The Innovative Organization: Viewed from the Shoulders of Schumpter, Chandler, Lazonick, et al.

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While it may be true that we all became Keynesians at some point following the Second World War, we are since the 1980s all rapidly becoming Schumpeterians [19]. We are carried along as academicians usually are, in the backwash of historical change; in this instance, the emergence of an intensely competitive global economy has given us a new appreciation for the Austrian economist's central ideas. Schumpeter's great contribution to economic analysis and to economic and business history was to focus attention on the decisive causal role that entrepreneurship played in the long-term performance of economic systems. In particular, he posited that innovation accounted for the growth of these systems -- a subject with which we have become obsessed in the United States as our economy's performance has fallen short of our expectations [30, 31].

Politicians have picked up the scent. Industrial policy and public-private research and development are attracting tremendous attention inside the beltway in Washington, D.C. As we might have expected, organizations like the Brookings Institution have adapted quickly to the new quest for a national policy that will enable the United States to renew itself, to get back that something that was apparently lost when our economy started to sag. While there are different opinions about what that "something" is, there seems to be a consensus that it has something to do with innovation, with the sort of entrepreneurship associated with Schumpeter's grand theory [24].

I cannot claim to be impervious to what is happening so close to my home base in Baltimore, but my objectives in this essay are far more humble than those of the Washington elite. While they are attempting to change America's competitive position in the global economy, all that I intend to do is outline a set of concepts which I hope will be useful to scholars working on the history of the modern business firm. My goal is to develop a micro-perspective. I am attacking this problem by narrowing the subject to a small

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subset of those organizations -- that is, to those which have been innovative and have remained innovative over the long-term.[2] So the specific objective here is to build the foundation for a dynamic, micro-historical concept of the innovative business organization.[3]

To make the task even more specific, I provide you with five brief vignettes from twentieth-century U.S. business history. These are the sorts of narratives, of stories, with which historians of business work on a daily basis. They are the stuff of our history. My goal is to develop a perspective that will encompass all five and also give us some analytical leverage on the problem of explaining how organizations become and remain innovative over the long-term.

I

The first vignette involves MCI, Microwave Communications, Inc., which in its early years had no technological edge on its competition, was dreadfully strapped for capital, and had no advantages of scale or scope. What it did have was a good sense of a major opportunity that existed in the U.S. telecommunications industry and the political and legal skills that were needed to capitalize on that opportunity. It rode a wave of technological, political, legal, and regulatory changes that enabled it to become a major player in the nation's telecommunications market. It helped shape the political, legal, and regulatory aspects of those developments and thus the industry which it entered. But clearly, the movement away from regulated monopoly was much broader than the sequence of events in which MCI was directly involved [35, 2, 11, 14, 21].

During MCI's early years of struggle against the Bell System, the company had effective, entrepreneurial leadership and a powerful ideology. Jack Goeken and William McGowan -- increasingly the latter -- provided the leadership as MCI struggled in the 1960s and 1970s to break the Bell System's hold on the nation's market for long-distance telecommunications. MCI's culture was framed in terms of David's battle against Goliath. This underdog ideology resonated with many regulators, legislators, and a public increasingly skeptical of the dominant structures of authority in American society.[4] Focused on a single goal, MCI successfully became a major player in one of the nation's fastest growing markets and was by the mid-1980s a multinational with almost $2 billion dollars in sales [14].

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[2]I am arbitrarily defining the long-term as over twenty years.

[3]Public as well as private organizations can be innovative over the longterm, and my intention is to develop a micro-perspective that will facilitate comparative analysis of these two forms of organization. Here, however, I have limited my treatment to organizations in the private sector.

[4]By culture I mean the dominant value system of the organization; there will of course always be sub-cultures in any large organization, and all of these cultures will evolve over time as the organization, its hierarchy, and its personnel change. While corporate cultures are thus always being renegotiated, they have elements of stability that enable us to describe and analyze them.

The second vignette involves Air Products & Chemicals, a company less well-known than MCI but a firm which started from a similar position in the 1940s and became in the postwar years a major competitor in the liquid gas industry. Like MCI, it was confronted by a large, formidable first-mover. Nevertheless, Air Products parlayed a combination of government research contracts (and the engineering skills they gave the organization) and financial innovations into a strong competitive position in this industry. Like MCI, Air Products had political skills which it blended with acquired technical and with formidable financial skills; it too rode a wave of new opportunities, the primary one of which was Cold War rocketry, a development that was substantially broader than the industry involved in this brief description [3, 20].

During this long phase of expansion, Air Products had the same type of entrepreneurial leadership that characterized MCI, and both companies constructed dominant cultures which helped to sustain the process of innovation and integrate their operations.[5] At Air Products, the entrepreneurial leadership was provided by the company's founder, Leonard Pool, who headed the firm until the early 1970s. The culture constituted a rather unusual blend of the values associated with aggressive salesmanship (which reflected Pool's personal orientation) and with high-level engineering (which reflected one of the company's major competitive advantages) [3].

Our third vignette comes from the cola wars, courtesy of historian Richard Tedlow. Although it too involves a successful effort to make inroads on the market share of a powerful first-mover, it is a different story in most regards from the Air Products and MCI sagas. In this instance, there was no government involvement in what happened, nor was advanced technology or engineering a factor. Nevertheless, as Tedlow has explained, Pepsi gained competitive advantage over its much larger, well-established competitor, Coca-Cola. As I interpret that story, in the 1960s, Pepsi correctly read the wave of the future, a young population which would respond to an aggressive, well-focused advertising campaign and a slightly different product. The innovations in this case seem not to have involved any changes in technology. Nor was the competition that resulted framed in terms of prices. The advertising campaign was managed by the firm but provided by an agency; the innovation, as I see it, was based on the management's correct perception of the market and the changes taking place in one significant part of that market [33]. Successful product "differentiation through demographic and psychographic segmentation made Pepsi the near equal of Coke" [33, p. 109].

My fourth and fifth stories are both drawn from the work that Jeffrey L. Sturchio and I have been doing on Merck & Co., Inc., the pharmaceutical firm. The first of these vignettes is similar in one very important regard to the previous sagas. Like those three narratives, it involves an organization which had the internal capability to read early and correctly an opportunity opening

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[5]At times the sub-cultures in these organizations became elements in struggles over control. But for many years the central corporate cultures at both Air Products and MCI appear to have remained relatively stable, powerful, and important to both organizations' operations.

up outside the company and then to take advantage of that situation. Merck's corporate culture in the 1930s and 1940s was deeply influenced by the concept of progress through scientific discovery. In this case the initial discoveries took place in a new, low-status field of medical science, soil microbiology.[6] Because the firm's scientists and managers recognized the unusual opportunities in soil microbiology, Merck was able to share in the development of streptomycin, the first antibiotic effective against tuberculosis. Although the company surrendered its patent rights to a foundation, it still was able to beat the competition in bringing this pathbreaking product to market in the United States [9].

The second Merck story is more humble. No Noble Prize here. In fact, it is the kind of story that gets ignored by grand theory and even falls through the cracks in business history written from the top down. This vignette involves a middle manager who started working for the company's pharmaceutical manufacturing division in 1961. Al Link started out in warehousing: how much more humble can you get? The company warehoused its products on shelves, using fork lifts to stack and unstack the boxes. What Link noticed right away was that there was an open space at the top of each aisle. Why the open space? The answer: they had always done it that way. But Link decided to fill that space and increase their capacity for inventory; his innovations in that part of the operation ended up saving a significant part of the capital costs of warehousing. No new technology. No major investment. But a significant innovation. Maybe not innovation from the "bottom up," but pretty close to it [16].

There -- you have the five vignettes. Now I would like to turn to the concepts of innovation advanced by Schumpeter, Chandler, Lazonick, et al., and measure them against these five experiences. As you might anticipate, each of those distinctive approaches to the past captures some part of the history of these five business experiences with innovation, but none of them captures all of all five. That being the case, I would then like to steal from Schumpeter, Chandler, Lazonick and others the particular ideas that will be most useful in building a micro-perspective that will enable us to make full use of the five clumps of historical detail we have at hand. What I hope will emerge from this process is a dynamic micro-perspective on the innovative organization, but first we must decide what analytical resources we already have available. The father of entrepreneurial studies clearly deserves first consideration.

II

If we conceive of Schumpeter's theory as a net and our vignettes as fish, it seems apparent that the interstices in his particular net will not catch

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[6]Merck began to work with Dr. Selman A. Waksman, the Rutgers University scientist who discovered streptomycin, in 1938, only five years after the firm had opened its new laboratories for basic scientific research. One of the reasons the company was able to establish this relationship was that soil microbiology was at that time such a low-status area of research that Waksman could not get the support he needed from other sources [36, 37].

most of our history. Certainly the Al Link story passes through the net. So do significant parts of the other corporate stories. The Schumpeterian theory is after all a macro-theory and it appropriately catches only very large phenomena capable in and of themselves of bringing about observable results in a national economy. The creation of a railroad network. The development of an entirely new chemical industry or the application of refrigeration to meat packing in late nineteenth-century America. Those dramatic entrepreneurial ventures brought about the macro-effects, including destructive competition, that left their imprint on aggregate statistics [30, pp. 81-86]. None of our vignettes -- with the possible exception of the MCI story -- involve the Schumpeterian wave of destructive competition, and even the ensuing changes in telecommunications would be hard to locate in our aggregate statistics on the growth of the economy.

What does get captured by Schumpeter's net is the role in several of the stories of entrepreneurial leadership and the influence that the political setting frequently has on the process of innovation. Both William McGowan of MCI and Leonard Pool of Air Products conform very well to the pattern sketched by the grand master of entrepreneurial studies. In particular, their roles in acquiring capital for very risky, untested ventures fit in Schumpeter's model, as does the fact that neither man actually devised the technical innovations he brought to fruition. In both cases, skillful manipulation of the political system was an important aspect of their careers.

When we cast Chandler's net, we are even more successful. One of Chandler's great contributions was to place entrepreneurship in an organizational context -- its most important setting in the modern corporate economy -- and our purpose here is to analyze sustained organizational performance, not individual acts of innovation (howsoever influential they were). Chandler's central ideas -- in particular, the concept of "organizational capabilities" -- thus capture significant parts of the Air Products and Merck streptomycin stories; and even though the Pepsi narrative runs counter to the logic of *Scale and Scope*, that episode in creative marketing can be considered an example of the style of "strategic competition" that Chandler's recent work emphasizes [5, 34]. What passes through Chandler's net untouched of course are the political and legal dimensions of the vignettes, especially those brought out by the MCI and Air Products experiences [4, 6, 7]. Similarly, Al Link's confrontation with the warehouse slips through the net, in part because it was innovation from the near-bottom up, not from the executive committee down, a la Chandler [5, pp. 21-31, 18, p. 20].

But that of course is where Lazonick's net works very well. His theory of the innovative organization catches all of the warehouse story and tells us why such seemingly unimportant events are actually so important to our economic progress [15]. Indeed, even smaller bits of history from the shop floor can be gathered up in his conceptual network -- one which sweeps up the kinds of details that Nathan Rosenberg and others have pointed to as possibly the most important source of productivity change in the modern economy [22, 27, 13].

But Lazonick's theory -- like Chandler's -- lets the politico-legal events pass unnoticed and seems not to have been crafted with an eye to marketing

innovations such as those highlighted by Pepsi's success. Perhaps in that regard -- that is, his preoccupation with technological innovation -- Lazonick is still closer to the neoclassical tradition than he might like to admit. At any rate, this aspect of his theory leaves us still searching for a net that will bring in all of our historical catch, including the cultural aspects of innovative behavior.

Judging by the results of this brief fishing expedition, business historians need a new net and should start to make it by first weaving together some of the most useful concepts provided by these three distinguished scholars. From Schumpeter we can take the important ideas that innovation involves leadership of a particular sort and frequently has political dimensions -- it is only a slight extension of that idea to include in this category the legal skills which firms employ or hire. We can twist that idea together with Chandler's emphasis upon "organizational capabilities" and with his notion that in the modern economy "strategic competition" has replaced the type of short-run price competition that characterized the economy of small units. From Lazonick we can expropriate the idea that innovations flow upward as well as downward in the successful organization and that their originators receive suitable rewards that help sustain the institution's innovative drive. Now all we have to do is to put these several important concepts together, while adding a strand of thought here and there in a way that will enable us to make full use of our five vignettes.

III

We can start by re-defining innovation along the lines indicated by Richard Nelson and Nathan Rosenberg. In their characterization, innovation is anything that is new to the firm itself, "if not to the universe or even to the nation" [23, p. 4]. While Nelson and Rosenberg focus entirely upon technological innovation, we can simply apply the same principle across the entire range of the firm's activities.

In addition to being new, innovations give the organization some measure of competitive advantage. Efforts at innovation which fail can be very important; clearly failure rates go up as businesses push toward the front edges of practice and knowledge in any particular field. But innovations are by definition successful, as they are for Schumpeter, Chandler, and Lazonick; all that we have done with our definition is to change the measure of success, making it explicitly micro-historical and substantially broader [26].

How successful do the innovations have to be? Here we part ways with Schumpeter. The warehouse story clearly qualifies in our micro-perspective, as would even less significant innovations as long as they are introduced in an organized fashion in all or any part of a firm. To qualify, all that they have to do is 1) be new to the organization itself; 2) yield *a measure* of competitive advantage; and 3) be adopted and sustained by the organization, qua organization, and not merely by an individual within the business. This latter condition reflects the fact that we are interested here in organizational behavior, a la Chandler and Lazonick, not in the individual actors as such.

While these actions are organizational, they do not -- contra Chandler -- have to come from the top down or be a product of top-level investment decisions [5, pp. 26-28]. Many will be a function of top managers' decisions, either directly or indirectly. But many -- especially those of the humbler sort -- will not, and their cumulative impact can be great. Unlike Lazonick, I do not distinguish between "adaptive" and "innovative" behavior [15, pp. 92-111]. The process of innovation within an organization seems to me to involve a stream of changes being made on a day-to-day basis; many of them could be included in Lazonick's category of "adaptive" behavior. Some of these changes will be of small import and will be incremental in nature: re-interpreting Lazonick's term, we can call them "adaptive innovations." Others will have a more dramatic impact and they can be called "formative innovations," insofar as they reformulate the organization's competitive situation in a major fashion over a relatively long period of time [8, 17].

"Formative innovations" appear from our five vignettes to stem most frequently from broader changes taking place outside the firm. The successful organization needs the "organizational capability" to scan the environment, read it correctly, and then take advantage of the perceived opportunities; this is the thread that runs through the streptomycin, the telecommunications, the Air Products, and the Pepsi stories. To do so, the innovative organization maintains "creative boundaries" [9,25]. It aggressively gathers ideas generated outside the firm.[7] Many of the U.S. companies which have had great difficulty in recent years appear to have lost the "creative boundaries" which helped to account for their past success. As von Hippel has pointed out, in successful organizations, customers have been one of the most important sources of innovative technical ideas -- an insight we can apply to a non-technical area of innovation in the Pepsi story [12].

As the successful organization reaps the advantages of innovation, the process of change spreads across a broader range of the firm's functions. In part, this is a consequence of the income available to finance change; in part, it is a result of the culture of innovation and the leadership dedicated to that type of behavior. Companies introducing formative innovations are thus more likely to engage in adaptive innovation as well.[8]

This perspective on the firm makes no distinction between technological and non-technological innovation, between the innovations which stem from line activities and those which arise from the functions usually allocated to the staff in the modern firm. Hence we can accommodate the MCI story and the competitive advantage that firm achieved by way of its political and legal

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[7]There is a considerable amount of recent literature which emphasizes the development within the firm of technical and scientific capabilities [22, pp. 59-97]. Chandler's emphasis upon "organizational capabilities" and the internal affairs of the firm has a similar thrust. My own research indicates that too little attention has been given to the ongoing relationships between these organizations and their environment.

[8]Thus, Al Link's warehouse experience followed a period (1953-1960) in which Merck successfully launched a series of major innovations in structure, strategy, and product-line development.

skills. We can appreciate the innovative manner in which Air Products exploited the government's suspicion of large first-movers, as well as the way the company learned how to finance its operations in a new manner and thus achieve the sort of long-term cost advantage that enabled it to acquire a much larger market share.

Advertising is no different than research in this perspective, so long as it involves innovation and yields competitive advantage. Thus the streptomycin and the Pepsi vignettes bring us to the same conclusion, even though common sense, liberal ideology, and a great deal of economic analysis indicate that society is better off having a cure for tuberculosis than it is having Michael Jackson bouncing around on television [10, 29, pp. 43-44, 376-93]. Personal preferences aside, it is important to remember that our subject here is the organizational dimensions of innovation at the level of the firm. Our only measure of the impact of an innovation is its effect on the firm's competitive situation.

IV

Useful as these categories are, they are still essentially static. They enable us to redefine organizational innovation over the short-term but do not really help us understand how some institutions sustain innovation over the long-term. All five vignettes deal with fairly specific historical episodes, although some of them extend over several years.

We can nevertheless use the five narratives to move toward a dynamic micro-perspective by first reflecting on what was left out of each of the stories. In each case, of course, it was the competition. We need to ask ourselves, what was the competition doing while these innovations were taking place? Why did the competition fail to sense correctly the opportunities for change that were starting to take shape?

The telecommunications industry is a good place to start if only because there was essentially only one competitor and because I have spent some years studying the changes that have taken place in that industry. AT&T was clearly no slouch when it came to innovation. Bell Labs was widely considered to be the best of the nation's industrial research laboratories, and the U.S. telecommunications system was generally thought to be the best in the world [8]. Moreover, the Bell System was a powerful political actor with extensive experience in public relations and public affairs.

But three problems kept the System from responding effectively to MCI's challenge. One involved leadership and was a variant on the agency problem [28]. AT&T leadership was deeply committed to the guiding principles that had accounted for the firm's success over the previous sixty to seventy years. After all, they had been personally successful playing by those rules. Forced to decide between a strategy that would yield ground and facilitate a compromise or a strategy that would reinvigorate the System and reaffirm the powerful network mystique, they opted for the latter, more conservative choice [35]. The second problem involved the network mystique itself, a powerful corporate culture that had developed in the early Bell System and had been deepened and reaffirmed by success over the years. The

mystique of the network and the values it incorporated became in the crisis of the 1970s and 1980s an impediment to rapid change [1]. Meanwhile, in addition to the System's culture, its bureaucratic structure made it difficult to respond quickly to the challenges MCI, the Federal Communications Commission, and the courts were generating.

Every innovative organization inevitably faces these three problems. Its leaders and most of their followers have achieved their positions by correctly reading the previous wave of change; they have a commitment to the past patterns of behavior. In the course of that success, they have created a bureaucratic structure designed to suit those conditions; these kinds of organizations do not yield easily to the suggestion that a new wave is taking shape. In the case of AT&T and the Bell System, the previous wave had been a very long one, the success achieved had been great, and the challenges of reorienting the largest corporation in the world were awesome.

That was particularly true because the Bell System culture was so deeply planted. It had been an important component in the System's ability to sustain innovative behavior over the long-term. Leaders as well as followers in the System understood what mattered and how success was to be achieved. It seems unlikely that any business can sustain innovative over the long-term without a powerful culture of that sort. The culture helps ensure that the orientation toward innovation will not change when the firm experiences personnel changes. These can be especially challenging when they involve the organization's founder. Many of our most successful business organizations have achieved their greatest initial success behind the leadership of a dominant entrepreneur. This was the type of entrepreneurship that inspired Schumpeter and that challenged Chandler to develop a social or organizational variant on the Schumpeterian approach. But Chandler's solution to this problem -- with its emphasis on structure, scale, and scope -- gives little role to corporate culture. Too little, I believe, where the ability to innovate is concerned.

Eventually, however, even the Bell System had to change course. Then the functional culture became partially disfunctional, as did the bureaucratic structure, and the leadership. Of the three, the leadership proved easiest to change; the structure next easiest to alter; the culture was the most resistant to change.

The Bell System was clearly an extreme example but the differences between AT&T and other established competitors in other industries are merely matters of degree. All appear to have experienced the same fundamental problems -- problems stemming from success, not failure. These were the problems that arose when the firm's environment shifted and the organization's boundaries were no longer creative -- or at least no longer creative in the required manner. Then, it would appear, forceful leadership was needed to position the organization to catch a new wave of opportunities

to innovate.[9] Then, too, the organization's culture had to be adapted to new circumstances so as to provide competitive advantage.

Over the long-term, all innovative organizations can be expected to encounter transitional periods when they must adapt to a new environment of opportunities. These lend to the evolution of the innovative organization a long cycle effect, similar in certain regards to the product cycle. As the long "innovation cycles" start to take shape, the organization innovates across a broader front, gathering momentum, bringing a new cadre of managers to positions of authority, reconstructing its dominant culture. Eventually, however, the long cycle comes to an end: the most successful organizations anticipate the end of the cycle and develop new leaders, strategies, and cultures *before* the company loses its momentum; otherwise, the firm goes through the type of transitional crisis that the Bell System experienced.

Several of the subjects of our vignettes can be used to illustrate the long "innovation cycle." In telecommunications, MCI's first such cycle seems to have been coming to an end as the firm struggled with the changes taking place in the political and regulatory environments after the divestiture. Subsequently, a reorganized MCI, armed with a new marketing strategy, shows signs of recovering from those problems without experiencing a major transitional crisis.[10] Air Products had similar experiences in the years since it achieved its strong position in the liquid gas markets.[11] And shortly after the successful launch of the streptomycin business in the 1940s, Merck weathered a challenging era of transition [9, 32]. In the years 1953 through 1960, that company successfully met this challenge by integrating downsteam into pharmaceuticals, by developing a new cadre of professional managers, and by creating a new network of overseas subsidiaries.

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[9]Because this type of leadership will differ from the sort of leadership needed by an organization during the successful part of a long innovation cycle, a specialist -- the turn-around specialist -- has emerged in the corporate economy of this century. One of the major functions of such a specialist is to break the patterns of behavior and alter the culture associated with the firm's last cycle; the degree of change introduced may in many instances be more important than the qualitative nature of the changes implemented by the turn-around specialist. Larry Kahaner, *On The Line*, p. 49, briefly describes William McGowan's experiences as a turn-around consultant before he became involved with MCI. Subsequent to the episodes described in our vignettes, both AT&T and the Coca-Cola Co. experienced dramatic turn-arounds, as did the regional Bell operating companies.

[10]Companies with powerful founders, like McGowan of MCI and Pool of Air Products, frequently have special problems in maintaining their innovative momentum as the founder approaches retirement. Then the question of succession becomes an overriding concern. Actually, seen in the context of the innovation cycle, the problem may be more one of having developed the right kind of creative boundaries *before* the succession than it is the matter of chosing a particular leader to replace the founder.

[11]In the 1960s, the company diversified into chemicals and in the 1970s took the final steps in the transition from family to professional management [3, pp. 165-229].

Most aspects of that transition are beyond the purview of this paper, but I want to mention one part of the transformation that involved the corporation's culture. As a fine-chemical producer with outstanding research and development capabilities, Merck had prior to 1950 developed a powerful culture which blended the company's traditional emphasis on high quality products with a strong orientation to scientific progress and the values that progress embodied. When the firm merged with Sharp & Dohme in 1953, it became necessary to blend the Merck culture with Sharp & Dohme values framed largely in terms of aggressive pharmaceutical marketing. This meld, which took many years to complete, was an essential part of the "innovation cycle" that began at Merck in the 1950s and carried into the mid-1970s.

These long cycles are, I believe, the special province of the business historian. This is the type of phenomenon that can best be studied through intensive, firm-specific research of the sort that institutional historians have always done. Questions of leadership, of corporate values, of strategy and structure a la Chandler need to be answered on the basis of what one finds in company and relevant public records. The "innovation cycle" can only be studied historically, in part because in the successful organization new cycles are launched *before* outward manifestations of the problem begin to appear. Thus, you may not see a decline in total sales, a loss of market share, or a fall-off in return on investment. When you do see these manifestations of a transition, you may in fact be studying an organization which has already lost its ability to remain innovative, to find a new area of opportunity in which it can replicate its past success.

When you see large numbers of such organizations experiencing similar crises -- as appears to be the case in a number of our leading industries of late -- you may be able to link this micro-perspective on the innovative organization with a macro-perspective of the sort that Schumpeter and more recently Richard R. Nelson have provided us [23, 24]. But that task is beyond the perview of this brief paper. Sufficient for my purposes is this rough outline of a dynamic macro-perspective that I hope will enable historians to identify, describe, and analyze the performance of one very important type of modern business organization and the "innovation cycles" these firms regularly experience.

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