18-22 August, 1992.
10. Particularly in *The Visible Hand*, Cambridge, Ma., The Belknap Press of Harvard University Press, 1977.
11. Chandler has restated these propositions in transaction cost terms in the introductory chapter to *Scale and Scope*, Cambridge, Ma., The Belknap Press of Harvard University Press, 1990.
12. Lazonick has recently expanded on these ideas in 'Industry clusters versus global webs: organisational capabilities in the American economy', *Industrial and Corporate Change*, 2, 1, 1993, pp.1-24.
13. William Lazonick, 'Controlling the market for corporate control: the historical significance of managerial capitalism', *Industrial and Corporate Change*, 1, 3, 1992, pp.445-488. Lazonick is reacting against attitudes such as those of Michael C. Jensen as outlined in 'Takeovers: their causes and consequences', *Journal of Economic Perspectives*, 2, 1988, pp.29-48; and 'Eclipse of the public corporation', *Harvard Business Review*, 67, 1989.
14. As articulated in *The Work of Nations: Preparing Ourselves for 21st-Century Capitalism*, New York, Knopf, 1991.
15. These ideas are expanded upon in 'Learning and the dynamics of international competitive advantage' and 'Industry clusters versus global webs'.
16. Lazonick implies that the decision to layoff workers was a matter of discretion and that firms might have persisted with guaranteed employment despite sharp and sustained falls in output. *Competitive Advantage*, pp.270-271.
17. Michael E. Porter, *The Competitive Advantage of Nations*, New York, The Free Press, 1990.
18. 'Industry clusters versus global webs', especially pp.2-9. W. Mark Fruin has recently argued, however, that Japanese firms are far less centrally controlled and more responsive to market pressures than Lazonick indicates *(The Japanese Enterprise System: Competitive Strategies and Cooperative Structures*, Oxford, Oxford University Press, 1992).
19. *Business Organization*, p.167.
20. *ibid*, p.169.
21. They, like Lazonick, have generally "come to the realization that understanding economics and understanding the economy [are] not necessarily the same endeavors". Still it must be conceded that many economists prefer economics to the economy and have a tendency to use caricatures of reality to test theory. For a similar distinction between economic modelling and "how economists *talk* about particular events", see Richard R. Nelson, 'The tension between process stories and equilibrium models:

analyzing the productivity-growth slowdown of the 1970s', in Langlois (ed.), *Economics as a Process*, p.136.

22. Edith T. Penrose, *The Theory of the Growth of the Firm*, Oxford, Blackwell, 1959, pp.10-24.
23. A. Michael Spence, 'The learning curve and competition', *Bell Journal of Economics*, 12, Spring, 1981, pp.49-70; Joseph E. Stiglitz, 'Learning to learn, localised learning and technological progress', in Partha Dusgupta and Paul Stoneman (eds), *Economic Policy and Technological Performance*, Cambridge, Cambridge University Press, 1987, pp.125-153.
24. *Business Organization*, pp.271-273.
25. Michael J. Piore and Charles F. Sabel, *The Second Industrial Divide: Possibilities for Prosperity*, New York, Basic Books, 1984; Charles F. Sabel and Jonathan Zeitlin, 'Historical alternatives to mass production: politics, markets, and technology in nineteenth-century industrialisation', *Past & Present*, 108, August, 1985, pp.133-176; Charles F. Sabel, Garry Herrigel, Richard Kazis, and Richard Deeg, 'How to keep mature industries innovative', *Technology Review*, 90, 3, April, 1987, pp.26-35; Charles F. Sabel, 'Flexible specialisation and the re-emergence of regional economies', in Paul Hirst and Jonathan Zeitlin (eds), *Reversing Industrial Decline? Industrial Structure and Policy in Britain and Her Competitors*, Oxford, Berg, 1989, pp.17-70.
26. Barry Supple, 'Scale and scope: Alfred Chandler and the dynamics of industrial capitalism', *Economic History Review*, 44, 3, August, 1991, pp.500-514; David S. Landes, 'Introduction: on technology and growth', in Patrice Higonnet, David S. Landes and Henry Rosovsky (eds), *Favorites of Fortune: Technology, Growth, and Economic Development since the Industrial Revolution*, Cambridge, Ma., Harvard University Press, 1991, pp.1-29.
27. John Kay provides a sceptical evaluation of the importance of economies of scale in modern industry, noting that, "I have yet to encounter a firm or an industry where managers did not initially overestimate the importance of scale economies." (*Foundations of Corporate Success: How Business Strategies Add Value*, Oxford, Oxford University Press, 1993, p.172).
28. Lynn Krieger Mytelka, 'Dancing with wolves: global oligopolies and strategic partnerships', paper presented to the *Conference on Convergence and Divergence in Economic Growth and Technical Change: Maastricht Revisited*, Maastricht, December 10-12, 1992.
29. Paul A. David, 'The Dynamo and the computer: an historical perspective on the modern productivity paradox', *American Economic Review*, 80, 2, 1990, pp.355-361.
30. Paul L. Robertson and Richard N. Langlois, 'Innovation, Networks, and Vertical Integration', *Economics & Management Working Paper* No.3/1992, Department of Economics and Management, University College, University of New South Wales.
31. Edward Ames and Nathan Rosenberg, 'The progressive division and specialization of industries', *Journal of Development Studies*, 1, 1964-65, p.368.