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### ***Corporate Governance, Innovation and Economic Performance in the EU CGEP***

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## **EU SOCIO-ECONOMIC RESEARCH**

# **Corporate Governance, Innovation and Economic Performance in the EU — CGEP**

### **Final report**

**Project SOE1-CT98-1114**  
**Funded under the Targeted Socio-Economic Research Programme**  
**(TSER)**  
**Directorate-General for Research**

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## Preface

Within the Fourth Framework Programme of Research and Technological Development, the Targeted Socio-economic Research Programme (TSER) had as main objectives to increase European knowledge across three targeted areas – evaluation of science and technology policy options, research on education and training and on social exclusion and social integration. Research was undertaken through the funding of translational research networks of high quality, which were sought to provide policy relevant findings that could have an impact on the social and economic development of Europe.

The insights and information that the reader will obtain in the following pages constitute the main scientific findings and the associated policy implications of the research project “Corporate Governance, innovation and Economic Performance in the EU”.

This project brought together 5 research teams in a collaborative endeavour lasting 36 months.

The abstract and executive summary presented in this edition offer to the reader the opportunity to take a first glance on the main scientific and policy conclusions, before going into the main body of the research provided in the other chapters of this report.

The research reported in this publication should not be viewed in isolation. Over 300 research projects and thematic networks in the wider area of the social sciences have been funded under the Fourth and the Fifth Framework Programmes of Research and Technological Development. These collaborative research efforts involving more than 2000 European research teams have made significant advances to knowledge, support policy-making in Europe and have laid the foundations for the development of a European research community in the social sciences.

The Sixth Framework Programme, through Priority 7 ‘Citizens and Governance in a Knowledge Based Society’, is building on the progress already made and aims at making a further contribution to the development of a European Research Area in the social sciences and the humanities.

I hope readers find the information in this publication both interesting and useful as well as clear evidence of the importance attached by the European Commission in fostering research in the field of social sciences and the humanities.

Andrew Sors  
Acting Director



## EXECUTIVE SUMMARY

It was the promise of the “new economy” that it would generate innovation and growth that in the last half of the 1990s brought the debates on corporate governance from the United States to the EU. Central to this promise was a more enhanced role of the stock market in the operation of the economy, and specifically in the influencing the investment strategies and organisational structures of industrial corporations. In the midst of the Internet boom, even many supporters of the European “social market” models found it difficult to resist the notion that “innovation” and “creating shareholder value” were inextricably tied to one another. Yet there existed neither a coherent theoretical framework nor a robust body of empirical evidence to show that such was the case.

The research that we have done in the CGEP project has shown that if one wants to understand the new role of the stock market in the economy and its implications for innovation and performance, then one needs a framework for analysing a) the functions that the stock market can perform in the industrial corporation, and b) the relation between these functions and the innovation process. The starting point of the CGEP project was a theory of innovative enterprise that stresses three social conditions – strategic control, financial commitment, and organisational integration – and their interaction in the innovation process. The intellectual foundations for this theory of innovative enterprise, including its relation to the literatures on strategy, finance, and learning were elaborated in the CGEP Perspectives Report. The subsequent CGEP research on national systems and industry dynamics has enabled us not only to enrich the theory of innovative enterprise but also to connect it explicitly to an analytical framework on the four functions of the stock market: control, cash, compensation, and combination. While there is nothing new about the fact that the stock market can perform these functions in the industrial corporation, the CGEP project has broken new ground in both integrating these four functions explicitly into a framework for carrying out empirical analysis of the role that the stock market plays in different times, places, and industries as well as in showing how this changing role can influence the innovation process. Through our national and industry studies, moreover, we have shown how this research can be carried out and the types of insights it can yield.

We should emphasise, and caution, that the framework for analysing the relation of the stock market to the innovation process does not yield answers that can be abstracted from the historical – institutional, organisational, and industrial – contexts that shape this relation. Indeed, we believe that an important strength of our approach is our insistence on the integral relation between theory and history – including, as is evident in our industry studies, the present as history that is unfolding as we try to analyse it. In effect, in a world of innovation in particular, and socioeconomic transformation more generally, it is imperative to employ a research methodology that enables us to stay abreast of the process of change if we are to devise informed policies to affect the course of that change.

We now have a far clearer understanding of the relation between the stock market and the innovation process than at the outset of the CGEP project. By the same token, we would argue that the research on this relation must be ongoing if the EU hopes to devise policy approaches that regulate the role of stock market to support the innovation process in ways that contribute to stable and equitable economic growth. We do not at this point claim to have a set of policy proposals for the European Commission, and indeed we would only feel justified to draw upon our research for that purpose through an interaction with the relevant policy making bodies. As we stated in the very first sentence of our original proposal that resulted in the CGEP project, “[t]he objective of this project is to make the analysis of the innovative enterprise central to current debates on corporate governance.”

We conclude this Policy Report, therefore, by summarizing our findings on the relation between the four functions of the stock market and the innovation process, while showing as

well that, at present, a theory of innovative enterprise plays little if any role in the current European policy discussions on corporate governance in general and the role of the stock market in particular. These discussions – they can hardly be termed “debates” – continue to be dominated by a “shareholder value” perspective on the role of the stock market in the industrial corporation that, as we have shown in the Perspectives Report, contains no theory of innovative enterprise, and, more importantly, ignores an analysis of the changing role of the stock market in the innovation process. In supporting this argument, we consider the key policy documents promulgated by or circulated within the EU in recent years that deal with each of the four functions of the stock market that we have identified: control, cash, compensation, and combination.

## **Control**

For innovation to occur, insiders to the organisation must control the allocation of resources and returns. It is impossible for outsiders to understand the collective and cumulative learning processes that characterise the innovation process, and hence one cannot depend on outsiders to make decisions concerning the allocation of resources to that process. Hence the central role of insiders as strategic managers in making allocative decisions that can result in innovation.

Who are these strategic managers and what is their relation to the stock market? In publicly traded companies, strategic managers may be large shareholders. These owner-managers may be founders who have maintained the integration or ownership and control or they may be managers who have accumulated shareholdings as a result of their salaried positions. Large shareholders in strategic management positions may also be outsiders to the corporation who have taken control by agglomerating shares on the stock market and have attempted to transform themselves into insiders. Or these strategic managers may be former owners who have maintained positions of managerial control even as their ownership stakes have been reduced to small fractions of the total. Or they may be managerial personnel who as salaried employees of the corporation have worked their way up and around the organisation to positions of strategic management. Alternatively strategic managers may have been recruited from outside the company, based on their experience and performance in other posts. Those who occupy strategic management positions as salaried employees may exercise managerial control through the protection of large shareholders, in some cases the state, in other cases a family-run holding company, and in still other cases a group of stable shareholders (“noyau dur” in France), who delegate strategic decision-making power but have no interest in making allocative decisions. Finally strategic managers may exercise this control over allocative decisions by virtue of the fragmentation of shareholding on liquid stock markets, as was, for example, the case in US corporations from the early decades of the twentieth century.

Our studies have shown that these different relations between ownership and control can coexist, in some cases even among companies in the same industry based in the same nation. Moreover the evidence shows that, even when one holds industry and nation constant, the same ownership-control relation has resulted in innovation in some cases but not in others. That is, there is no simple relation between ownership-control and the innovation process. This is not to say that the ownership-control relation is unimportant; it is only to say that its influence on the innovation process must be analysed as one relation in what we have called “the social conditions of innovative enterprise”.

In addressing the relation of corporate control to innovation, and the influence of the stock market on that relation, the critical policy issue is: what ensures that those who are in positions of strategic control in high-technology companies have the abilities and incentives to make innovative allocation decisions? This question is not addressed by the perspective that argues that shareholders are the principals in whose interests the enterprise should be run precisely because one cannot assume that

shareholders as such have the abilities or incentives to assess innovative strategy, with all its complexities and uncertainties. This problem is implicitly recognised in the academic literature on agency in which shareholders as “principals” need to delegate decision-making power to managers as “agents”. But the problem posed by agency theory is how, in the face of “hidden information” and “hidden costs”, shareholders as principals monitor managers as agents to ensure that they act in shareholders interests, not how managers engage in innovative strategies. In the innovation process, the basic problem is *not* that information and costs are “hidden” – that is, there are asymmetries of information among participants in the innovation process. The problem is rather that, because of the technological, market, and competitive uncertainties that are inherent in the innovation process, the relevant information and costs are unknown to the participants in the process and are only learned through their interaction in that process. This is not to say the problematic of asymmetric information posed by agency theory is not a real-world phenomenon that needs to be studied. Rather it is to say that information asymmetries are not the basic problem that confronts the relations among participants in the innovation process.

In providing both liquidity and limited liability to shareholders, a major role of the stock market is to enable outsiders to invest in shares without having to assess the potential costs and prospective returns of an innovative strategy. Of course, many public shareholders do try to make these assessments, and indeed an industry of research analysts (currently in somewhat ill repute) has arisen to assist them in this endeavour. But the fact is that if they do not like what they see, they have the easy option of exit simply by selling their shares on the market. Alternatively, if they actually want to influence the strategic process that allocates resources to innovation, they will have to be able and willing transform themselves from outsiders to insiders. As strategic managers, they will then be confronted with the challenge of how to allocate resources to productive investments in the face of technological, market, and competitive uncertainty.

There thus remains a major unresolved, and generally poorly comprehended, corporate governance problem: How can societies that depend heavily on industrial corporations to invest in innovation ensure that strategic managers have the abilities and incentives to make such investments? In the case of the United States, which has generally been held up as a model of best corporate governance practice, there is evidence that before the “new economy” boom of the late 1990s major “old economy” corporations were operating in a “downsize-and-distribute” restructuring regime that shifted massive amounts of income from labour to capital, without necessarily putting in place the foundations for renewed innovation. In the “new economy” boom, there is also now evidence, some of it contained, for example, in the CGEP research on the telecommunications industry but more generally revealed to the public through investigations and reports in the wake of the Enron bankruptcy, that strategic managers of major corporations used the ideology of “shareholder value”, and the stock market speculation that this ideology fed, to engage in investment strategies that were touted as “innovative” but which benefited a small number of insiders at the expense of employees, suppliers, governments, and other stakeholders, including of course shareholders.

To our knowledge, the European Union does not at present have a set of principles of corporate governance that can guide public policy in dealing with such managerial behaviour, much less with providing a constructive set of guidelines for influencing strategic



management to promote the innovation process. In the fallout from the collapse of the “new economy” boom, public attention is focused on better disclosure, more transparent accounting methods, and the regulation of the investment banking sector, in particular the separation of investment activities from trading activities. But little attention is being focused on how corporate structures can ensure that managers as insiders allocate resources and returns to support the innovation process. Moreover, there remains a tendency, inherited from the “new economy” euphoria over “maximizing shareholder value” to view “old economy” structures such as codetermination and works councils as out of step with the demands of the “new economy” for flexibility and rapidity in decision making. Moving forward in the corporate governance debates, there is a need to rethink how the relation between managerial decision-making and the constituencies to whom management is responsible can promote the innovation process. In our view, the ideology of “maximizing shareholder value” was always a simplistic response to a complex problem of governing the corporate allocation process. From the perspective of 2002, it should be seen that it was in fact an irresponsible position to take, especially given that its proponents made little if any effort to show empirically the role that stock market played in the industrial corporation, much less how that role could contribute to, or undermine, the quest for stable and equitable economic growth.

### Cash

During the 1980s, it was common to portray the stock markets as short-sighted and to herald so-called bank-based financial systems such as those of Germany and Japan as providing the model of “patient capital”. At the same time, as we have already mentioned, studies of corporate finance showed that funds raised on the stock market represented only a relatively small proportion of the total financial resources that industrial corporations had available to them. In the 1990s, however, there was a marked shift toward the assumption that the stock market is an important source of cash for corporations, and that those corporations that did not show sustained increases in their stock price would be starved of new investment funds. The spectre that began to haunt Europe was that large institutional investors, particularly those from the United States who were used to getting high returns on their portfolios, would not invest in the stock of European corporations that did not show themselves to be “shareholder-friendly”, and as a result Europe would be unable to participate fully in the “new economy” boom.

There are two major problems with this argument. The first problem is that when an institutional investor buys the shares of a company on the secondary market, it is not clear how these purchases affect the flow of cash to the corporations concerned. Nevertheless, as we have documented in the CGEP national and industry studies, during the “new economy” boom many companies in both the United States and the EU did raise substantial amounts of cash by issuing shares on the primary markets. But that very fact raises the second problem with the argument that the stock market has become central to financing the innovation process. Particularly in the presence of speculative stock markets, it is possible for a company to engage in “marketing” or “repositioning” activities that boost its stock price but that have little if anything to do with actual investments in innovation. There is a need to look carefully at what companies that raise money on the stock market *in advance of their innovative efforts* actually do with the funds that they raise. There is also a need to consider the extent to which the superior stock-price performance of companies that have in fact shown themselves to be innovative has *resulted* from their innovative successes rather than from the a priori expectations of public investors that such companies would become innovative successes. From this perspective, precisely because the success or failure of an innovative strategy can only reveal itself after the commitment has been made to

pursue that strategy, one would expect the causal relation to run from successful innovation to superior stock-price performance rather than vice versa. One could argue that for many companies that have proven to be innovative – the histories of Microsoft and Cisco would provide good examples – it is only after the success of an innovative strategy that the shareholding public comes to recognise that the company is indeed innovative, with its stream of earnings giving it a track record that becomes valued on the market. At that point, however, the company is less in need of external funds than it was when it embarked on the innovative strategy, and now it has the option of choosing, if need be, to leverage its retentions through debt markets rather than equity markets to reinvest in its growth. Public shareholders may now be quite willing to finance the further growth of such companies, but the companies may have no need or desire to issue more shares to the public.

There is, in fact, a surprising lack of systematic research on the role of the stock market as a source of cash as well as on the uses to which this cash is put once it flows into the corporation. Yet the European Commission (as many other policy-making bodies around the world) has issued high-level policy documents that proceed from the assumption that the role of the stock market as a source of cash to fund enterprise growth is a well-known, and indeed an obvious, fact. Two such documents are the “Initial Report of the Committee of Wise Men on the Regulation of European Securities Markets”, released in November 2000 (EC 2000) and “Risk Capital: A Key to Job Creation”, released in December 1999 (EC 1999).

The “Regulation of European Security Markets” (“RESM”) report states at the outset that “[t]he Committee believes that there will be significant long term benefits if the European Union can integrate its financial and capital markets quickly.” Specifically, the report argues that an integrated European services and capital market would improve the allocation of capital in the European economy, reduce the costs of financial intermediation, and make the EU a more attractive location for investment from outside the EU. In promoting this agenda, the report asserts that “[t]he raising of finance through the issuance of equity and corporate bonds has now overtaken bank loans as a source of corporate funds” but that “[n]evertheless, these sources of finance are still less developed than in the US.” To support this argument the report refers to the following table:

**Comparative data on financial systems (euro-zone, US) (% GDP, 1999)**

	Euro-zone	US
Bank loans to corporate sector	45.2	12.4
Fixed income securities:	98.8	166.2
corporates	7.4	29.0
financial institutions	36.4	46.8
public sector	54.9	48.4
Stock market capitalization	90.2	179.8

Source: ECM monthly bulletin, July 2000.

The problem with this chart – as was explained in both the CGEP Perspectives Report and the CGEP National Systems Synthesis Report – is that stock-market capitalization as a percent of GDP is a very poor proxy for “the raising of finance through the issuance of equity”. This measure tells us nothing about the extent to which the stock market was actually used a source of funds in the Euro-zone or in the United States. In an accompanying figure, the report provides data on market capitalization as a percent of GDP at the end of 1999 for EU-15 as well as Japan and the US, with the figures ranging from 16 percent for Austria to 272 percent for Finland, but again these figures provide no information about the differences across these countries in “the raising of finance through the issuance of equity”. The only other data on the role of the stock market as a source of finance that the report presents have similar problems. It states: “The most notable growth has to date been achieved in equity, where

recent annual growth rates of volumes traded have exceeded 30% per annum over the period 1995-1999". Trading, however, is not the same as investing. The report goes on: "New securities and new listings have been a significant component in the growth of European stock market capitalization....The number of companies listed on EU-15 exchanges has grown steadily from 6401 in 1995 to 8111 in 1999 (with the bulk of this growth occurring in the Euro-11 markets – from 3475 to 4416)" (EC 2000, 9). Again, however, listing is not equivalent to fund-raising.

The "RESM" report also provides an Annex on "Recent academic work on the links between size and growth of financial markets and the growth of output" in which the report contends:

In the 1990s...an expanding theoretical literature has emerged [that] has tended to depart from the traditional focus on bank financing by examining the possible links between stock markets and long-run growth. For instance, liquidity and risk based models have been designed which show that greater international risk sharing through internationally integrated stock markets result in accelerated productivity growth by inducing shifts from safe, low-return portfolios, into high-return portfolios. Until recently, however, little empirical evidence was made available to sustain the theoretical predictions foreseen by these models. However, the findings of three recent papers, briefly discussed below, shed light on this issue by showing, using new methodology, the validity of the positive predictions of the theoretical models.

But of the three papers to which the "RESM" report refers, one paper measures the role of the stock market in terms of its "liquidity" – that is, the value of trading on stock markets – not to its roles in financing investment. A second paper that seeks to show the empirical relation between "financial intermediary development" and the sources of growth make no conceptual distinction between bank finance and stock-market finance, while their empirical models only include measures of "private credit". The third paper uses stock market capitalisation as a percent of GDP as its measure of stock-market finance, not because the authors believe that this measure is the most appropriate, but because of the lack of a measure of funds actually raised from the stock market. They argue that it would have been better to have a measure of funds in initial and secondary public offerings, but state unfortunately such data are not widely available.

One cannot assume that one of the benefits, if not the main benefit, of the stock market is that it funds economic growth if one does not have a reasonable measure of the extent to which this is the case. As a foundation for EU policy that seeks to structure and regulate the stock market to support innovation and growth, there is a need for systematic research on the role of the stock market as a source of funds for industrial corporations as well the uses of the funds that these companies raise on stock markets.

The "Risk Capital" report, which the Commission adopted in October 1999 as the Communication for the Implementation of an Action Plan argues that "risk capital is an essential element of growth and job creation" and that "risk capital is developing in Europe, but not fast enough and its allocation remains sub-optimal" (. Amplifying this argument, the "Risk Capital" report goes on to state:

While venture capital investment more than doubled in Europe over the last four years, only €7 billion was invested in Europe in 1998, compared with €12 billion in the USA, and the difference is even stronger in early stage investments: €1,6 billion compared with €4.5 billion in the USA. The European stock markets for high growth companies have grown strongly, but they remain dwarfs compared to the American Nasdaq.

There is no doubt about the strength of US venture capital industry and its importance to high-tech innovation in the United States. Nor is there any doubt that a liquid stock market -- one

on which shares are readily bought and sold – is of critical importance to the venture capital process. But how does the venture capital process work, and what is its relation to the stock market? This is a critical question that the “Risk Capital” report simply does not address.

In fact, a liquid stock market is very important to the venture capital process. It is the existence of a liquid stock market that is willing and able to absorb the shares of a company when it does an initial public offering (IPO) that enables venture capitalists to cash out and reap returns on their original investments. But the venture capital process itself is not a market process. It works best at transforming innovative strategies into high quality, low cost goods or services that are competitive on product markets when the venture capitalists are deeply rooted in the industry and closely involved with the entrepreneurs whose ventures they are funding. Nor is the ability of a new venture to do an IPO (and hence for the venture capitalists to cash out) a sign that the innovative strategy has been a success. It is revenues generated on product markets, not revenues generated on stock markets, that prove that in fact an innovative investment strategy has resulted in goods or services that users of these products want and at prices that they are willing to pay. In the presence of speculation, there is no necessary connection between these two types of success.

Indeed, there is a tension within the venture capitalist industry, and within many of its constituent firms between being a “patient capitalist” who waits until the company has proven itself on product markets before doing the IPO and being a “financial engineer” who looks for the best opportunity to do the IPO, regardless of how far the new venture has progressed in the innovation process. When stock markets are speculative – that is, willing to absorb companies that have not proven themselves in the innovation process of the speculation that they will -- and when institutional investors, who supply the venture capitalists with funds, are pressuring the venture capitalist firms to take advantage of this opportunity for cashing out, the industry will tend toward “financial engineering”. This tendency is, of course, greatly exacerbated when, as we now know to have been the case in the “new economy” boom in the United States, investment banks and their institutional investors conspire to pump up the price of a newly floated “technology” company. Unsophisticated investors, seeing the “opportunity” that they have missed by not buying the stock at the outset (an opportunity that in fact they did not have), are then prone to snap up the stock as it reaches its peak and, as those in the know sell, heads into a steep decline.

Although the recent US experience is not the first time that the “financial engineering” model has become evident in the US venture capital industry, it is clear that the contribution of venture capital to the innovation process has been rooted in the “patient capitalist” model. Judging from the “Risk Capital” report, in the attempt to reproduce the outcomes of the US venture-capital experience, European policy-makers have over the past few years devoted too much attention to the creation of “new markets” – with the dangers of encouraging “financial engineering” that such markets in and of themselves entail -- and not enough attention to encouraging the development of the “patient capitalist” model for mobilising finance to help transform new ventures into going concerns.

### **Compensation**

A key feature of the “new economy” has been stock options, not only for high-level executives but also for non-executive personnel, especially highly-educated professional,

technical, and administrative personnel. We have already seen that there is considerable ambiguity about what function stock options actually perform in the innovation process: Are they used to manage the labor market or manage the learning process? Do stock option awards encourage or undermine the collective and cumulative learning processes that are the essence of innovative organisations?

We have also seen that very little research has been done on the relation of stock options to the learning process. Yet there has been much talk of the need to import the practice of awarding stock options into Europe and, for the sake of innovation, making them central to the way in which corporate employees are rewarded. For example, the "Risk Capital" report, to which we have already referred, devotes one and a half pages to a discussion of the subject, in a box entitled "the benefits of employee ownership schemes such as stock options". In particular, the "Risk Capital" report argues:

*"There is considerable theoretical as well as empirical evidence pointing towards the strong contribution of employee share ownership schemes to economic growth."* (italics in original)

What is this evidence? Firstly, the report argues (without, however, citing any sources) that stock options can play both capital-saving and labour-mobility functions for innovative companies:

For young high growth companies, stock options are a tool to attract talents they need, but cannot afford paying (sic) the high salaries large companies can offer. Granting stock options helps young companies preserve start-up capital for expenditures other than high salaries. It increasingly is a prerequisite for hiring and keeping the most innovative and entrepreneurial employees.

The "Risk Capital" report recognises, however, that while "[t]here is considerable evidence of the relationship between *employee stock ownership* and firm performance,... "[u]nfortunately such work still needs to be done on stock options." (our emphasis). It should be added that besides the basic question of the relationship between stock options and innovative capabilities, about which little is known, the experience of the past few years points to the need to understand the phenomena in the presence of volatile stock markets that, as some of the CGEP research shows, can upset the reward systems of even the most innovative companies.

### **Combination**

If there is one issue that is central to the current EU policy agenda that requires an understanding of the role of the stock market in the innovation process, it is the use of stock as a combination currency. As the Financial Times put it in February 2002, in the wake of the release of the European Commission's "Report of the High Level Group of Company Law Experts on Issues Related to Takeover Bids": "Common rules for corporate takeovers have become a test for Europe's capacity to reform itself." The main thrust of the proposals is that restrictions on corporate takeovers that violate "shareholder democracy" must be dropped. In particular the takeover directive seeks to compel companies to seek shareholder approval before managers try to defend the company against a takeover bid. The authors of the "Takeover Bids" report argue that takeover bids in Europe should be guided by two principles: 1) "In the event of a takeover bid the ultimate decision must be with the shareholders"; and 2) "the holder of the majority of risk-bearing capital should be able to exercise control". In support of the first principle, the report contends:

Defensive mechanisms [to block takeover bids] are often costly in themselves, apart from the fact that they deny the bidder the opportunity to create wealth by exploiting the synergies after a successful bid. Most importantly, managers are faced with a significant conflict of interests if a takeover bid is made. Often their own performance and plans are brought into question and their own jobs are in jeopardy. Their interest is in saving their jobs and reputation instead of maximising the value of the company for shareholders. Their claims to represent the interests of shareholders or other stakeholders are likely to be tainted by self-interest. Shareholders should be able to decide for themselves and stakeholders should be protected by specific rules (e.g. on labour law and environmental law).

In support of the second principle the report states:

In the Group's view, proportionality between ultimate economic risk and control means that share capital which has unlimited right to participate in the profits of the company or in the residue on liquidation, and *only* such share capital, should normally carry control rights. All such capital should carry control rights in proportion to the risk carried. The holders of these rights to residual profits and assets of the company are best equipped to decide on the affairs of the company as the ultimate effects of their decisions will be borne by them. This report will use the term 'risk bearing capital' to refer to this concept. (EC 2002, 21, emphasis in original)

As is evident in these statements, an unqualified acceptance of the shareholder perspective on corporate governance provides the starting point for the High Level Group's consideration of reform of the European takeover code. As Frits Bolkestein, the European Commissioner for the internal market put it in an interview with the Financial Times on February 25, 2002:

We are in the business of drafting a new [takeover] directive. This is important because who makes the running in a company? Is it the board? Yes, they are the managers of a company, but what about the shareholders? I want to have a European market in shares, a shareholder democracy, one share one vote....[I]f I accept the recommendations of Jaap Winter [chairman of the High Level Group], it would be a big step. If you have a liquid market for shares, it is efficient. We would make some headway in our competitive struggle with the US.

When Bolkestein was asked, "Do you think managers are too dominant in European countries?" he responded:

Yes. They run the company and, of course, nobody else is going to run the company but the management. But on issues like big pay-offs for managers who have left whopping big losses behind, or whether or not to accept a [takeover] offer, shareholders must come into their own.

While, as we have stressed from the outset of the CGEP project, the problems of entrenched management that proponents of the shareholder perspective on corporate governance have stressed is a very real issue that should be central to the policy debates on corporate governance. But an analysis of the evolution of "shareholder value" ideology in the United States since the 1980s clearly shows that, given the inherent dependence of the corporation on strategic managers (as Commissioner Bolkestein recognises), the ideology of "maximizing shareholder value" only entrenches this position further, as the "payoffs" to those strategic managers who end up in control become bigger and bigger. In our view, the European takeover directive confronts a real problem, but invokes a perspective for solving the problem that from both an economic and social point of view has proven itself to be problematic in the United States – the nation that is supposedly providing the model of good corporate governance to Europe.



For example, a restriction on “shareholder democracy” that the takeover directive would strike down is the 14 percent shareholding the Lower Saxony has in Volkswagen, thus potentially exposing the company to takeover. But, as is clearly shown in the CGEP study on Volkswagen, that company has performed very well behind this protection. While one could perhaps argue that the threat of having that protection dropped has motivated Volkswagen employees to work harder and better, the fact is that there is no reason to believe that the company would achieve superior performance if there were no barriers to its being taken over.

At the same time the much-needed debate over corporate governance and economic performance in the EU is not advanced by the response to the EU takeover proposals of the Wallenberg family, who make use of different classes of shares with different voting rights to maintain control of their holding company, Investor. According to the takeover proposals, a vote by shareholders on whether the board should try to defend the company from a takeover bid would be based on one-share one-vote, even in cases where the company has a dual voting rights system. According to the Financial Times on January 31, 2002: “Mr [Jacob] Wallenberg said the proposals could violate the European Convention on Human Rights as they would breach the right of owners of some of the shares to exercise their vote.” It may be that the EU will have a debate about whether or not “shareholder rights” and “human rights” should prevail in the matter of corporate takeovers. But unless the debate asks whether or not the protection that the Investor voting structure provides to the Wallenbergs promotes or undermines the abilities and incentives of the Investor enterprises to generate higher quality products at lower unit costs, it will have nothing to do with the relation between corporate governance and economic performance.

The “Takeover Bids” report reflects the perspective of a number of influential members in the European Commission. The irony is that, in advocating shareholder rights in takeover bids, the report makes no mention of the reason why takeover bids have become just a potent mechanism of changes in corporate control over the past few years – the use of stock rather than cash as a combination currency. It can plausibly be argued that it was this use of the stock market that, taking advantage of speculation, drove the “new economy” to unsustainable heights, making the subsequent collapse in stock prices inevitable. In calling for a new “shareholder democracy” in Europe or any other reform in the governance of corporations, would it not make sense for the European Commission to launch a full-scale programme of research into how corporations make use of the stock market – for control, cash, compensation, and combination? As we have shown in the CGEP project, given the uncontested fact that the stock market has become more important in the EU, is it not a high priority to know what functions it performs for the corporations whose shares it lists and trades? It is clear that the control, cash, combination, and compensation functions of the stock market interact to influence the innovation process. Policy initiatives should *start* from an understanding of this relation. They should not start from a perspective on corporate governance that has systematically ignored the relation between corporate governance and innovation, and that, in its arguments for “shareholder democracy” and “shareholder value” fails to even identify the functions that the stock market performs. To allow such a perspective to guide the future of corporate governance in the EU is, in our view, a very dangerous prospect.

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## **1. The Objectives of the CGEP Project**

During the late 1990s “corporate governance” became a much-debated topic in the European Union. Over the course of the twentieth century, and especially in the decades following World War II, the sustained growth of many industrial corporations meant that, individually and collectively, they exercised control over the allocation of vast quantities of productive resources. As a result, the performance of the national economies in which these corporations operated became highly dependent on corporate decisions to allocate resources to productive investments and to allocate returns to corporate “stakeholders” including employees, shareholders, creditors, and governments. Within the EU, many different national systems of corporate governance prevail, but both European integration and globalisation are creating pressures toward convergence to an “ideal” corporate governance system. An understanding of the relation between corporate governance and economic performance is therefore of profound importance to the evolution of the EU.

As the importance of understanding the relation between corporate allocation decisions and economic performance has become increasingly apparent, the propensity of economists to assume that the market mechanism is the preferred mode of allocating resources to achieve superior economic performance has become increasingly problematic. The paradox of the advanced economies as they evolved over the course of the twentieth century is that, while markets in labour, capital, and products have become both more pervasive and more competitive, powerful industrial corporations have remained central to the resource allocation process. But among economists who have been trained to think systematically about how markets allocate resources, there is little systematic understanding of how, why, by whom, and for whom corporate allocation decisions are actually made, much less about how the particular institutional and economic environments in which corporations find themselves at any point in time affect their decision-making processes. Economists whose perspective on the relation between resource allocation and economic performance is grounded in the theory of the market economy are generally ill equipped to analyse how corporate control and market control interact in shaping the allocation-performance relation.

If one wants to avoid a perspective that assumes from the outset that market control of resource allocation is superior to corporate control, one should not go to the other extreme by assuming that corporate control over resource allocation is inherently superior to market control. One does, however, need an analytical framework for asking why, how, and under what conditions corporate control can enhance economic performance. Without such a framework, the debates on corporate governance are bound to be sterile and irrelevant and the conclusions that are drawn from these debates most likely wrong.

As indicated by its title, the project on corporate governance, innovation, and economic performance (CGEP) posits that the critical link in understanding the relation between corporate resource allocation and the performance of the economy is the *innovation process*. In our view, one cannot explain the potential contribution of the industrial corporation to superior economic performance in an economy in which there is market competition for capital, labour, and customers if one cannot explain why and under what conditions corporate allocation decisions result in innovation.

From an economic perspective, we define innovation as a process that, given prevailing factor prices, results in higher quality and/or lower cost products than had previously been available. Thus defined, innovation provides an indispensable foundation for growth in real per capita income. Such growth, however, is but one measure of economic performance. In the CGEP project, we define superior economic performance along three “income” dimensions: growth, stability, and equity. The project on corporate governance, innovation, and economic performance, therefore, seeks to understand how and under what institutional and economic conditions corporate resource allocation supports innovation processes that result in stable and equitable economic growth.

The broad goal of the CGEP project has been to enhance our understanding of the relation between systems of corporate governance and economic performance among the nations of the EU. The specific objectives of this project have been:

- to analyse how prevailing systems of corporate governance in EU nations influence the investment strategies and the distribution of corporate revenues of industrial corporations based in those nations;
- to compare the influence of corporate governance on corporate investment strategy and revenue distribution among EU nations and with the cases of the United States and Japan;
- to determine the extent to which international competition and intergenerational dependence are creating pressures on national systems of corporate governance that will affect the incentives and abilities of corporations to invest in innovation in ways that will contribute to stable employment and an equitable distribution of income;
- to elaborate the policy implications of the analysis of comparative corporate governance for economic growth, employment opportunities, and income distribution in the EU.

The first phase of the CGEP project entailed a review of the debates on corporate governance and economic performance. The “Perspectives Report” (Lazonick and O’Sullivan 2000b) argues that the shareholder and stakeholder perspectives that have dominated the debates on the relation between corporate governance and economic performance lack a theory of innovation (see also O’Sullivan 2000a, chs. 1-2 and 2000b). In the Perspectives Report, we characterise the innovation process as cumulative, collective, and uncertain. In so doing, the Perspectives Report reinterprets the labor-economics approach based on the distinction between general and specific human capital and the transaction-cost approach that builds on the concepts of asset specificity, bounded rationality, and opportunism. The Perspectives Report integrates this view of the innovation process with a “Penrosian” theory of the growth of the firm to yield a theory of innovative enterprise, and indicates the relation of this theoretical approach to the academic literatures on path dependency, strategic management, organisational learning, and corporate finance (see also O’Sullivan 2002; Lazonick 2002a and 2002b).

It should be noted that, in its final form, the Perspectives Report represents the views of William Lazonick and Mary O’Sullivan, the co-directors of the CGEP project.

Although other members of the project commented on the Perspectives Report, their collaboration in the CGEP project did not require that they employ a particular analytical framework in their own specific contributions. What has been important to collaboration among the partners in the CGEP project is that we ask a common set of questions and that we focus research on a common set of relationships. The research that has resulted from the CGEP project reflects these objectives. For orienting the project as a whole, the usefulness of the Perspectives Report has been as a reference point for discussions among project members, particularly at the six project workshops, about the direction and purposes of CGEP research, the key questions to be asked and relationships to be studied, and the interpretation of the results of this research.

The CGEP research focused on, at the macroeconomic level, the changes in the role of the stock market in the “national systems of corporate governance” in the CGEP economies, and, at the microeconomic level, the influences of the changing role of the stock market on corporate resource allocation in particular industries and in particular companies within those industries. The macro level research (which nevertheless often entailed compiling data sets from micro level transactions) enabled us to discern those cross-national differences in stock market institutions that, through the different functions that stock markets can perform in the industrial corporation, could be affecting the ways in which corporations that operate within the particular institutional environment were making allocative decisions.<sup>1</sup> It is only at the micro level, however, that we can discern how the role of the stock market in the industrial corporation actually affects not only corporate allocation decisions but also the way in which these decisions are implemented in the corporate organisation. That is, it is only at the microeconomic level of the firm and industry that we can analyse the relation between corporate governance and the innovation process.

In carrying out this research at the macro and micro levels, the CGEP project was dealing with a set of relationships between financial institutions and industrial corporations that were, during the course of the project, in the process of rapid, and as it turned out unstable, transformation. The CGEP project was originally conceived in late 1997 and early 1998, in the midst of the “new economy” boom based on the Internet revolution. Funding of the CGEP project began on January 1, 1999, and as we carried out our research agenda in the boom years of 1999-2000, it became clear that, from the perspective of establishing the links among corporate governance, innovation and economic performance, the most critical factor that had to be analysed in the “new economy” boom, whether in the economies of North America or those of Western Europe, was the changing role of the stock market in shaping the investment strategies and organisational structures of the industrial corporations upon which these economies were relying to generate innovation.

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<sup>1</sup> One concern of the CGEP project was “intergenerational dependence”, and in particular the extent to which household savings in the CGEP economies were becoming more reliant on returns from corporate securities, and in particular the stock market, as was already the case in the United States and (among the CGEP economies) Britain. The CGEP project’s empirical research on intergenerational dependence generated new data on, and insights into, the changing importance of the stock market in the savings systems of the “CGEP economies” – that is, Britain, France, Germany, Italy, and Sweden (see Weller 2002; Clark 2001a and 2001b). But, in the end, this research on the role of the stock market in household saving served as a backdrop to the main CGEP research agenda: the role of the stock market in the industrial corporation

The importance of this focus on the changing role of the stock market in the governance of the industrial corporation was borne out when, from late 2000 until the present, the stock markets went into a steep decline and many companies that had been central to the new economy boom found themselves in serious financial straits. Given the research that we had already done on the influence of the stock market on corporate resource allocation in the boom, we were then in a position to follow what happened in the decline. One result is that much of the research that we were doing was essentially being carried out in “real time”; our empirical research is up-to-date, and indeed, notwithstanding the end of the CGEP project, ongoing. By the same token, the implications of the rapidly changing relation between the financial environment and the productive capabilities of the industries and companies concerned for corporate, and ultimately economic, performance is still unfolding.

That having been said, we believe that, with its focus on the changing role of the stock market in the industrial corporation, the CGEP project has both developed an analytical framework for doing the relevant empirical research and launched a mode of inquiry that potentially has profound implications for the ways in which European policy makers regulate financial markets and corporate resource allocation for the sake of superior economic performance. Section 2 of this report provides a summary of the CGEP analytical framework on the changing role of the stock market in the industrial corporation. In Section 3, we summarise research from the national systems phase of the project that documents the changing role of the stock market in the five CGEP economies. In Section 4, we summarise the industry research – which consists of cross-national studies of the aircraft engine, automobile, computer software, and telecommunications industries – on the changing role of the stock market in the industrial corporation. Based on our research, in Section 5, we provide some general conclusions, and articulate many remaining questions, on the relation of the different functions of the stock market to the innovation process. In Section 6 we draw on this research to examine critically some of the leading policy arguments concerning the different functions that the stock market should play to promote economic performance in the EU

## **2. The CGEP Focus: The Functions of the Stock Market**

Over the past several years, the European policy debates on corporate governance have focused on the rise of the “new economy” and the role of a “shareholder value” model of corporate governance in supporting its growth. The European debates have been heavily influenced by the experience of the United States. Until the mid-1990s, with the exception of Britain, there was little interest in the US shareholder value model in the European Union. It was associated with what we have characterised as a “downsize-and-distribute” corporate governance regime in which the focus of large incumbent corporations was to downsize their labour forces and distribute corporate revenues to shareholders in the forms of dividends and stock repurchases (Lazonick and O'Sullivan 2000a and 2002b). Such a corporate governance regime, that is, tended to redistribute income from labour to capital. In contrast, the social market economies of the EU favoured a “retain-and-reinvest” corporate governance regime – one in which both people and money are retained within the corporation and reinvested in new productive capabilities.



But the European view of US-style corporate governance changed in the last half of the 1990s as the US economy experienced a “new economy” boom that was characterised by not only rapidly rising stock prices but also the use of stock for mergers and acquisitions, stock-based compensation (in the form of stock option grants), and capital raising by industrial corporations. Whereas previously the corporate governance debate had focused on the allocation of resources and returns by large incumbent corporate enterprises, now the debate focused on how an orientation of the economy toward the stock market, and indeed the emergence of “new markets” for the listing of “new economy” stocks, could promote new venture creation. Some industries, of which the most prominent was telecommunications, witnessed attempts by many incumbent old-economy companies to themselves make the transition to the new economy through the use of their stock to acquire startups and to compensate a broad base of *non-executive* employees with stock options, as distinct from the longstanding practice in old-economy companies of granting stock options only to top executives.

An important mechanism for transferring the US model of corporate governance to Europe was cross-border M&A activity, with both US companies acquiring European companies and vice versa as well as cross-border combinations within the EU. In these combinations, the level and rate of growth of a company's stock could determine whether it would dominate a combination; for example, the way Daimler dominated Chrysler when the two companies merged in 1998 or the way Vodafone took over Mannesmann in 1999. In a rapidly evolving high-technology industry such as telecommunications equipment, a high and rising stock price gave a company an advantage in competing against other companies in purchasing small technology firms, often still in the startup phase, thus enabling the acquiring to take control of new productive capabilities. Alongside this industrial activity, the stock-market driven model was also transmitted from the United States to Europe by the global search by US institutional investors for higher returns on their financial assets as well as by the ideology of the economic benefits of “maximizing shareholder value” that emanated from Wall Street and US academia (see Lazonick and O'Sullivan 2000a).

The collapse of the “new economy” boom over the last two years has created considerable confusion in these debates. Great faith had been placed in the prospects for superior economic performance that could be generated by the “new economy”. If one were to judge by the media attention to the Internet revolution, corporate advertisements promoting “next-generation” products such as 3-G mobile, the market projections of research consultants, and the bullish recommendations on “technology stocks” by financial analysts, the boom of the late 1990s was both real and sustainable. Now, in the midst of the collapse of the “new economy”, the last half of the 1990s is being characterized by many as an “abnormal” period of unprecedented speculation and, in the wake of mammoth bankruptcies such as Enron and Global Crossing, of corporate misinformation. Since it was the promises of this “new economy” boom that won support in Europe for the theory and practice of “shareholder value”, the collapse of the boom should lead Europeans (if not Americans) to think deeply about the theoretical and empirical foundations for that approach to corporate governance and about what it was that, in the recent experience of boom and bust, actually went wrong.

From its conception in 1997-98 through the period of funded research from January 1999 through March 2002, the CGEP project sought to distinguish rhetoric from

reality in the operation of the “new economy”, especially in terms of the role of the stock market in the innovation process. Our general approach, as laid out in the Perspectives Report, has been to evaluate the debates on corporate governance in terms of alternative theories about the relation between the governance of corporate resource allocation and the economic performance of enterprises and the economies in which they operate. Our particular approach, as we have already stated, is based on the argument that to make the link between corporate governance and economic performance one needs a theory of how different modes of corporate resource allocation affect the innovation process, on the grounds that innovation is a necessary (although by no means a sufficient) condition for stable and equitable economic growth. As elaborated in the Perspectives Report, the research agenda that derives from this approach asks a) *who* exercises strategic control over corporate resource allocation, b) *what* kinds of investments do they make in the productive capabilities of the corporation, and c) *how* the returns on these investments distributed to different parties.<sup>2</sup>

Given the centrality of the stock market to the “new economy”, and particularly to companies in high-technology industries, the empirical work of the CGEP project focused on *the changing role of the stock market* in the CGEP economies, at both the national and industry levels, in comparison with the experience of the United States. Such research, which one would expect would be central to any discussion of the role of “maximizing shareholder value” in the performance of enterprises and economies, has been largely neglected thus far in the corporate governance debates, not least by the proponents of the shareholder perspective. Our research asks what *functions* the stock market actually plays in the industrial corporation, how those functions have changed over time, and, within the industrial corporation, how the role of the stock market affects the innovation process. Through this research, we have identified four ways in which companies use the stock market, which we categorize as *control*, *cash*, *compensation*, and *combination*.

Within a framework for analyzing “the innovative enterprise” (O’Sullivan 2000b; Lazonick and O’Sullivan 2000b; Lazonick 2002a), our research asks the following questions for each of these stock-market functions:

- a) *control*: How through the fragmentation or concentration of stock ownership does the listing of a company’s shares on stock market affect that relation between corporate ownership of shares and corporate control over the allocation of resources and returns, and what are the interests of the types of people who, as a result, exercise control over corporate allocation decisions?;
- b) *cash*: To what extent does the stock market enable companies to raise money, and do they use the money that they raise to fund corporate expansion, to restructure balance sheets, or fund operating expenses? Also, in the cases of initial public offerings or privatisations of state-owned companies, does the cash raised go to the companies that are being listed on the stock market or is

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<sup>2</sup> For the original articulation of the “who, what, and how” of corporate governance and the relation of one’s answers to one’s view of innovation and economic performance, see O’Sullivan 2000b.

it used to effect the transfers of share ownership from existing to new shareholders?<sup>3</sup>

- c) *compensation*: to what extent do companies use stock to remunerate employees (in the forms of stock option or stock purchase plans) or other corporate participants such as directors, shareholders (in the form of stock dividends), suppliers, and buyers, and what do companies expect to achieve and actually achieve by such stock-based compensation?
- d) *combination*: to what extent do companies use stock rather than cash to merge with or acquire other companies, what is the purpose of such mergers and acquisitions, and how are they integrated into a coherent organization?

In each case we are interested in understanding both *how* companies use the stock market, that is, the functions per se, and *why* they use the stock market, that is, the purpose of the different functions.

Only through specific case studies can we address the question of whether such use of the stock market for such purposes supports or undermines the innovation process. If one does not know *how* industrial corporations actually make use of the stock market, one cannot *even begin* to ask the question of *why* they use the stock market, and hence one is incapable of analysing the relation between the stock market and innovation in the industrial corporation. Indeed, as we shall discuss in the final section of this policy report, different theoretical perspectives and policy positions on issues related to corporate governance make critical assumptions about the function or functions of the stock market in industrial corporations, which may or may not be borne out empirically. In the absence of documentation on how corporations do or do not make use of the stock market, one cannot analyse the influences of each of the different functions on the incentives and abilities of these companies to innovate. And, as we have argued in detail in the Perspectives Report, understanding the institutional conditions that influence the corporate innovation process is critical for understanding not only performance of the enterprise but also the performance of the regional and national economies in which these enterprises operate. Alongside employment conditions, regulatory conditions, and other financial conditions, the stock market is one of these institutional conditions that can influence the innovation process. In the empirical work in the CGEP project we have laid heavy emphasis on the changing functions of the stock market in different nations and industries, not because we think that the stock market is the only or even the major institutional condition that influences the innovation process, but rather because of, firstly, the great faith that many academics, policy makers, and executives have placed in the notion that a stock-market driven economy could result in sustainable prosperity, and, secondly, the fact that over the past decades the role of the stock market in the corporate economy has assumed a level of importance that it had never held before.

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<sup>3</sup> If an IPO or a privatisation results in a transfer of share ownership from existing to new shareholders, then the listing per se is not performing the cash function of the stock market but will have implications for the control function.

### **3. The Functions of the Stock Market: National Systems**<sup>4</sup>

As part of the CGEP project, we conducted five EU case studies on the national systems of corporate governance in Britain, France, Germany, Italy, and Sweden (see Owen 2001; O'Sullivan 2001a; Jürgens and Rupp 2001a; Amatori and Colli 2001; Smith 2002), as well as comparative studies of the United States (Lazonick and O'Sullivan 2000a) and Japan (Lazonick 2001). The most striking developments were in the relationship between the stock market and the corporate economy. The analysis of the functional mechanisms that link corporations to the stock market is a crucial complement and, to some extent, corrective to much of the existing literature on comparative systems of corporate governance. Most of the recent studies in this area have been preoccupied with the structure of, and changes in, patterns of corporate share ownership across countries, and their implications for corporate governance and performance. There is, however, a substantial limitation to the analysis of corporate share ownership patterns for understanding corporate governance. Essentially the approach assumes that patterns of share ownership have straightforward implications for corporate governance when, in fact, the links between ownership and control are not at all clear. Certainly, if we look at shareholders' formal powers to intervene in corporate activities, even in a country like the United States that is ostensibly one of the bastions of shareholder value, we find many obstacles to shareholders' directly exercising a profound and sustained influence on the way in which corporations allocate resources and returns. It seems much more likely that shareholders exercise an influence over corporate behaviour in a more indirect way, notably through, for example, their influence on a company's ability to raise finance in the stock market or their willingness to provide a high valuation to a corporation's stock, thus making it a more valuable compensation and combination currency. Therefore, studying the extent to which corporations rely on the stock market as a source of cash or as a currency for accumulating capabilities is necessary to understand the extent to which these indirect forms of influence are operative in different countries at different times.

Studies of the extent, characteristics, and implications of the changing role of the stock market are remarkably lacking. Many scholars rely on proxy variables such as the market capitalization of, and trading volume on, the equity market to quantify the role of the stock market in the corporate economy. Perhaps the variable most commonly employed to document the extent to which change has occurred in the economic role of the stock market is market capitalization as a percentage of GDP. However, as the National Systems of Corporate Governance Synthesis Report (O'Sullivan 2001b) shows, using the example of Britain, there are serious problems with relying on secondary market indicators for understanding the real importance of the equity markets in the corporate economy. There is no substitute for direct analysis of how the mechanisms that link the corporate economy to the stock market differ across country and have changed in importance over time. For the five CGEP economies, the Synthesis Report traces the evolution of three different mechanisms through which the stock market has been linked to the corporate economy: specifically, it analyses the role of shares as a) a source of corporate finance; b) as a currency in merger and acquisition activity and c) as a component of employee stock option plans and share ownership schemes.

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<sup>4</sup> The following section summarizes the National Systems of Corporate Governance synthesis paper by Mary O'Sullivan (2001b).

In the analysis of the stock market as a source of finance, perhaps the most striking pattern that emerges is that, at least in terms of the value of proceeds raised, share issues that facilitated a change of ownership of existing assets dominated share issues related to corporate capital raising. In the former, the proceeds of the issue went to liquidating shareholders, they were used to pay off existing debt, and/or they contributed to the financing of acquisitions. The general implication of the analysis in the Synthesis Report is that in these corporate economies the stock market has primarily been a mechanism for the transfer of existing claims on real resources rather than a channel for funds to facilitate new investment in the corporate economy. While we are used to thinking of the secondary market as performing the function of providing liquidity for existing claims, the fact that the *primary* stock market has been largely preoccupied with performing that role is a significant finding.

Of course, some companies did use the stock market to raise new capital for investment. In particular, many companies listing for the first time on the new markets in various CGEP countries raised significant capital to finance investment. However, given that in many of these cases, it is a requirement of listing that new companies use 50 per cent or more of the proceeds of their IPO to finance new investment, we should be careful not to read too much into this cash function for changing future patterns of corporate finance. Moreover, another striking fact from the analysis above is the extent to which the stock market's significance in recent years even for these companies is its role in providing capital for acquisitions.

It should also be emphasised that there are major publicly-traded companies that list on the main markets that, like ST Microelectronics, the Franco-Italian semiconductor company, have used the stock market to raise capital for internal investment.<sup>5</sup> Until recently, however, they seem to have been the exception rather than the rule especially when one considers the largest issues of shares. It is worth emphasising though that a new trend may be unfolding, at least as far as IPOs on the main markets are concerned, with more companies turning to the equity markets to raise capital. It is, however, as yet far too early to say if it represents a long-term tendency.

Indeed, for these types of issues the possibility that their use of the stock market as a source of finance was a temporary phenomenon induced by speculative conditions in the late 1990s must be seriously considered. As boom has turned to bust in some of the main markets of the CGEP economies, share issues by major companies have dried up. A similar point can, of course, be made with respect to share issues on the new markets where the boom-to-bust phenomenon has been even more spectacular than in the main markets.

There was a really spectacular growth in M&A activity in all of the CGEP economies – with the partial exception of Sweden where the annual figures for M&A activity show considerable volatility from year to year with no clear trend emerging -- not so much in the numbers of transactions taking place as in the value of the deals undertaken. Cross-border M&A activity played a decisive role in driving these

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<sup>5</sup> It may be that companies listing on second markets in CGEP economies behave differently from those that account for the bulk of new issues on the main markets and, in particular, that they are more inclined to use these listings to raise capital. At the moment, we cannot comment on this matter since the listing behaviour of these companies has not yet been systematically analysed.

overall trends in all of the CGEP economies except Italy (where increased domestic M&A activity was the most important factor behind the higher values of M&A activity recorded in the second half of the 1990s). In terms of the consideration paid in these deals, there seems to have been a general trend in the late 1990s towards a greater reliance on shares in European M&A transactions.

The growing importance of M&A activity, especially cross-border transactions, in CGEP economies creates a direct interest in shareholder value for corporations in these countries. Whether their interest in the M&A movement is offensive – their desire to be an acquirer – or defensive – their concern with remaining independent – maintaining a highly-valued stock has become a condition for the achievement of corporate goals. When shares themselves become an important currency for the conclusion of M&A deals, the pressures for shareholder value become all the more direct. As for the use of the stock market for raising corporate finance, however, the sustainability of the trend towards higher levels of M&A activity has been called into question by increasing volatility in the world's stock markets.

The third mechanism that links the stock market to the corporate economy is the role of shares as a basis for corporate compensation. Unfortunately, analyses of differences and trends in the use of shares for compensation are severely hampered by the fact that, in most of the CGEP economies, corporations are not required to disclose detailed information on the award of stock options. The comparative data that are available do suggest the growing importance of stock-based compensation policies in all of the CGEP economies, a trend that is confirmed by various national surveys.

Once one has documented the important mechanisms at work in the evolution of the relationship between equity markets and corporations in CGEP economies in recent years, one can begin to address the question of the implications of these developments for corporate governance in the CGEP economies. A conventional wisdom on the growing importance of the stock market in various economies has emerged that is rooted in the shareholder theory of corporate governance. The central preoccupation of this stream of inquiry, that emanates from financial economics, has been the study of mechanisms that increase the control of financial markets over corporate resource allocation and that, as a result, limit the discretion of corporate managers to act other than in the interests of shareholders (for reviews of the literature, see Hart 1995; Shleifer and Vishny 1997). A number of mechanisms have been suggested by contributors to this literature for increasing shareholder control over corporate management. From the shareholder perspective on corporate governance, the growing importance of share issues to the corporate economy, increased levels of M&A activity, and the growing prevalence of stock options in the CGEP economies could be interpreted as evidence of increased shareholder influence in these economies.

The Synthesis Report challenges this conventional wisdom by illustrating the gap between theory and reality through an analysis of limitations on the influence of shareholders on the supply of capital for corporate investment, the market for corporate control, and the award of stock options to corporate employees. As O'Sullivan (2000a, 2000b, 2002) has argued elsewhere, since the shareholder theory of corporate governance has no theory of the innovation process, one should be



sceptical about the usefulness of the shareholder theory of corporate governance as a guide to ways in which the stock market has influenced the corporate allocation of resources and returns as well as the implications of the relation between the stock market and corporate decision-making for corporate, and economic, performance.

Rather than attempting to understand systems of corporate governance primarily through an analysis of the dynamics of financial markets, the findings of the “national systems of corporate governance” phase of the CGEP project call for a reorientation of the way we study these systems. In particular, these findings emphasise the importance of linking developments in corporate governance to analyses of industrial dynamics. So too the explanatory value of analysing the relationship between recent developments in corporate governance and the specificities of the structure of corporate control within national economies as well as for particular companies are underlined.

These issues can only be understood by studying how companies develop and utilise resources within a particular industrial context. Through a number of industry case studies undertaken as part of the CGEP research project, and summarised in the next section of this report, we are attempting to differentiate between the various internal and external drivers of changes in corporate resource allocation in the CGEP economies. The insights that we glean from the industry analysis help identify the critical forces at work in driving change in national systems of corporate governance in Europe, and in particular the prospects for convergence in corporate governance systems. As with our national studies, the prime focus of the industry studies is on the changing functions of the stock market in the corporate economy.

#### **4. The Functions of the Stock Market: Industry Studies**

The following table provides a guide to the CGEP industry studies:

	<b>INSEAD</b>	<b>WZB</b>	<b>JETS</b>	<b>STEP</b>	<b>ISE</b>
Aircraft engines	Overview Rolls-Royce US companies				
Automobiles	PSA and Renault Fiat	European synthesis Volkswagen			
Computer software	Video games	Intershop PSI			
Telecom-munications	Optical networking	Deutsche Telekom MobilCom	US entrants (plus US & EU profiles)	Nordic area	Joint ventures

- INSEAD: The European Institute of Business Administration, Fontainebleau, France (W. Lazonick, industry studies coordinator and, with M. O'Sullivan, CGEP project co-director)
- WZB: Wissenschaftszentrum-Berlin, Berlin, Germany (U. Jürgens, coordinator)
- JETS: Institute for Japanese-European Technology Studies, Edinburgh University, Edinburgh, UK (M. Fransman, coordinator)
- STEP: Studies in Technology, Innovation, and Economic Policy Group, Oslo, Norway (K. Smith, coordinator)
- ISE: Istituto di Storia Economica, Bocconi University, Milan, Italy (F. Amatori and A. Colli, coordinators)

The purpose of the industry studies has been to analyse the impact of different systems of corporate governance on the innovation process in different companies, controlling for industry, and in different industries, controlling for nation. Building on national systems studies, we emphasise the changing functions of the stock market in the corporation and their impacts on corporate resource allocation and organisational learning. We chose to study industries – aircraft engines, automobiles, computer software (specifically, Internet services and video games), and telecommunications -- characterised by technological complexity and global competition.

- For the past three decades, observers of the *aircraft engine* industry have been asking when the Big Three – General Electric, Pratt & Whitney, and Roll-Royce – would be reduced to only two. With Pratt & Whitney as the once-dominant industry player, and General Electric as the clear industry leader now, our research has focused on Rolls-Royce's ability to remain competitive in the 1990s on the basis of a technological superiority in engine architecture that resulted from sustained development over a period of more than three decades, notwithstanding what would appear to be dramatic changes in corporate governance regimes.
- Despite globalization of production and markets, the international diffusion of technological and organisational advances, as well as the rise of cross-border mergers, the *automobile* industry still remains one in which the forms of corporate governance differ markedly across the CGEP countries. An important finding of our comparative study of major auto companies in France (Renault and PSA), Germany (Volkswagen), and Italy (Fiat) is that those companies (Fiat and Renault) which relied most on the use of financial indicators in strategic planning have the worst performance in terms of the indicators of both capital and labour, while the better performers in these respects have been those companies (PSA and VW) that have been more reluctant to introduce shareholder value policies.
- The *computer software* industry is one that is still open to new ventures despite the dominance of large segments of the industry by powerful companies such as IBM, Microsoft, Oracle, and SAP, and hence an excellent industry to observe how the changing role of the stock market – and particularly the rise of new markets – is affecting both the innovation process and the growth of the firm. Our studies focus on two companies engaged in Internet services in Germany, as well as on the emergence of French and British video game companies as new global competitors in the 1990s.
- *Telecommunications* was at the heart of the “new economy” boom of the late 1990s, with corporate stock often playing a major role in determining the pace of corporate acquisition and mode of employee compensation. Our studies look at the strategies of both incumbents and entrants at the equipment supplier and service provider levels of an industry that probably manifests the changing role of the stock market in the industrial corporation more than any other in the 1990s.

In what follows, we give general summaries of the most important findings of the industry studies. We are confident in saying that the underlying industry studies, taken as a body of work, go much more deeply into the actual functions of the stock

market in the industrial corporation than has been done before, and as such represent an important, and we might say innovative, contribution to the literature on corporate governance. That having been said, however, we should caution that, given the “real time” character of our studies, and the complexity of the issues involved, these industry studies do not in and of themselves provide clear-cut conclusions on the relation between the stock market and innovation in the industries involved. As we shall discuss in the conclusion of this Policy Report, the industry studies identify the types of phenomena and relationships that must be taken into account in any attempt to regulate financial institutions for the sake of supporting innovation. These industries studies can, in our view provide important fuel to relevant policy debates – debates that, on the issues of corporate governance, are, as we shall also elaborate in the conclusion, greatly in need of having a fire lit under them.

#### **4.1 Aircraft engines<sup>6</sup>**

An aircraft engine is composed of a large and increasing number of interacting components belonging to different technological fields. New engine development programmes involve a large number of actors (suppliers, regulatory bodies, airframers, and airlines) that require an effort of co-ordination from both an organisational and a technological viewpoint. In order to co-ordinate, manage, and integrate the roles of the actors involved in the industry, engine makers need to span their capabilities over a wide range of scientific and technological fields and they are required to develop specific organisational (e.g. project management) and relational (e.g. marketing) capabilities. On the other hand, there is a trend in the industry towards a greater division of labour between engine manufacturers and first- and second-tier suppliers. This poses significant managerial implications in terms of allocation and control of resources required for the development of new engines (Prencipe 2000).

Three companies – General Electric, Pratt & Whitney, and Rolls-Royce – effectively control the global markets for commercial aircraft engines. For some time observers of the industry have expected that one of the Big Three would eventually be forced to withdraw from the industry, and at the beginning of the 1990s, it appeared that the British-based company, Rolls-Royce, would be the one to go. A decade later, however, it was Pratt & Whitney, one of the two US-based companies, that appeared to be in the most vulnerable position (see Almeida 2001). In January 2000 Pratt & Whitney had the dominant share of “in-service” widebody turbofan engines, with 45 percent compared to General Electric’s 32 percent and Rolls-Royce’s 23 percent. But Rolls-Royce had a larger share of new orders than Pratt & Whitney, even though both companies trailed far behind General Electric, which, through CFM, its joint-venture with the state-owned French company, SNECMA, also dominates the single aisle and regional jet markets.

Rolls-Royce’s current position in the industry is based on its superior technological capabilities, embodied in the three-shaft architecture of its turbofan engines. The modularity embedded in the three-shaft architecture has enabled Rolls-Royce to develop and stretch a family of engines with an unmatched range of power to meet different market niches and therefore deploy similar technological solutions across

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<sup>6</sup> The following summary is taken from Prencipe (2000) and Lazonick and Prencipe (2002).

engines without incurring heavy additional development costs. Moreover, three-shaft engines are simpler, shorter, lighter, and more rigid than competing engines based on two-shaft architectures. These characteristics enable the three-shaft engine to sustain high levels of performance throughout its life, thus resulting in low maintenance costs. While Pratt & Whitney and General Electric Aircraft Engines have teamed up to develop a new engine for the Airbus A380, Rolls-Royce has relied on the embedded modularity of its three-shaft engine architecture to package a number of 'engine solutions', for example, the Trent 900 for the Airbus A380 and the Trent 500 for the Airbus A340-500/600 for which Rolls-Royce is the sole supplier. Based in a country that was, at the end of the nineteenth century, the "workshop of the world", Rolls-Royce is today, at the beginning of twentieth century, the only British engineering company that can claim to be a world leader.

The purpose of our study of Rolls-Royce is to document how the company has remained a power in the turbofan engine industry, notwithstanding its own troubled history and the relative lack of international success, more generally, of British companies in high-technology manufacturing industries over the past half century or so. Rolls-Royce made its initial investments in the three-shaft architecture in the 1960s (starting as early as 1963), when the eventual superiority of the technology was not at all assured. Since that time, Rolls-Royce has sustained its investments in these technological capabilities, despite dramatic changes in the company's ownership. Founded in 1906 (with origins dating back to the 1890s), Rolls-Royce was, until 1971, a publicly traded limited liability corporation that included both the original automobile division and the aircraft engine division. In 1971 the company went bankrupt because of its attempt to develop the RB211 for the Lockheed L1011 Tristar. When Rolls-Royce emerged from bankruptcy in 1973, it was as a nationalised company that had spun off its automobile business. Even as a nationalised company Rolls-Royce had to cope with the dramatic shift in the identity of its owner from the Labour governments of Wilson and Callaghan from 1974 to 1979 to the Conservative government of Thatcher from 1979 to 1987, when Rolls-Royce was privatised. Since 1987 Rolls-Royce has remained a publicly traded corporation, although one in which the British government has maintained a "golden share" that prevents a takeover of the company. Nevertheless, as we show in detail, Rolls-Royce has been highly dependent on external finance, including two major share issues in 1993 and 1995, to fund its growth. But despite the company's unquestioned technological and market successes as a publicly traded company, Rolls-Royce is by no means a favourite of stock-market investors: between January 1997 and January 2000, stock prices in the FTSE100 rose by 47 percent, while Rolls-Royce's stock price fell by 13 percent. In August 2000 Rolls-Royce's share price fell so low relative to the FTSE100 that the company was not included (as it turned out, temporarily) among the 100 companies that make up the index. As of March 1, 2002, the FTSE100 was up 23 percent and Rolls-Royce stock was down 23 percent compared with their levels on January 1, 1997.

One might expect that such major changes in modes of ownership as well as the company's relations with particular types of owners would have resulted in significant changes in corporate governance, including the ways in which the company allocated resources to the development of technology. The question that this study poses is how the technological development of the three-shaft engine was sustained from the late 1960s through the 1990s despite these dramatic changes in modes of ownership

and changing pressures on the relations between managers and owners. The study shows how under very different governance and economic conditions, Rolls-Royce's management, dominated by career engineers, were able to sustain a development strategy that faced fundamental technological, market, and competitive uncertainty, and that, even when these uncertainties have been overcome, the stock market does not deem the company to be a financial success.

## 4.2 Automobiles<sup>7</sup>

The car industry has come under pressure from the capital markets. It has been singled out as one of the major value destroyers in terms of shareholder value in recent years. The low market capitalisation of some of the companies has put them under threat of hostile take-over. Institutional investors have voiced their discontent about corporate governance structures in the car industry. In sum, there is a strong pressure on companies to change their traditional corporate governance systems.

However, in terms of ownership most of the European car makers have only a limited exposure to the stock markets. At all events, this is true for the companies considered in the CGEP automobile study: Fiat, PSA, Renault and Volkswagen. While the first two are still controlled through family ownership, the latter two have the state as dominant owner that protects insider control.

Each of the four companies has a distinctive corporate governance system that cannot be fully explained by differences of ownership. Thus the role of the families in the cases of Fiat and PSA remains predominant for strategic decisions, even if the Agnelli and Peugeot families must, although to differing degrees, negotiate with non-family CEOs and to take into account the place of institutional investors. In contrast, the role of the state in the case of Renault and Volkswagen has been reduced to a supervisory board with no actual involvement in running the companies. But the state remains a dominant stakeholder in both cases. The role of labour is quite different in these two companies: at Volkswagen labour remains an important stakeholder with an institutionalised presence in Volkswagen's corporate governance system; at Renault labour has lost its direct influence.

Nevertheless, recently all four companies have put shareholder interests higher on their priority lists and shown signs of a change in their corporate governance systems. The central questions posed by the CGEP automobile study are:

- How far will pressure from the capital markets remove differences in the traditional characteristics of corporate governance at these auto companies?
- Do companies with different corporate governance systems, and operating in different institutional environments, take different approaches when under the pressure of capital markets?
- What more specifically is the pressure that the stock market exerts on these companies? Do they rely on the stock market to finance their activities? Or does

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<sup>7</sup> The following summary of the CGEP automobile study draws substantially on the summary paper by Jürgens, Lung, Volpato, and Frigant (2001), which is in turn a synthesis of Jürgens (2001), Lung and Frigant (2001), and Volpato (2001).

the importance of the stock market lie rather in its functions as a market for corporate control?

We did not observe a marked reduction of investment levels nor a substantial divestment process for the four car makers during the decade 1991-2000, but rather a strong direction towards more products, more volume, etc. Some differences can be observed but they are mainly explained by the specific cycle of product development rather than by any short-termism: growth is also a necessary component of the shareholder value policy. Differences were also found with regard to the outsourcing of automotive components where PSA and VW exhibited a more 'productionist approach' while Fiat and Renault seemed to be more eager to disinvest in these areas and possibly move into new areas of business. Interestingly, these differences do not correspond with the family/state divide in their ownership characteristics.

All four companies have moved towards a shareholder value orientation, but clearly with different degrees of emphasis. It seems that Fiat and Renault have adopted a far more stringent policy of setting financial targets. This is related to the strong position of finance-oriented CEOs in both companies. Fiat, as was shown, has reorganised its targets system explicitly towards the goal of "value creation"; PSA, while making similar moves, remains reluctant to introduce as intensively as Fiat the new rules of shareholder value management. Paradoxically, Renault managers appear to keep more autonomy from their main shareholder (the state) than PSA (Peugeot family) in such changes. In the case of Volkswagen the year 2000 marked the beginning of a capital market oriented target system. A number of measures were taken to enhance communication with investors. At the same time the company refrains from putting shareholder value at the top of its priority list. Instead it seeks a balance between shareholder and workholder values.

None of the four companies used the stock markets for regular operations and investment. Only at Renault under special conditions of near bankruptcy and EU directives to reduce state ownership as a precondition for allowing a 'rescue' subsidisation, was there a substantial shift in the ownership structure. Fiat as well as PSA and Volkswagen made great efforts not to allow any shift of ownership structure that could endanger the existing top management group. The share swap between Fiat and GM to a certain degree fits into this policy framework (as long as GM does not exercise its option to acquire a majority ownership of Fiat.). The stock market policies of PSA and Volkswagen have been dominated by the perceived need to avoid a take-over and have been mainly implemented by buying back their own shares.

The case studies of the four car companies lead to the conclusion that the introduction of new rules and routines associated with shareholder value policy has taken diverse forms within the European automobile industry. There is a big gap between the rapid introduction of shareholder value criteria at Fiat and the attempt to develop a more symmetrical consideration between labour and capital at VW. Such differences are not explained by the type of share ownership, whether family or state.

At Fiat and PSA, the Agnelli and Peugeot families are deeply involved in the strategic decisions concerning their companies, but the family control has recently been evolving differently: the French company appears to have been more cautious in the introduction of shareholder policy. The reinforcement of control by the Peugeot



family has clearly indicated this new direction. In contrast, the Agnelli family now seems ready to accept a need to share the control of Fiat Auto with other partners. The global alliance with GM, and the arrival of managers coming from General Electric have accelerated the transition toward a more Anglo-American style of shareholder policy. This policy is definitely an element in all Fiat official documents, while shareholder value figures less prominently at PSA. There are other differences. A clear policy of stock options is adopted by the Italian company, while it remains limited for the French one. The stock market has been used to reinforce the control of the Peugeot family on PSA: although this policy was also followed by the Agnelli family until the mid-1990s, the ambitious globalisation strategy then took the leading role in determining policy. PSA has clearly reinforced its activities in the component sector while Fiat is engaged in an exit strategy for this sector, with the spin-off and sales of several departments of Magneti-Marelli, its component division. Retreating from manufacturing activities to focus on services associated with the automobile product – as the US car makers Ford and GM are doing – seems a possible trajectory for Fiat, but not for PSA.

We also found divergences in the transition of the state-controlled car companies towards a new mode of corporate governance. In both cases, the state has been reduced to a role of supervision without a direct involvement in running the company. But this reduced control of the dominant shareholder has had different consequences. At VW, the co-management policy remains strong and works council/union members are represented on the supervisory board and thereby involved in strategic decision making. At Renault, the implicit compromise between unions (mainly the CGT) and management that had governed the company from the Second World War until the mid-1980s has been broken. The managers of the French company have definitely been moving towards a shareholder value policy, and although this was not so evident as in the Fiat case, it gave clear messages to the financial market and community, and could lead to a possible future total privatisation of the company.

In both Renault and Volkswagen, financial criteria play a growing role in investment decisions, but this is not an indication for a full shareholder value policy. It is related to the declining role of the main shareholder, the state, as an active source of new funds and follows from the European Commission competition policy that requires that firms have to be autonomous from the state in financing their investment and growth policy. For institutional reasons, and due to available cash generated by profits or sales of previous stakes (Volvo Car by Renault), the financial market played no role in financing investment, acquisitions or alliances. Finally, the German maker seems more committed to the development of new technologies, especially for electronics, while Renault is evolving towards a role of coordination of product development (associating suppliers which would have the role of technological innovators) and a closer relationship with the final market.

A result that comes out most clearly from our research is the fact that none of the companies needed the stock market for its operational activities, including major investment in new facilities and new product programmes. The same is true to a large extent even for the financing of acquisitions although the issue of getting access to “acquisition currency” has played an increased role in the debate and some companies have declared an intention for the future to play a more active role in this area. Neither has the use of stock options with their implication of an incentive function for

the stock markets in motivating and retaining personnel, primarily management, played an important role. The most important influence of the stock market rather lay in its function for a hostile take-over. Interestingly, even though all four companies investigated were protected to some degree by family or state ownership they strongly felt the need to brace themselves against this potential danger. In view of this danger companies followed a dual strategy of trying to enhance their stock market valuation on the one hand and of erecting protective barriers against hostile take-overs on the other hand.

If we rank the degree of movement towards shareholder value management policy for the four car companies studied, the scale would be: from VW (least), to PSA, then Renault and, finally, Fiat (most). This order is clearly not related to the type of control, family/state. Any explanation of the trajectories of these firms clearly needs to consider additional factors and hypotheses. Boyer and Freyssenet (2001), for example, provide strong confirmation of the limited explanatory role of ownership structures.

The level of employment and the development of gross profit margins could reasonably be taken as the two best economic performance indicators to represent, on the one hand, the interest of employees, and, on the other hand, the interest of the shareholders. On this basis it is interesting that these companies rank almost in reverse order to their ranking in terms of the degree of adoption of shareholder value policies. Those companies (Fiat and Renault) which have moved most in terms of the use of financial indicators have the worst performance in terms of the indicators of both capital and labour; the better performers in these respects have been those which have been more reluctant to introduce shareholder value policies (PSA and VW). Another source confirms this result: in July 2001, the Total Shareholder Return Index calculated by PricewaterhouseCoopers and published by Automotive News Europe indicated that PSA was the best performer in the European car industry over the previous twelve months while Fiat was the worst. VW followed PSA, performing better than Renault for 2000/2001. In view of our findings we may even reverse the causality and claim that the companies which achieve better economic performance have been less under pressure of shareholders, especially institutional investors. In the short term it seems to be clear that economic performance in the auto industry is explained by other factors, especially by the success of the product policy. But changes in corporate governance may have an effect in the medium/long term, as it implies a progressive change in the routines of the companies at all levels.

### **4.3 Computer software**

Our studies of computer software included the case of two small German companies, Intershop (Jürgens and Rupp 2001b) and PSI (Jürgens and Rupp 2001c), and a study of six French and six British companies in the video game industry (Larrue, Lazonick, and O'Sullivan 2002). In all of these cases, our prime interest has been in the role of national financial systems in supporting the transition of new ventures to going concerns, a process that in the "new economy" boom was facilitated by the emergence of "new markets" (nouveau marché, Neuer Markt) in an attempt to replicate the success of the US NASDAQ in both motivating the creation of new ventures and enabling them to make use of the stock market as publicly listed companies.

*Intershop*<sup>8</sup>

Intershop was founded in Jena in 1992. To begin with it bore the name NetConsult and sold NeXT computer systems. After two software products, the first Internet-based standard software product INTERSHOP was produced in 1996. Sales of NeXT computer systems were discontinued that year, and the product name INTERSHOP was adopted as the firm name. Intershop Communications AG operates in the e-business software sector. It develops and sells standard software for e-business applications. In addition to its software products, Intershop offers the services of its own consulting and support teams. Concentration on the Internet business was directed towards conquest of the American market. In 1996 Intershop set up an office in Silicon Valley. In terms of staff and turnover, Intershop is one of the few big primary sector software companies in Germany. It is a high-growth enterprise, based on sales of software licenses on standard software. Marketing and sales are extremely important functions for Intershop. Of the company's 1,218 employees in 2000, 385 worked in marketing and sales. In its attempt to achieve greater growth through internationalisation, the company has entered strategic alliances with, for example, Hewlett-Packard and ABB.

A legal department specially employed for the stock-market flotation was to examine whether the Neuer Markt or NASDAQ was preferable. There were two reasons for choosing the Neuer Markt: first, Intershop was now quite well known in Germany and Europe, and, second, the bureaucratic and legal hurdles were lower. With the proceeds from the IPO, Intershop was able to start building its worldwide marketing organisation. In 2000 Intershop was floated on NASDAQ. With its strong equity position, Intershop was able to undertake a number of investments and acquisitions in the following years, but it is far from being entrenched in the US market; in 2001 its stock price fell drastically and it closed its Silicon Valley facilities.

Intershop has no works council. Instead, the company has established various forms of meetings with employees. There is an offsite meeting, a three-day workshop held outside the company. There is an executive meeting of eight top managers that is regarded as an alternative to executive board meetings. An all-company meeting is held every Monday in Hamburg, intended to bring the whole staff together, of which some 80 percent attend. There are also team leader meetings, the human resources department meetings, and the so-called weekly one-to-ones (individual meetings with the team leader). In addition to meetings, the company uses complaint boxes and round table discussions to replicate the functions of the works council.

There have been stock option plans at Intershop for some time now. In May 2000 distribution of options was top management (10 people), 12 percent; middle management (40 people), 15 percent; and remaining employees (about 1150 people), 73 percent. According to the HR director, stock options were an important recruitment incentive. Although employees insisted on the importance of a fixed salary, analysts liked to see the company distribute stock options among employees.

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<sup>8</sup> The following summary is taken from Jürgens and Rupp (2001b).

*PSI*<sup>9</sup>

PSI *Aktiengesellschaft für Produkte und Systeme der Informationstechnologie*, Berlin, has operated in two areas, the project or customized software business, and the product or packaged software business. The *project* segment produces software solutions for the production and distribution of energy and goods. Customized information technology systems are developed and implemented for the distribution of electricity, gas, and oil. This segment covers four fields: process control systems for energy supply systems, production management for manufacturing companies, information logistics for service companies, and consulting for processes of change. The customers of the systems segment are major energy supply companies and various manufacturing and service firms. The *product* segment develops and markets the packaged ERP (Enterprise Resource Planning) product Psipenta for small and medium-sized companies primarily in mechanical and plant engineering, electrical engineering, and electronics.

On September 1, 1998, PSI listed on the Neuer Markt, increasing its equity for 1998 to DM108.6 million from DM23.8 million the previous year. Yet PSI was by no means a new entrant to the German software industry. It was founded in 1969 under the name *PSI Gesellschaft für Prozeßsteuerungs- und Informationssysteme* as a limited liability company. The founders were six former AEG employees, each of whom held one-sixth of the shares and received the same pay. A liquidity crisis in 1974 necessitated the adoption of a “participation model” of governance, in which every employee who had been with the firm for at least 18 months and worked at least 75 percent of normal working time could subscribe for shares and acquire an interest in the company. By 1965 150 of 235 employees (63 percent) were shareholders. Managers were appointed by the shareholders’ meeting and controlled by the administrative board (*Verwaltungsrat*), half of which was appointed by all employees, regardless of whether they held shares, and half by shareholders. The advisory board (*Beirat*) submitted recommendations to the administrative board and could move resolutions. The advisory board had a role similar to that of the works council—which did not exist at PSI—but had more extensive rights than the works council under the Industrial Constitution Act. One-half of annual profits were distributed among all employees equally and one-half among shareholders in proportion to their holdings.

In 1983 PSI was split into the two divisions (*Geschäftsbereich*), Industry and Energy, each of which were in turn divided into departments (*Fachbereich*). The individual departments were organised as profit centres which were largely autonomous in development, in production, and in marketing the technology specific to the department. A planning procedure set annual targets (costs, turnover, and contribution margins) as a means of controlling departments. The departments were responsible for recruitment and dismissals, but subject to a joint annual plan for personnel expansion. Every two years, heads of department (*Fachbereichsleiter*) had to be confirmed in their positions by a simple majority vote of departmental staff.

By 1993 an increase in the number of shareholders to 368 resulted in the conversion of PSI into a unlisted stock corporation (*Aktiengesellschaft-AG*). Now the management board (*Vorstand*) was to be appointed, not by the administrative board

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<sup>9</sup> The following summary is taken from Jürgens and Rupp (2001c).

and the shareholders meeting but by the supervisory board (*Aufsichtsrat*), which could now include outside shareholders. PSI sought to maintain control in the hands of employee-shareholders by means of restricted registered shares that require supervisory board approval before share transfers can be made.

By the time PSI listed on the Neuer Markt in 1998, it had grown to about 800 employees. When the company went public, its promoters emphasized its capabilities in packaged software despite the fact that the company's current strength was in customized software; in 1995, the turnover ratio between the two types of businesses was 4:1. With its total turnover increasing from €95.2m in 1998 (DM186m) to €146.7m in 2000 (DM291m), this ratio was 2.0:1 in 1998, 2.5:1 in 1999, and 3.1:1 in 2000, with profits in the customized segment, but larger losses in the packaged segment in all three years. Meanwhile PSI's labor force increased from 833 employees at the end of fiscal 1998 to 1362 employees at the end of fiscal 2000, and sales per employee rose from €92,000 to €108,000 (DM175,150 to DM181,424).

What was the impact of the Neuer Markt flotation on PSI? It was able to increase its level of investment substantially, from an average of €7.9m in 1996-1998 to €21.7m in 1999-2000. It was able to engage in a number of acquisitions. The proportion of shares owned by employees had fallen to about 30 percent in 2000, while the company, GoldZack, that managed the flotation had a 8.5 percent stake (down from 15 percent at the time of the flotation). The company's stock price surged by about 300 percent from the IPO to early 1999 but subsequently declined sharply, falling below its IPO price in mid-1999. In early 2002 the stock price has been at about two-thirds of its IPO price. In April 2001 PSI ranked third in market capitalization among software firms on the Neuer Markt. Given its level of sales, its market capitalization was relatively high compared with other software companies on the Neuer Markt; for example, with a turnover of Euro 255 million in 2000, Brain International had a market capitalization of Euro 21 million, whereas, with a turnover of Euro 147 million in that year, PSI had a market capitalization of Euro 167 million Euros. The company has become more stock-market oriented through the development of an Investor Relations department and a stock-option program that extends to about 10% of employees including management board members, executive personnel, managers, and "innovative" employees. Old PSI employees seem to object to financial centralization and prefer the traditional pay models. Its tradition in customized software means that PSI remains focused on technical perfection for particular clients – the type of "over-engineering" for which German SMEs are well known -- rather than on mass marketing. But, particularly since its flotation, PSI has grown beyond the SME stage, and through its Psipenta division it is focusing its R&D efforts on packaged software. Within the company as a whole there remains a "discussion of values" between "old" and "new" employees, with the "old" employees arguing that within the new environment "entrepreneurs are becoming managers" and the "new" employees arguing for an increase in pay differentials, using those prevailing in other listed companies as the benchmark. The key business issue for the future is whether PSI's new financial orientation can generate profitable growth, without undermining the technical capabilities that the company has accumulated over the past three decades and on which the revenues and stability of the company still depend.

*French and British Video Game Software Companies*<sup>10</sup>

Microsoft's decision to enter the video games industry with its launch of the X-Box game console in November 2001 reflected the enormous market opportunity that the industry offered. Total revenues in the worldwide video games industry had increased from \$5.7 billion in 1995 to \$ 19.4 billion in 1999, and although the industry experienced a modest downturn in 2000, it was estimated the size of the market would jump to \$30.5 billion by 2002. The producers of proprietary game consoles – currently Nintendo, Sony, and Microsoft -- dominate the video games industry. But they make their profits on sales of software – that is, video games that are sold to be played on its hardware. Control over a proprietary console has given its producer the possibility of publishing games that can only be played on its system and of collecting fees from other video game software companies who are licensed to develop and publish games for its system. To capitalize on this possibility, however, a console producer must develop and publish a sufficient quantity of “high-quality” games that convince video gamers to spend money on its specialized hardware as well as software. These games can be generated by the console producer's in-house development teams or by external developers who may, however, hold licenses to produce the same game for more than one console producer.

Since the launch of the 8-bit NES/Famicom platform in Japan in 1983 and the United States in 1985, a new generation of ever more powerful console platforms has been introduced about every five years. Video games can also be played on PCs, but until recently, one could not buy a specialized PC that could match the growing technological sophistication of proprietary consoles in terms of graphics, color, animation, and sound effects. Intel now markets a chip that gives a PC the game-playing capability of the most sophisticated console – but at five times the cost. First it was technology that secured the dominance of the proprietary console; now it is economics.

By far the biggest markets for consoles have been in Japan, where the installed base of PCs is relatively low, and the United States, where the installed base of PCs exceeds that of Japan and all of Europe combined. While PC software has remained an important source of revenue in the video game industry, console software revenues exceeded PC software revenues in all of the major markets except Germany. While the United States remains the biggest market for all types of video game hardware and software, US-based companies have since the mid-1980s lost control of the market for console platforms to the Japanese. In the early years of the microcomputer revolution, US-based companies such as Atari, Mattel, and Coleco had developed home computers for video games, but abandoned the market in 1984 when a dearth of high-quality games caused the industry to crash. Since Nintendo's US launch of its NES/Famicom console platform in 1985 revived the industry in the United States, in no small part because of Nintendo's in-house development of highly popular games (most notably the Super Mario Brothers series), Japanese console producers have dominated, with Sony replacing Sega (which withdrew from consoles in 2001) as the alternative to the Nintendo platform. Microsoft's X-Box represents an attempt to shift control over one of the industry's hardware platforms back to the United States. At

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<sup>10</sup> The following summary is taken from Larrue, Lazonick, and O'Sullivan (2002).

this stage in the evolution of the video game industry only such a powerful company could contemplate entry as a console competitor.

While there is only room for two or, at most, three console platforms in the global video game industry, large numbers of other companies participate in the industry as developers and/or publishers. Developers design and program games that can be played on a personal computer and/or a console. Publishers, to quote one definition, “are responsible for the overall management of a game's development, its packaging, manufacture, distribution, marketing and, more often than not, funding.”<sup>11</sup> Until the early 1990s, some “independent” video game publishers – that is, publishers who were not also console producers – confined themselves to marketing an “on-the-shelf” selection of games provided by “third-party” developers who themselves maintained and financed their own independent studios. However, the most aggressive and well-financed independent publishers held licenses to produce games for the console producers. Nintendo, by far the most dominant company in the industry until the entry of Sony in 1995, restricted each licensee to five games per year to encourage the development of high-quality games, and pushed the financial risk onto publishers by compelling them to order and pay for game cartridges in advance.

During the 1990s the commercial success of a game became ever more dependent on both technological sophistication and marketing of a concept, which in turn often required the purchase of a license to base a game on a celebrity, sports team, book, firm, or well-known cartoon character. Intensified competition led publishers to become more proactive in the development of games by selecting game prototypes (“demos”) proposed by developers and financing a large proportion of the development process. Publishers pay developers non-refundable advances on future anticipated royalties on a “milestone” basis at progressive stages of a game’s development. It typically takes two years between the negotiation of a development contract and the marketing of a completed game, with the publisher bearing all of the financial risk but, in return, reaping most of the financial rewards of a successful game.

Over the course of the 1990s, as the hardware on which games could be played became more advanced and as “gamers” demanded more sophisticated graphics, color, animation, and sound, the cost of developing a game increased. Coming into the 1990s, a team of two or three people could still develop a marketable game in, on average, ten to twelve months at a cost of half of million dollars. Some development studios were able to finance their first game from personal savings and small loans, and, if successful, use the revenues to finance subsequent games. Currently, however, for a game to generate sufficient profits to finance the subsequent growth of a developer requires that it become one of the top 30 sellers, a rather risky proposition given the number of highly capable development studios (including the in-house operations of the console producers and publishers) in the industry. The development of a game requires a much more specialised division of labor than was the case in the past. As Ian Livingstone of Eidos Interactive has put it:

It takes typically a team of 15 people about 18 months to develop a game. It's no longer the domain of two blokes in the garage, as we

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<sup>11</sup> [http://www.gamesinvestor.co.uk/Business\\_models/business\\_models.htm](http://www.gamesinvestor.co.uk/Business_models/business_models.htm)

say back in England. It's a team of specialists and they all have their duty too, so it's more like making a movie where you have a producer running the team to budget and schedule. So you have 3-D programmers, 2-D programmers, 3-D graphic artists, FMV guys, artificial intelligence guys, networking guys, speech, sound, video. It's a very complicated business but the rewards are great.<sup>12</sup>

The European Leisure Software Producers' Association has estimated that it currently costs a total of over £2m, about €3.2m, to complete a premium console game project, some ten times the cost a decade ago.<sup>13</sup> The industry giants have published games that have taken three years to develop at a cost of \$20m or more.

While developers remain the creative force in the video game industry, publishers occupy the critical strategic positions in the value chain. In 2000 nine of the top ten publishers by sales were based in the United States or Japan. What is notable, however, is the position of a French company, Infogrames, among the top ten. Founded in 1983, Infogrames began expanding internationally in 1994, at which time it had 111 employees and \$30.3m in revenues. By 1998 it had increased its payroll more than five-fold to 600 and its total revenues more than eight-fold to \$241.8m. In 2001 the company had about 1800 employees and over \$600m in revenues. In the first three-quarters of 2001, Infogrames held the number three spot in terms of market share in the United States and was third, fourth and fifth in France, Germany, and Britain respectively. In fact, Infogrames is not the only European company to have attained a position of international prominence in the video game industry. Among other French-based publishers, Vivendi Universal is strong in the United States, and Ubi Soft is strong in France and Germany, but also has a presence in the UK and US, while the British-based company, Eidos Interactive, is particularly strong in the European markets.

The emergence of a number of strong European video game publishers over the past few years represents a significant change in international competition in an industry that throughout its previous history had been dominated by companies based in the United States and Japan. That European-based companies have never developed (and very probably never will develop) console platforms undoubtedly reflects Europe's failure more generally as hardware producers in microcomputers. Indeed, in many accounts of the evolution of the video game industry, one gets the impression that European capability in supplying the video game market remains non-existent. For example, Steven L. Kent's The First Quarter: A 25-Year History of Video Games (2000) contains virtually no references to European individuals or companies -- a somewhat ironic omission in view of the fact that the preface to the US edition of the book is written by Peter Molyneux, a well-known video game developer based in Britain.

In fact, Britain possesses a rich base of development studios, which currently numbers about 250, compared with about 60 in France. In 1999 British-based developers were responsible for one in four games sold in Britain and one in eight sold in the United States. In that year, 30 percent of game sales on the French market originated with

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<sup>12</sup> Interview of Ian Livingstone by Steve Young on "Digital Jam", May 29, 1998, Transcript # 98052907FN-L11.

<sup>13</sup> "Big boys on the prowl," Financial Times, May 21, 2002, 4.



British developers, whereas French developers accounted for five percent of the top 100 games in Britain. Yet there is concern in Britain that, notwithstanding its strong developer base as well as the emergence as Eidos Interactive as an internationally competitive publisher, it is not capturing commensurate value from its video game industry for lack of sufficient investments in publisher capabilities. Within Europe over the past several years, French-based companies have made much more progress as publishers than have the British.

Our study of the video game software industries in France and Britain seeks to explain both the emergence of European companies as major competitors in the global video game industry and the relative success of French publishers compared with the British in global competition.<sup>14</sup> Our study shows that in both countries, video game software companies used the stock market extensively to raise cash, as well as in many cases to acquire other companies and to compensate employees. This research puts to rest the notion that British financial markets are too “short-termist” to support the financing of British video game companies, even in their “new venture” phase. At the same time, however, that at least in the late 1990s and early 2000s, compared with the British, it appears that French video game software companies have been much more successful in making use of the stock market in its cash, compensation, and combination functions in pursuing their competitive strategies. The key question for this research, which can only be resolved by delving more deeply into the organisational evolution of the companies concerned, is whether it was relations of French companies to financial markets or their internal organization of the game development process, or a combination of the two, that explains their success in global competition.

#### **4.4 Telecommunications**

All five CGEP partners carried out studies of the telecommunications industry, which was a key industry to study in the rise and decline of the “new economy”. The study carried out by the Italian team (Brusoni 2001) analyses the shift from the “old” to the “new” telecommunications industry by using SDC joint venture data for 1984-1997 to develop indicators of the progressive shift of innovative capabilities from the former PTTs to the equipment suppliers, and the emergence of a ‘market for technology’ as a dimension of a new ‘governance’ regime of innovation in the New telecommunications industry.<sup>15</sup> Focusing on the relationships between a relevant sample of fixed operators, mobile operators and equipment suppliers, the SDC data allow us to explore the evolution of the process of vertical specialisation. The analysis of vertical specialisation is relevant to the study of the mechanisms governing the organisation of innovative activities, because one of the key end-results of the transition from the old to the new telecommunications industry relates to the shift on an innovative regime led by the operators to one led by the equipment suppliers. This report stresses the distinction between “what firms do” and “what they know”. Markets for technologies are proposed as one of the key enabling factors that make possible entry in technologically complex industries, such as telecommunications. The evidence presented partially corroborates this argument. The relationship between mobile operators and equipment suppliers seem to be coordinated via

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<sup>14</sup> The companies currently included in the study are, in France, Infogrames, Ubi Soft, Cryo Interactive, Titus Interactive, Kalisto, and Delphine, and in Britain, Eidos, Gremlin, Rage, SCi, Empire, and Argonaut.

<sup>15</sup> The summary in this paragraph is taken from Brusoni (2001).

transactions other than joint ventures. However, no definitive characterization of the relationship between equipment suppliers and fixed operators can be made.

The other CGEP telecommunications studies focused on the evolution of specific companies in particular institutional environments. These studies included a) a study of the rise of the Nordic area to a position of leadership, especially in mobile communications (Hauknes and Smith 2002), b) the transformation of Deutsche Telekom to compete in the “new economy” environment (Caspar and Rathe 2002), c) the German company, Mobilcom (Caspar and Jürgens 2001), d) three US new entrants, Global Crossing, Level 3, and Qwest (Fransman 2001), and e) the optical networking industry, focusing on Alcatel, Nortel, Lucent, and Cisco (Carpenter, Lazonick, and O'Sullivan 2002).

### *The Nordic area*<sup>16</sup>

This paper studies the links between corporate governance and one of the major technological innovations of the modern era, mobile telephony. Focusing on three countries of the Nordic area, Sweden, Norway and Finland, the paper asks why this relatively small and indeed peripheral region has become a world leader in this complex and dynamic technology. The basic argument is that the governance systems of the major telecommunications service companies of the region supported the development of mobile technology over a long period when the success of the technology, including the emergence of mass markets for it, was highly uncertain.

The approach taken to corporate governance in this paper differs from that which is common in the literature. Rather than looking at governance as a problem of how corporate managements comply with the value maximisation objectives of shareholders, this study follows Lazonick and O'Sullivan (2000b) in seeing it in terms of its influence on resource allocation. Specifically, the study is concerned with the processes through which firms allocate resources to tangible and intangible investments in innovation. A key question is how different modes of corporate governance contribute to innovation and economic growth over the long run.

The Nordic region is a world leader in the diffusion of ICT products and services, and has a sustained record of innovation and enterprise development in telecommunications. In recent years, most of the attention in this field has been focused on firms such as Ericsson and Nokia. In 2000 Ericsson supplanted Lucent as the leading producer of telecom equipment, mainly because of its position in mobile networks. Ericsson now has a 40 percent global market share in GSM infrastructure systems, a strong position in other major mobile standards (such as TDMA), and was by the end of May 2001 involved in 31 of 50 3G infrastructure agreements announced, in many cases as sole supplier. Nokia has continued to increase its lead on global terminal (that is, handset) markets. In 2000 Nokia's market share was more than 30 percent, over double the share of Motorola in second place. Its market share had increased to more than 35 percent by the end of the first quarter of 2001, approaching the goal set by Nokia of a 40 percent global market share.

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<sup>16</sup> This summary is taken from Hauknes and Smith (2002).

In seeking to understand the evolution of technology, and the growth of the firms themselves, we emphasize the need to look behind the firms, at the long run commitment of resources into telecommunications in the Nordic area. The development trajectory in this field has now lasted more than a century, and has shaped the overall capabilities of the region, as well as the dynamics of such firms as Ericsson and Nokia. The long-term role of telecommunications service providers – firms such as Telia (Sweden), Telenor (Norway) and Sonera (Finland) – is central to the development of the technologies and standards that culminated in satellite communications, in the NMT technology, and then in GSM. These telecoms enterprises played central formative roles in all of the major innovation decisions, and in the evolution of the technology as a whole. Telia, Telenor and Sonera were formerly state-owned monopolists, whose governance was shaped by complex social, regional and industrial objectives. These governance systems supported those actors with long-term perspectives on technology development. The governance structure of these enterprises permitted and shaped the long-term technological, engineering and skill commitments, in the face of sustained uncertainty, that made the radical innovation of mobile telephony possible. These enterprises made bold, long-term investments in a range of radical technologies in communications that laid the basis for the leadership positions that Ericsson and Nokia now have. Indeed the state-owned service providers decided which firms would win and lose, for some key equipment suppliers disappeared along the way. Now, of course, Telia, Telenor and Sonera are deregulated and largely privatised, and so major governance shifts have occurred simultaneously with the evolution of the core technologies. The paper concludes by discussing whether and how these governance shifts affect the ability of these enterprises to sustain technological advance in the years ahead.

### *Deutsche Telekom*<sup>17</sup>

This paper describes changes in the German telecommunications market and its impact on the former incumbent, Deutsche Telekom AG (Bonn), after the political decision to liberalise the German market for fixed and wireless voice and data transmission. In Germany, the market for telecommunications was liberalised in 1998. Subsequent market growth was characterised by a considerable number of new entrants, growing traffic, and significant price reductions. A key driver of growth has been mobile communications.

Two types of new telecommunications firms entered the market: new network operators and service providers (resellers). In 2000 more than 1800 license holders were registered with the German regulatory authority, the majority being Internet service providers offering Internet access services.

The German regulatory authority, Regulierungsbehörde für Telekommunikation und Post (RegTP), is expected to ensure the transition from a monopoly to working competition in the market for telecommunications. Both the regulatory framework and RegTP's decisions have fostered competition in the German telecoms market. New entrants have faced low formal entry barriers, interconnection rates have been low, and mobile communication has not been subject to regulation (except frequency licensing). As a consequence, in international comparison, the German market for telecommunications belongs to the most liberalised in the world in terms of numbers

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<sup>17</sup> This summary is taken from Caspar and Rathe (2002).

of competitors, incumbent's market share and price reductions: incumbent's market share decreased significantly, the number of competitors increased, and prices went down up to 90 percent in most submarkets (the local loop being the most notable exception).

Before liberalisation, a state-owned authority, Deutsche Bundespost, held the monopoly in fixed and wireless voice and data communication. As part of market deregulation, this authority was regrouped into Deutsche Telekom (DT) and then transformed into a joint stock company. DT shares were sold to the public by the German government in 1996 (IPO), 1999, and 2000. By end of 2000 57 percent of DT shares were held by the public, of which 62 percent were held by institutional investors, and 38 percent by private households.

Since 1998, liberalisation exposed Deutsche Telekom (DT) to fierce competition in its core businesses, particularly fixed line voice communication. This competition resulted in significant reductions of both revenues and earnings in network communications. In 1999 DT had already lost more than 30 percent market share in non-local calls.

The market for mobile communications was not significantly affected by liberalisation. In mobile communications DT's market share remained stable at around 40 percent, the main competitor being Mannesmann (now Vodafone). In Internet access services, DT's subsidiary, T-Online AG, is the leading German ISP with a market share of just under 70 percent in 2000.

The de-monopolising of the industry created entrants on all layers, threatened the incumbent's core capabilities (network operation, customer ownership), accelerated the innovation process and shifted the loci of value creation within the industry's value chain. DT's management reacted to these competitive challenges. Its overall vision has been to establish DT as a *global telecommunications player* in the liberalised market environment. To achieve this vision DT made attempts to reorganise its activities into a divisional form comprising four business fields or "pillars":

- T-Com (fixed network, telecommunications infrastructure, cable TV)
- T-Mobile (mobile communications)
- T-Online (Internet services)
- T-Systems (data and IP systems solutions)

These pillars are expected to exhibit sustained growth in order to stabilise declining revenues from fixed voice communication. The most important characteristics of this vision is the decision to remain integrated. DT's management puts an emphasis on synergies between the business fields and expected payoffs from being a one-stop solution provider. Current developments in the individual pillars rather seem to reflect the costs of this strategy, i.e., the problem of cross-coordinating increasingly dissimilar businesses and the problems of decentralising decision rights (or a lack thereof).

DT has made considerable progress in the transition from a bureaucratic authority into a competitive telecommunications company in an environment of rapid technological change and new competitive challenges by both incumbents and entrants. DT's management opted to remain integrated and adopted a divisional organisation,

accompanied by new pay schemes (performance oriented remuneration system and stock option programs). But the costs of the radical changes have become clearly visible during the transformation process. Employee approval of the new organisational structure is low. Furthermore, the targeted move from access to content and from individual services to integrated solutions provision along new value chains has proven to be difficult.

### *MobilCom*<sup>18</sup>

MobilCom was founded in 1991 by Gerhard Schmid, who had previously been employed in the marketing divisions of large companies. With the acquisition of a UMTS licence, MobilCom is being transformed into a 3<sup>rd</sup> generation mobile communications network operator. This study traces the development of MobilCom from dealer in telecommunications services to network operator, looking in more detail at innovation aspects against the background of the company's dependence on financial markets.

MobilCom was the first firm quoted on the Neuer Markt. In anticipation of the IPO, MobilCom Holding GmbH was converted into a public limited company on August 29, 1996. MobilCom was ideal for this market segment, being a young firm in a young and very dynamic market. The company needed money to continue its rapid expansion as a dealer in telecommunications services. But in contrast to many other firms in this segment, MobilCom was in financial surplus when it went public. Many high-tech companies in the segment still needed capital to achieve market maturity and to develop sales. The sales company MobilCom had a finished product and wanted to use the capital only to expand its distribution channels.

The (long-distance) fixed network was opened to competition in Germany on January 1, 1998. MobilCom was among the first firms to be awarded a licence by the Regulatory Authority for Telecommunications and Posts (RegTP) as a trunk network operator (class 4). The company thus entered the call-by-call selection business. The performance of the fixed network segment still depends very strongly on the regulatory framework, or more precisely, on the Regulatory Authority for Telecommunications and Posts (RegTP). The frequently changing regulatory framework has not given telecommunications companies sufficient planning horizons to invest more heavily in the fixed network, for example, at the local network level.

On July 23, 1998 MobilCom bought topnet EDV und Datenkommunikation AG, an Internet service provider founded in 1996 by a group of 80 related firms. At the time of acquisition, the company had a high-speed network (backbone). topnet's top-ranking product is FreeNet, an Internet access program. In early 1999 MobilCom acquired AIS Axon Internet Service GmbH. The company operates and markets what was then the biggest German-language Internet search engine, DINO-Online. MobilCom subsequently consolidated its Internet business, launching it on the stock-exchange on December 3, 1999 in the form of freenet.de AG. MobilCom holds a 78 percent stake in the firm.

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<sup>18</sup> The following summary is taken from Caspar and Jürgens (2001).

MobilCom is now among the 50 biggest companies in the Neuer Markt index, the Nemax 50. Within the index, however, MobilCom's status has declined. In July 1999 it still ranked second with a market capitalisation of €3,812m. On November 9, 2001, its market capitalisation was €997m, relegating the company to rank nine in the Nemax 50. The biggest company in the Nemax 50 is Deutsche Telekom with a market capitalisation of €3,676m.

Of the DM 17,136 million that MobilCom invested in 2000, DM 16,854 million were spent on intangible fixed assets, i.e., the UMTS license. This investment exceeded all previous investments at MobilCom. France Telecom bought into MobilCom to finance the investment, drastically increasing equity capital. Despite this measure, debt grew more strongly than equity. Debt in this case was long-term loan capital. To finance the UMTS license, two variable interest loans were raised, a senior interim facility of DM 8,029 million and a capital market bridge of DM 1,979. In spite of the rapid expansion to which MobilCom has been accustomed, the purchase of the UMTS license eclipses all previous growth by its sheer dimensions. In the coming years the company will be facing enormous financial challenges.

After it became known in late 2000 that MobilCom was going to bid in the UMTS license auction in Germany, the firm's stock price shot up. From this point on, the company developed in line with the other telecommunications companies in Europe. Once the enormous sums involved in the award of UMTS licences in Britain became known, share prices gave way. From now on telecommunications firms were in a dilemma. If a company received no UMTS licence it had no future—if it did, it had to shoulder a mountain of debt. Since mid-2001 the MobilCom stock price has stabilised at a relatively low level.

As a service provider, the firm has acted as an agent in mobile telephony for the network operators D1/T-Mobile, and D2 Vodafone, and later also for E-plus. In early 1998 MobilCom gained a licence as a trunk network operator, and entered the fixed network and Internet businesses. Through acquisitions and expansion, the company has developed into the second biggest mobile telecommunications service provider in Germany and, after Mannesmann Arcor, the second biggest competitor of Deutsche Telekom in the fixed network sector. Employment at MobilCom grew steadily from 35 people in 1992 to 318 in 1997, but climbed to 918 in 1998, 2880 in 1999, and 4590 in 2000. In 2000 MobilCom bought a UMTS licence, and will be one of six UMTS network operators.

The rapid expansion of the company and the capital requirements this engendered could not be handled by the company founder alone. Two equity investment companies were thus called in. With the conversion of the private limited company (GmbH) into a public limited company (AG) and the stock exchange flotation in 1997, the two equity investment companies withdrew. Despite several capital increases by issuing new shares, Gerhard Schmid retained a controlling interest in the firm. Because of the enormous costs associated with the UMTS licences, Schmid sought out France Telecom as a partner with financial strength and experience in the development of networks even before the 3G auction. France Telecom currently has a 28.5% stake in MobilCom, with the option of acquiring a majority interest. In 2000, the MobilCom board of management was expanded from two people, including chief executive Gerhard Schmid to four people, including Schmid and one person from

France Telecom who is in charge of coordinating the development of the UMTS network and is responsible for safeguarding the interests of France Telecom in corporate decision-making.

In the face of a declining stock price after the telecoms bubble burst, Schmid has repeatedly stressed that MobilCom has no stock buy-back programme. At the same time, he has attempted to stabilise the stock price by means of private buying, and has thus increased his holding in the company again.

Employees receive stock options at a par value of DM 5, which they can exchange for MobilCom shares within four years, less the price of the share at the time of acquiring the option. Until the options are exercised, interest is paid on them on market terms, or even prefunded by MobilCom as a loan at the same interest rate. In 1999, 276 employees participated in the profit performance of the company under the stock option plan. All employees nominated by their superiors for notable commitment are entitled to options. The employee stock ownership plan operates with convertible loan stocks.

The growth of MobilCom has been influenced not inconsiderably by mergers and acquisitions. Most firms acquired offer distribution channels for telecommunication services. The development of these companies is comparable to that of MobilCom. They began as service providers, then extended their operations to the fixed network and Internet businesses.

Despite expansion, MobilCom has restricted its business activities to Germany. Explicit concentration on the domestic market is the clearly formulated business strategy of the company founder, who wants to present the image of a German company in the German market. MobilCom is the exception in Europe in espousing such a "local" orientation. It is still uncertain whether this strategy can be sustained. The other major shareholder (France Telecom) is likely to see the future of the firm in a mobile telecommunications group under its subsidiary Orange. If France Telecom becomes the controlling shareholder of MobilCom, this change is likely to take place quickly. MobilCom would then cease to be the exception in having a domestic orientation, having become part of a Europe-oriented (and even global) mobile telecommunications group.

#### *US New Entrant Operators: Global Crossing, Level 3, and Qwest<sup>19</sup>*

Much of the boom in the telecommunications industry in the late 1990s was driven by new entrant network operators who raised massive amounts of capital and made massive amounts of investment in fiber optic capacity. Whereas the incumbent telecommunications operators often sought to upgrade their legacy systems to gain the advantages of optical and data communications technologies, new entrants made "greenfield" investments in "next-generation" systems. As part of the CGEP project, JETS developed a number of profiles of such new entrants (see the contributions by Ian Duff on the CGEP website, [www.insead.edu/cgep](http://www.insead.edu/cgep)). This paper examines how three of these new entrants, Global Crossing, Qwest, and Level 3, all of which originated in the United States, financed these investments, and asks what the

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<sup>19</sup> The following summary is taken from Fransman (2001).

implications of their experiences are for the “shareholder” theory of corporate governance.

That during a few years in the late 1990s these three companies made massive investments in new fiber optic capacity, either by installing it themselves or by acquiring other companies that had done so, there is no doubt. Global Crossing increased the size of its network from 8,326 route miles in 1997 to 85,850 route miles in 2000, with a projected 101,000 route miles when the network would be completed. Of this completed network, 74 percent would be built and 26 percent would be bought. Level 3 increased the size of its network from 410 route miles in 1998 to 19,410 route miles by the second quarter of 2001. Qwest expanded its network from 9200 route miles in 1997 to 106,000 route miles in 2000, with its acquisition of the Baby Bell, US West, for \$43.5 billion in stock during 2000, accounting for much of the one-year increases in Qwest's network by 68,700 route miles and the company's employees from 10,000 to 67,000.

To finance these expansions, the three companies relied on combinations of equity issues (both private placements and public stock offerings) and debt, and in addition each company to varying degrees used its own stock as an acquisition currency. From 1996 to at least March 2000 financial investors held the belief that relatively attractive earnings would be made by the best of the new entrant telecoms operators. This belief was influenced by two assumptions (that have not been considered in detail in this study). The first was the assumption that a significant increase in demand for telecoms capacity would emerge from the rapid diffusion of Internet-based services. The second assumption was that new entrant telecoms operators, at least the best amongst them - such as Global Crossing, Level 3, and Qwest – were better placed than the incumbents to meet this demand. The result was that a significant proportion of the total amount of funding provided by financial markets went into the telecoms sector, including telecoms equipment suppliers.

Data is provided in this paper showing that funding in the forms of equity, debt, loans and credit facilities were important, although different instruments were used for different purposes. For example, Level 3 stated that it tended to use equity to fund the more risky parts of its activity – in order to share the risk with shareholders. Over the last four years or so for the three companies studied the debt:equity ratio changed, although in different directions. Accordingly, it would be incorrect to conclude that shareholders were in general more important than the providers of the other forms of funding for the entry and growth of these companies. Furthermore, there is no evidence to indicate that shareholders have been any more important than the other providers of funds in influencing the decisions made by these companies. Indeed, as the likelihood of global recession began to emerge in the latter part of 2000, and the indebtedness of all telecoms operators tended to increase while their revenue growth (for various reasons) slowed, so the influence of the debt-holders seems to have increased.

It is shown in this paper that the size of the network of the three new entrants studied increased rapidly. Network growth was the result of two very different processes: ‘build’ and ‘buy’. ‘Build’ refers to the company itself investing, in these cases mostly through external finance, in the growth of its network. ‘Buy’ refers to the acquisition of network assets through the acquisition of other telecoms network operators,



typically financed in the form of equity or cash.<sup>20</sup> While the paper contains data that show that Global Crossing built 74 percent of its network and bought 26 percent, data on this split are unavailable for the other Level 3 and Qwest.

From March 2000, however, the new entrants telecoms operators were thrown into a state of financial turmoil by the downturn in financial markets. The assumption that they were a privileged part of the economy deserving to receive a disproportionate part of the available financing was turned on its head as the telecoms boom turned into the telecoms bust. New entrant companies that were generally regarded as being well-run suddenly faced severe difficulties. At best their growth slowed considerably, but they continued to survive. At worst they became part of the 'consolidation process' as in the case of Global Crossing in early 2002 they went bankrupt or many of their assets were acquired by their competitors. Financial markets ceased to be nurturing and instead became punishing.

What were the distributive impacts of the boom and bust in the telecoms sector? Clearly shareholders who bought stock in the boom and hung on to their securities after mid-2001 lost substantial sums of money. Similarly, large numbers of jobs have vanished at new entrants in the telecoms decline, although one could argue that such was the case only because new entrants created so many new jobs in the boom. There would seem to be a role for public policy in controlling financial markets to mitigate such instability. But what about the fact that well-positioned managers and board members in the new entrant telecoms companies were able to cash in their shares for huge amounts of money, even when scant profits were being made in the boom and their company was headed for significant financial difficulty in the decline? Reference is made in the paper to the "value-extracting" activities of Joseph Nacchio, CEO of Qwest, a manager who was awarded very large amounts of stock-based compensation. In mid-February 2001 Nacchio announced the regular *daily* sale of his Qwest stock over a period of 28 months. Prior to this announcement, Nacchio was one of seven Qwest board members who had in January 2001 sold shares totaling \$70m. At Qwest's stock price that prevailed on February 16, 2001, the daily sales would have yielded Nacchio \$456,550 per day or in excess of \$338m over the 28 month period. At the time of the announcement, the stock price was \$37.10. The last date at which that price was exceeded was May 30, 2001, and since that time Qwest's stock price has declined to its current (February 5, 2002) price of \$9.24. Assuming that Nacchio has made these sales at an average price of about \$23 over the past year, he would have realized over \$100m from his daily sales. Yet during 2001, Qwest lost \$3.95b, of which \$3.29b was investment write-downs. Should the ability of insiders at new entrants to realize such huge personal fortunes in advance of the sustained success of the companies they control and manage be subject to regulation?

*The Optical Networking Industry: Alcatel, Nortel, Lucent, and Cisco*<sup>21</sup>

The purpose of this paper is to analyze the impact of the stock market on the innovative capabilities of high-technology companies that have been central to the "new economy". The empirical focus is on equipment suppliers in optical networking -- an industry that integrates the bandwidth potential of fiber optics with the data

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<sup>20</sup> See the appendix of Fransman 2001 for further details for the three companies.

<sup>21</sup> This summary is drawn from Carpenter, Lazonick, and O'Sullivan 2002.

communications potential of the Internet. Through analysis of the changing role of the stock market in the accumulation of innovative capabilities at major optical networking companies – Alcatel, Cisco Systems, Nortel Networks, and Lucent Technologies -- this study provides a foundation for assessing the impact of the stock market on strategic decision-making and organizational learning at the companies concerned, particularly in the context of the volatility that has characterized financial and product markets over the past few years. The prime contribution of this paper is its focus on the different roles that the stock market can play in the industrial corporation as a) a determinant of the locus of *control* in the corporation, b) a *combination* currency to extend control across more than one company, c) a *compensation* currency to integrate personnel into the business organization, and d) a source of *cash* that can be used to fund investment or restructure the corporation's balance sheet.

This paper explains, at the industry level, how the stock market came to play an enhanced and changed role in the new economy compared with the old. In the speculative boom that reached its peak from the last quarter of 1998 through the first quarter of 2000, many highly touted technology startups with little or no revenues were able to do IPOs with only a small portion of their stock being issued to the public while raising unprecedented amounts of cash that could fund future growth. For established companies, corporate stock played a much more important role than previously as a currency to acquire other companies, especially high-technology startups, often in the form of a pre-IPO private purchase. A high stock price became important in the competitive bidding among these companies for high-technology acquisitions, and hence played an important role in determining which companies would exercise strategic control over new technologies that they did not develop in-house. Then, to develop and utilize the acquired technologies, the acquirer had to integrate the capabilities of the acquired company with its own capabilities. Such organizational integration generally meant an emphasis on the use of stock-based compensation for recruiting and retaining key personnel, most of them in *non-executive* positions, who might otherwise have gone to work for competitors. These established companies also had to offer stock-option packages to current personnel to keep them from “jumping ship” to startups. Corporate stock thus came to play an important role in the accumulation of innovative capabilities by both new ventures and going concerns.

This paper shows how three “old economy” companies -- Nortel Networks, Lucent Technologies, and Alcatel – competed with a “new economy” company, Cisco Systems to use their corporate stock as an acquisition and compensation currency for the accumulation of innovative capabilities. From the early 1990s, Cisco Systems had pioneered a stock-based “growth-through-acquisition-and-integration” business model, first in providing packet-switching equipment for local area networks and then from 1996 to enter the optical networking industry. This paper then connects the analysis of the changing roles of the stock market in the accumulation of innovative capabilities to the “social conditions of innovative enterprise” framework, developed by Lazonick and O'Sullivan (2000b). This framework emphasizes the importance of the roles of three social conditions in the innovation process: a) *strategic control* that determines how strategic decision makers choose to allocate resources to uncertain investments in innovative capabilities, b) *organizational integration* that determines the structure of incentives that motivates employees to apply their skills and efforts to

collective learning processes, and c) *financial commitment* that determines whether the enterprise will have the resources available to it to sustain the cumulative learning processes until they can generate financial returns. Specifically, we explore the impact of the use of stock a) as an acquisition currency on strategic control and b) as a compensation currency on organizational integration, as well as c) the effects of using stock as an acquisition and compensation currency on corporate cash flow and restructuring, and hence on the sources of financial commitment.

The analysis presented in this paper raises, but by no means provides definitive answers to, a number of questions concerning the impact of the stock market on the innovation process in the optical networking industry. How did such use of stock, entailing as it did pressure on corporate executives to maintain high stock prices, affect the strategic decisions of these executives to invest in innovative capabilities? Did the existence of startups and high stock valuations bias top managers toward acquiring innovative capabilities externally when their companies may have accumulated these capabilities more effectively through internal development of the technologies in question? Did the use of stock options as a key component of compensation packages for large numbers of managerial and technical personnel motivate these employees to engage in organizational learning for the companies that employed them? Or did such compensation encourage highly individualistic behaviour on the part of these employees, with their own remuneration being driven much more by their prospects for individual mobility from one company to another via the labor market than by the need for the company to create an internal remuneration structure that could encourage organizational learning? To what extent has the use of stock as an acquisition and compensation currency put pressure on these companies to outsource and divest their manufacturing capabilities (another attribute of the “virtual” Cisco model)? Given that, with the dramatic slowdown of growth in the telecommunications industry in 2001, every optical networking company has had to engage in substantial organizational restructuring, how did the use of corporate stock as an acquisition and compensation currency in the boom make these companies more vulnerable than they otherwise would have been to the current slump?

## **5. The Functions of the Stock Market and the Innovation Process**

### **5.1 Control**

It is because of the inherent uncertainty of the innovation process that it matters *who* controls corporate resource allocation decisions. By definition, an innovation process confronts three types of uncertainty: technological, market, and competitive. Technological uncertainty is inherent in the transformative character of the development, or learning, process that is the essence of innovation; if the enterprise already knew how to produce a product that was sufficiently high quality and/or low cost to compete for revenues on the market than a process of innovation would not be required. Market uncertainty exists because there is no assurance that even when the innovative transformation has occurred that overcomes technological uncertainty the enterprise will find buyers who want the product at a price that returns the costs of the innovative investment strategy. Moreover, in a world of competition based on the transformation of productive capabilities and sales on market, *competitive uncertainty*

exists because, even if an enterprise does produce a higher quality, lower cost product than had previously been available on the market, a competitor who is aiming for the same result may out-produce the enterprise in terms of quality and/or cost. The implication of this inherent uncertainty is that, if the success or failure of the innovation process is not to be reduced to a matter of luck (which no doubt plays some part in the innovation process), strategic control over the allocation of the enterprise's resources must be in the hands of people who have insights into a) the extent of the potential market demand for a product, and what the market considers to be "high quality" and "low cost"; b) the technological challenges that the innovation process must confront; c) the organizational and technological capabilities that their enterprise possesses to carry out this process, and hence how those capabilities must be enhanced for innovation to occur, and d) the innovative capabilities of competitors. Within a business organization, no one person possesses a sufficient understanding of all, or even any, of the technological, market, competitive, and organizational conditions that can influence the success or failure of an innovative investment strategy. Moreover, since innovation is a process that unfolds over time, a successful innovative strategy must be based on a process of organizational learning about the conditions that influence the innovation process, including the ways in which these conditions are themselves changing. Furthermore, there is always the possibility that those who exercise strategic control may use it for their own opportunistic ends in ways that undermine the innovation process. Innovative strategy is a complex social process in which the abilities and incentives of those who make allocative decisions must be aligned with the capabilities and goals of the organization that must implement the innovation process.

Owner-entrepreneurs who are successful in building up a new high-technology venture generally have a deep understanding of the market, technological, and competitive conditions that their innovative efforts face, as well as the capabilities that their enterprise possesses to innovate in the context of these conditions. Particularly in the case of new ventures, the innovation process may be promoted when ownership of the enterprise and control over the allocation of enterprise resources is integrated in the persons of one or several owner-entrepreneurs. The history of industrial capitalism over the last century, however, has exhibited a tendency toward the separation of ownership and control. Such separation can occur for many reasons and under many different conditions. But in successful enterprises, this separation tends to occur when, on the one side, the owner-entrepreneurs want to retire from the managerial function and, on the other side, the growing organizational and technological complexity of the innovative enterprise means that the available owner-entrepreneurs cannot supply the managerial capabilities that the innovation process requires.

Under such circumstances, a classical function of the stock market is, through an initial public offering (IPO), to separate share ownership from managerial control. In performing this function *per se*, the stock market may not be used to raise funds for the enterprise but rather to enable the owner-entrepreneurs to transfer their ownership stakes to the shareholding public. At the same time, control over the enterprise may be left in the hands of managers who, with the owner-entrepreneurs, have been engaged in building up the enterprise from a new venture to a going concern, thus meeting the requirement of the innovation process that those who control the allocation of enterprise's resources have an understanding of both the enterprise's

existing productive capabilities and new capabilities that must be accumulated. Indeed, these inside managers may well be the previous owner-entrepreneurs who after the IPO possess a minority shareholding in the company that now employs them.

Nevertheless, there is no guarantee that, with a public flotation, control will be left in the hands of such inside managers. With shares in the corporation being publicly traded, outsiders may now be able to accumulate sufficient ownership rights to take control over the enterprise's allocation decisions. Such a takeover will be less likely the more fragmented is shareholding, the more the corporation does not need to rely on shareholders to supply capital to fund its growth, the more there are legal restrictions on shareholders' ownership rights, and the more shareholders, by virtue of such critical legal devices as limited liability, are in fact content to leave control over corporate allocation decisions in the hands of inside managers.

When allocative control is in the hands of inside managers, there is no guarantee that they will use that control to make allocation decisions that result in innovation. Given the requirements of the innovation process, however, the problem is not solved by assuming that outside shareholders, by virtue of their ownership status, must exercise control over managers. Even if they are interested in doing so, it was the inability of owners to allocate enterprise resources to innovation processes that had become more organisationally and industrially complex that precipitated the separation of ownership from control in the first place! Public shareholders are outsiders to the enterprise who, we can assume, would not have invested in corporate shares but for the possibility that a liquid stock market creates for selling their shares, and with them their "ownership" status, at any point in time. Public shareholders generally have little if any understanding of either the enterprise's capabilities or the market, technological and competitive conditions under which innovation must occur. Indeed as public shareholders who can buy and sell shares, they may feel no need or desire to acquire such knowledge.

How then are managers who control the corporate allocation of resources themselves controlled to make decisions that can result in innovation? Successful innovation depends on the augmentation of the enterprise's current capabilities through organisational learning, and hence is dependent on the cooperation of the organization in the process. Processes that integrate strategic managers – those who control the allocation of corporate resources -- into the operations of the enterprise and that make their own personal success, for example their level of pay, dependent on the success of the enterprise as a whole can serve such a function. We shall discuss more fully the role of stock-based compensation in linking the rewards of strategic managers to, or delinking their rewards from, the reward structure of the organization engaged in the innovation process. Suffice it to say here that the more important are interactions among individuals within the organisation to the success of an innovation process, the more must the reward system for strategic managers be determined by an *organisational*, as distinct from an *individual*, process.

In addition, for strategic managers to remain aware of the existing capabilities of the enterprise and the investment requirements of the innovation process, there must be open lines of communication between them and those within the enterprise upon whom they rely to develop and utilize productive resources. Our own national and industry studies confirm the findings of previous comparative studies that show that,

across nations characterised by different employment, financial, and regulatory institutions and across industries characterised by different technological, markets, and competitive conditions, there are many different ways to solve this basic organisational problem. But if, as has often, and perhaps typically, been the case, the management of the enterprise has necessitated the separation of share ownership from managerial control, and if an important function of the stock market has been to facilitate this separation, then we should not expect that a function of the stock market is, or can be, to solve the problem of ensuring that, given the separation of ownership and control, strategic managers use their allocative control in ways that promote the innovation process.

There exist, especially in Europe, many long-established and innovative industrial enterprises in which even at the beginning of twenty-first century descendants of founding families maintain controlling shares in publicly traded companies. This persistence of the integration of ownership and control has occurred historically for a number of reasons, the documentation of which has been beyond the scope of this project. Suffice it to say that, in different times and places, the stock market has permitted these companies to “go public”, for the purpose of raising cash either for the enterprise (the sale of treasury shares) or for themselves (the sale of private shares) without giving up strategic control. In fact, as for example our studies of PSA (Peugeot-Citroen) in France and Fiat in Italy show, even in family-dominated corporations, the increasing complexity of industrial and organizational conditions demands that over time or in certain critical periods significant strategic decision-making be delegated to non-family managers who are at once in close communication with the dominant owners and embedded within the organizations upon which they rely to implement their investment strategies.

Like such “old economy” European companies, our studies give examples of “new economy” companies, not only in Europe but also in the United States, that can do an IPO without separating ownership from control. Such is the case especially under speculative stock market conditions in which public stockholders will snap up the IPO issue of a relatively young company that has not yet developed an extensive managerial organization and in which only a small fraction of the companies shares are put on the market. In such flotations, the founding owner-entrepreneurs can maintain their positions strategic control. One question that is raised in some of our industry studies – the cases of such US optical networking startups as Sycamore and Corvis being the most extreme examples (see below) – is whether the innovation process is supported or undermined when those who both own and control the enterprise are able to use a speculative stock market to both raise massive amounts of cash both for the company treasury and for themselves, even when the company has no sustained record of profitability and, indeed, even when no venture capitalist would consider providing funding to these companies in the amounts involved.

## **5.2 Cash**

It is often assumed that the main function of the stock market in supporting the growth of enterprises in general and investment in innovation in particular is the supply of “risk capital” – cash that fund new investments in productive capabilities that will only generate returns in the future under certain technological, market, and competitive conditions that are, at the time of the new investments uncertain. While

some companies do make use of the stock market to raise cash at certain times, and while one can find some cases in which the ability to do so has been critical to technological development or even the survival of the firm, there is little empirical grounds for arguing that the ability to raise money from the stock market has in general been the critical source of funds for financing innovative investment strategies. Far more important for sustaining the innovation process have been internally generated revenues, firmly under the strategic control of inside managers, who, when need be, have been able to leverage these retentions with external funds raised either from bond markets or from financial institutions on a relational basis.

A basic assumption of the shareholder perspective on corporate governance is that that as suppliers of risk capital, investors in corporate stock are the only participants in the enterprise whose returns are not contractually predetermined. The returns to shareholders, under these assumptions, are dependent on the size of the “residual”, that is, revenues that are left over after the corporation has paid all of its contractual claims. As the only “residual claimants”, it is argued, shareholders are the only participants in the corporation who have an interest in ensuring that corporate resources are allocated to their best alternative uses, and hence it is shareholders who should exercise control over the strategic allocation of corporate resources and returns.

As we elaborated in the CGEP Perspectives Report, the assumption that shareholders are the only “residual claimants” can be contested by the fact that the expected contributions and the actual rewards of many if not most people who work for a corporation are not, and one could argue cannot, be fully specified contractually, especially where, as in an innovation process, non-routine work is involved. Employees who are engaged in an innovation process tend to exercise considerable discretion over how well they perform a job, while the rewards that they receive for the work that they do today may only be reaped through sustained employment with the company over a period of years or even decades. Yet even the most highly educated employees in industrial corporations in the advanced economies do not generally enjoy career-long contractual guarantees. Rather, at any point in time, they supply their skills and expend their efforts in the face of uncertainties that their employer will generate the revenues that can enable the corporation to deliver on their expectations for sustained and remunerative employment. Conversely, it can be argued that, but for these expectations of sustained and remunerative employment, employees would not be willing to supply the skills and expend the efforts that they do. Moreover, unless they exercise strategic control over the allocation of resources and returns, employees run the risk that even if the corporation as a whole is successful in generating the revenues that can support their expectations for sustained and remunerative employment, those who do exercise strategic control may decide at some future date to terminate their current employment relation, thus preventing them from sharing in these revenues to the extent that they had expected.

Arguments along these lines have been made in an important book by Margaret Blair (1985) in which she advocates a “stakeholder” perspective on corporate governance, on the grounds that employees are induced to invest in “firm-specific human capital” on which the expectation that they will receive a future stream of returns from the specific company that currently employs them. If these stakeholders are excluded from the corporate governance process, their prior investments in firm-specific human

capital will be put at risk, and indeed employees may therefore refuse to make these investments, to the detriment of the company and the economy as a whole. Hence, Blair argues, employees, like shareholders, have “residual claimant” status in the industrial corporation; for the sake of superior economic performance, *both* employees and shareholders should exercise control over the allocation of corporate resources and returns.

As we have elaborated elsewhere (O'Sullivan 2000a; Lazonick and O'Sullivan 2000b), however, there are some empirical problems with Blair's arguments. Firstly, the approach fails to specify the characteristics of human capital that make it “firm specific” and the technological and market conditions under such investments occur. Secondly, even if employees' human capital is “firm specific”, thus preventing them from using their accumulated capabilities at other companies, there is no body of empirical evidence that shows that, in the modern industrial corporation, it is employees rather than their employer who actually fund these investments. If it is the company that funds these investments in “firm-specific human capital”, then one could argue that it is shareholders, investing through the stock market, who supply the capital for these investments in the industrial corporation, thus restoring the shareholders to the status of *sole* “residual claimant” as assumed in the shareholder perspective. If one assumes that it is companies rather than individuals who fund investments in human capital (and to our knowledge systematic research on this question still remains to be done), then evidence that public shareholders are an important, if not sole, source of such risk capital becomes all the more critical to the shareholder perspective on corporate governance.

Nevertheless, as documented in both the CGEP Synthesis Report on national systems of corporate governance and in a number of the industry studies – particularly the “new economy” companies in telecommunications and computer software – but also on two notable occasions in the 1990s an “old economy” company such as Rolls-Royce -- some companies do make use of the stock market to raise cash either as part of an IPO or through a secondary issue. These funds raised from the stock market can potentially be used to support the innovation process, and hence may constitute risk capital, as is generally assumed. In all of the companies that we studied in the French and British video game industries, the ability to go to the stock market for cash to fund their growth was critical to their survival. It is also worth noting that in virtually all of these companies, some of which have now been in existence for twenty years, the original owner-entrepreneurs are still exercising managerial control and retain minority ownership stakes, although in raising external finance the ownership stakes of the British owner-entrepreneurs seem to have been eroded much more than their French counterparts. The relation between the control and cash functions of the stock market in different national environments is a topic in need of much further study.

The economic conditions under which companies have the incentive and ability to raise cash from the stock market is another area for further study. For example, in our case study of Rolls-Royce, the company did two major rights issues in the first half of the 1990s, the first one in 1993 to fund high-thrust engine development in for widebody planes, and the second one in 1995 to acquire Allison Engine and thus position itself in the regional jet engine market. In these rights issues current shareholders were given the option (which could itself be sold within a given time-frame) to buy new stock at a discount to the market price in proportion to the shares



that they held. It is worth noting that at the time of the 1993 issue, notwithstanding the fact that current shareholders would have the first option of purchasing the shares at a discount from the market, the financial press stated that shareholders “lived in fear of a rights issue” because, as was the case in 2001 when BT did a major rights issue under adverse conditions, it was a lack of profitability and high levels of debt that led Rolls-Royce to turn to this mode of finance. At the end of the decade, when Rolls-Royce had returned to profitability and had paid down its debt, it was able to issue debt rather than stock to leverage its internal resources for funding engine development. It also had an extra incentive to do so; whereas when the company had issued shares in 1993 and 1995, its stock price was tracking the FTSE100, from the late 1990s its performance relative to the FTSE100 fell off considerably.

Speculative stock market conditions can also induce companies to issue stock to raise cash, some of which may be used to fund technology development. For example, in the optical networking industry, in the speculative stock market conditions of the late 1990s, three US-based “new economy” companies -- Ciena, Corvis, and Sycamore -- were each able to raise in excess of \$1b through stock issues. Ciena, founded in 1992, had already been begun to establish itself as a profitable company when it went public in 1997. But Corvis (which was started in 1997 by the founder as Ciena after he had sold most of his stake) and Sycamore (which was launched in 1998 by the founder of Cascade after it had been sold to Ascend) were still in the startup phase. Sycamore, for example, which has gone public in October 1999, did its secondary stock issue for about \$1b in March 2000, when it had a total of about \$19m (sic) in revenues and one customer (Williams Communications, currently on the verge of bankruptcy). The secondary issue was done at \$150 per share, about 40 times the price at which its stock, two years later, now trades. Sycamore has used the funds from its stock issue for both R&D and operating expenses (without the stock issue nest egg it would have already gone out of business or have been absorbed by another company). The shareholders who snapped up Sycamore's stock issue on March 15, 2000 were most likely speculators who thought that they could quickly resell it at a higher price -- something that at it turned out they were only able to do on March 27 when the stock price went briefly as high as \$156.50. In effect, the speculators were inadvertent venture capitalists, each taking a stake in what was, despite its public listing, still at startup at a price that no “adventent” venture capitalist would have ever dreamed of paying.

In fact, as the CGEP studies of the fundraising activities of new entrant telecommunications network operators such as Global Crossing, Level 3, and Qwest show (Fransman 2001; Duff 2000), the use of the stock market to raise capital for new investments -- in this case, transcontinental and intercontinental optical fibre networks -- can lead to a massive misallocation of resources. Investments in these networks entailed high fixed costs with the expectation of revenues to be generated over many years if not decades through the integration of voice, data, and video service provision. Speculative stock markets enabled these companies to raise billions of dollars that could go directly into the purchase of state-of-the-art optical fibre and gear and laying the cables. Now, with the marked slowdown in 2001 of the economy in general and telecommunications in particular, these companies are all in financial difficulty, burdened with many billions of dollars amounts of debt. In February 2002, Global Crossing, which had grown from 46 employees and no revenues in 1997 to 16,400 employees and \$3.8b in reported revenues in 2000, became, after Enron, the

second largest bankruptcy in history. These companies, which put massive amounts of telecommunications capacity in place in the period 1998-2000, would not be in such financial straits if their capital raising had been limited to the stock market; their shareholders might never be able to recoup their investments, but the corporate balance sheets would not have been so burdened with debt. The stock issues, however, provided a basis for leverage through loans from banks and other financial institutions as well as bond issues. In order to boost stock prices, which in turn enabled the companies to raise more cash on the stock market and issue more debt, the network operators had an incentive to show increasing revenues above and beyond those actually being generated. While the actual revenue streams would only be long term, companies found ways to put them on the books right away. One such manipulation, for which some of the companies are under investigation by the US Securities and Exchange Commission (SEC) in the wake of the Enron and Global Crossing bankruptcies, is a swap. Company A (say Global Crossing) would sell company B (say Level 3), network capacity and book the sale as current revenues, while simultaneously buying an equivalent amount of capacity from company B but book the purchase as assets (that would ostensibly generate revenues over the long term). In the transaction, company B would use the same accounting subterfuge, booking the sale of capacity as revenues but the purchase of capacity as assets. The swap entailed absolutely no change in productive capacity or earning power for either company. Yet both companies showed higher earnings that helped boost the prices of their stocks, which in turn enabled the companies to attract more debt, which in turn enabled the companies to over-invest in capacity.

Some have argued that, notwithstanding collapse of the stock prices, and in some cases, the bankruptcy of these companies, the investments that they made in telecommunications infrastructure will not be wasted. From this perspective, the speculative boom, and even the accounting ruses, permitted the mobilisation of resources to put a global communications structure in place that will provide useful services for years to come. There are two problems with this point of view. Firstly, even if the capacity is eventually put to use, returns on these services may be very low, even though at the time that the investments were made, stock speculators as well as creditors (who in some cases were given privileged access to stock at the IPO as an inducement to make loans) thought that the returns would be high. Meanwhile more stable-technology and low-technology industries, that looked less sexy on the market but that in fact would have generated higher rates of returns on new productive capacity may have been starved of investment funds. That is, the speculative boom and the financial manipulations resulted in a misallocation of resources in the economy as a whole. Secondly, given both technological obsolescence and physical deterioration, it is not the case that all or even most of this capacity will eventually be put to use, with some estimates placing the wasted investments at 60 percent of the capacity put in place. A combination of innovation and obsolescence mean that real capacity created today may be of little economic value tomorrow.

The recent "new economy" boom was unique in the history of speculative manias in the extent to which it actually enabled companies to raise cash on the stock market that they used for investment in new productive capacity. The promise of the riches to be reaped through participation in the Internet revolution enabled companies that had no track record for generating earnings to mobilise unprecedented amounts of

cash from the stock market that was pumped into new investment. In both the US stock-market mania of the late 1920s and the Japanese bubble economy of the late 1980s, previous speculative stock market booms in the advanced economies, established companies sold stock to the public at inflated prices. Yet most of these companies had no need for cash for new investment; indeed many of the companies had huge amounts of excess cash that, through financial intermediaries, found its way into the hands of stock market speculators in the form of call loans that, by permitting the purchase of stock on margin, further fuelled the stock market boom. These companies sold their stock on the market at speculative prices, not to finance investment in new productive capacity, but rather to restructure their corporate balance sheets, using the funds raised to shore up their cash positions or to pay off debt. As a result, when in the aftermath of the US stock market boom of the late 1920s and the Japanese stock market boom of the late 1980s, the stock market crashed, the major industrial corporations, unburdened by debt or with large cash reserves, represented a *stabilising* factor amidst the destruction of financial values and (and hence the life savings of many households).<sup>22</sup> In sharp contrast in the recent boom it was the very ability of industrial corporations to raise cash from the stock market for new investments that would only generate returns in the distant future, if ever at all, that exacerbated the impact of the stock market crash on the economy. In the recent boom, the use of the stock market to raise cash for new investments was probably more important than ever before in the history of modern capitalism. But, with the collapse of the “new economy” euphoria, the relation between this function of the stock market and economic performance provides no endorsement of its efficacy. In the end, the use of the stock market to raise cash contributed both to the destruction of “shareholder value” for those shareholders who got caught on the wrong side of the speculative boom and to the misallocation of resources in the economy as a whole.

It is of some significance that at the height of the “new economy” bubble some European governments – most notably Britain and Germany – took advantage of the boom to extract huge fees from telecommunications companies that bid for UTMS (3G) mobile licenses. In the bubble, companies seemed to believe that if they did not bid for the licenses at hugely inflated prices, their stock prices would suffer for their apparent failure to remain innovative in the “new economy”. With the bursting of the bubble, as we now know, the stock prices of virtually all the companies in this sector fell drastically, while the companies that had “won” the licenses found themselves heavily in debt.

### **5.3 Compensation**

The changing role of the stock market in the US “new economy”, as it evolved from the microcomputer revolution of the late 1970s and early 1980s through the Internet

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<sup>22</sup> This is not to say that the role of the major industrial corporations was the same in the United States in the 1930s, during which the employment rate never went below 15 percent as it was in Japan in the 1990s, during which the employment rate never rose above five percent. For a month-by-month account of the forces that drove the US economy into recession after the 1929 crash, see Wigmore (1985). After a time, by about 1931, as product demand deteriorated, the major US industrial corporations added to this instability by laying off employees. In contrast throughout the 1990s, after the 1980s bubble had burst, major Japanese industrial corporations stabilised the Japanese economy by keeping people employed (Lazonick 2001).

revolution of the last half of the 1990s, is not well represented by companies such as Sycamore Networks and Global Crossing that were launched in the midst of the late 1990s speculative boom. Of far more importance, both to the development of the “new economy” and for understanding longer run trends in the changing role of the stock market are companies such as Intel, Microsoft, Sun Microsystems, Oracle, and Cisco that had established their profitability during the 1980s and early 1990s before the onset of the Internet revolution. These companies did not go to the stock market to raise significant amounts cash for new investment, either at the time of their IPOs or subsequently. For example, when Microsoft went public in 1986, it raised \$42m for the corporate treasury and \$16.7m for owners such as Bill Gates and Paul Allen. But, with just over 1000 employees and generating \$200m in annual revenues, the company did not go public because it needed cash. Rather, the prime purpose of the IPO was to enable its employees to exercise the stock option awards that Microsoft had begun to offer all of employees in 1982, as it sought in particular to recruit and retain highly mobile software engineers. For a young company with growth prospects, including stock options in the compensation also had the advantage of enabling a company to increase the amount of revenues available for reinvestment in the company by offering a cash salary somewhat lower than would otherwise be the case. In addition, in the United States, companies receive a tax credit when employees exercise their stock options equivalent to the taxes that the employees pay on the resultant capital gains. Furthermore, according to accounting standards (that, however, have been heavily criticised for distorting reported earnings), stock option awards are not booked as current compensation. The resultant increase in reported earnings from the use of stock options is in turn thought to help boost stock prices, thus, among other things, making the options more valuable to employees.

During the 1950s and 1960s stock options became a significant form of compensation for top executives of major US industrial corporations (see Lewellyn 1968, 1971). The microcomputer revolution of the early 1980s, however, with its open architectures and opportunities for startups, had led firms to use stock options to recruit and retain highly mobile “talent”. It became a common practice for “new economy” companies that did high-end design work but little manufacturing to have *broad-based* stock option plans that extended to virtually all employees, a very high percentage of whom were university graduates. From the early 1980s, therefore, “new economy” companies used stock options to recruit and retain, and ostensibly to motivate, not only executives but also substantial numbers of *non-executive* personnel.

A US Department of Labor pilot survey in 1999 showed that, for publicly listed companies, 27 percent of non-executive employees with incomes of \$75,000 and over had stock options (US Bureau of Labor Statistics 2000). A survey of a “near-constant” sample of 350 US-based companies in 1993 and 1999 showed that the proportion that had made provision for broad-based plans increased from 17.4 percent to 39.4 percent, while the proportion that actually made grants under these plans was 5.7 percent in 1993 and 18.0 percent in 1999 (Sabow and Milligan 2000, 100). Another survey of the top 200 US industrial and services companies by sales revealed that 7.5 percent of their outstanding shares were authorized for stock option plans in 1990 and 15.2 percent in 2000 (Pearl Meyers 2001). Besides the spread of stock options to non-executive employees that these figures reflect, stock options still figured prominently in top executives compensation of these companies; in 2000, the

average CEO salary was \$11.3m, of which 60 percent was stock options and nine percent salary.

From the public (in the United States, SEC) filings and annual reports of companies, we can get general descriptions of the stock option plans in place and how they change over time. In the CGEP project, the most in-depth study of the use of stock options is for the optical networking industry. In this industry, “new economy” companies such as Cisco, Ciena, Sycamore, and Corvis have broad-based stock option programs that extend to virtually all employees, executive and non-executive.<sup>23</sup> As of July 31, 2001, exercisable stock option grants at Cisco totaled 1.06 billion shares, or 14.7 percent of the company’s shares outstanding. With such a program in place since 1987, Cisco revised it when it bought StrataCom in 1996, and now assumes the stock-option plans of its acquired companies. Cisco, Nortel, Lucent, and Alcatel all have executive stock option plans, and, as required by SEC regulations, publish information on the stock-option remuneration of their top five executives. “Old economy” companies such as Nortel, Lucent, and Alcatel have introduced non-executive stock options in a more *ad hoc* manner than Cisco as they have sought to retain employees of “new economy” acquisitions or key current personnel who were likely to “jump ship” to other companies. Lucent’s 2001 Annual Report states only that the company “has stock-based compensation plans under which outside directors and certain employees receive stock options and other equity-based awards”, and that it assumes the stock options plans of acquired companies. As of September 30, 2001, Lucent had 683 million options outstanding, equivalent to 20 percent of the company’s publicly traded shares. Nortel has had a stock-option plan in place since 1986, but in 1995 initiated a “key contributor stock option program”, under which (with awards made in January of each year) it granted 3,416,000 shares in 1998 and 2,080,000 in 1999, but only 60,000 in 2000, and none in 2001. In June 2001 Nortel announced a “stock option exchange program” to adjust for the collapse in stock prices. In 2000 Alcatel adopted a “company-wide” stock-option scheme in which all employees could share in 1.8 million grants, 3000 “future directors” in 3.0 million grants, and 5000 US employees in 2.4 million grants.

But why do companies use stock-based compensation? One can posit a capital-saving rationale: stock options can be seen as deferred wages, and many “new economy” companies that award stock options to non-executive employees pay salaries that are somewhat lower than the going rate. More generally, however, it is a motivation rationale that is used to justify stock options awards; through stock options, it is argued employees can share in the gains of the enterprise, if and when they are generated, and hence stock option awards give recipients the incentive to devote their time and effort to generating these gains. If so, we can think of stock options as an incentive mechanism that helps companies “manage the learning process”. Such an incentive mechanism is likely to work best when a company’s stock price is rising continuously and at a fairly steady as a reflection of its innovative efforts. Even then, especially for companies that have broad-based and systematic stock option plans that function as a *collective* incentive mechanism, it can be argued that it is prospects of promotion to positions of higher pay, responsibility, and authority that remain the key incentives to which employees as individuals respond. Indeed, the prospect for a

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<sup>23</sup> The following material on the use of stock as a compensation currency is drawn from Carpenter, Lazonick, and O’Sullivan (2002), where complete references can be found.

more generous stock option award may well attach to the achievement of a position higher up the hierarchy, in which case it could be that it is the possibility to promotion into these positions, not stock options per se, that motivates an employee's performance.

It cannot, however, be assumed that the purpose of stock option awards is to motivate employees once they are with the company. A more important role of stock option awards may be to recruit employees from the labour market and/or retain them with the company in the face of labor market competition. Our study of the use of stock options in the "new economy" boom suggests that their prime purpose was to "manage the labour market" rather than "manage the learning process", and that such was the case especially for "old economy" companies that were seeking to make the transition to the "new economy", with non-executive stock option awards as a tool for doing so.

Currently, very little is known about how, or even whether, stock-based compensation promotes organizational integration, thereby supporting the processes of organizational learning. Thus far most studies of the influence of stock-based compensation on performance have focused on executive stock options (see Hall and Leibman 1998; Murphy 1999; Datta et al. 2001). A paper entitled "Stock Options for Undiversified Executives" (Hall and Murphy 2000) recognizes that these studies have been marred because they use a finance model that assumes that the holdings of options are diversifiable across a portfolio of securities whereas it is inherent in stock-option grants that they are non-tradable and hence non-diversifiable. There is, however, a growing stock-options literature that focuses on how managers can deal with the volatility of the stock market, changes in labor mobility, and accounting and tax laws and loopholes (see, for example, Zingheim and Schuster 2000). There is also some academic research, supported primarily by the National Center on Employee Ownership and published in the Journal of Employee Ownership, Law and Finance, that, based mainly on survey data, has shown a positive impact of broad-based stock options on productivity (see Blasi et al. 2000; also Carberry 2000; Holsinger 2001). From our perspective, there is a need to deepen this line of research by focusing specifically on the impact of stock-based compensation on the innovation process. Within the optical networking industry, for example, such research (which can only be done in a meaningful way with the cooperation of the companies concerned) could compare the implementation of broad-based, or more accurately *systematic*, stock option programs by "new economy" companies such as Cisco, Ciena, and Sycamore Networks with what can be called *ad hoc* option programs by "old economy" companies such as Nortel, Lucent, and Alcatel that are seeking to make the transition to the "new economy" within a volatile financial environment.

In the optical networking industry, Cisco was able to use systematic stock-based remuneration as an element of its growth dynamic in the 1990s. The accounts of Cisco's performance prior to the explosion of acquisition activity in the optical networking industry in 1998 stress that the key to the success of its growth-through-acquisition model was the organizational integration into the Cisco system of the technologies and the people that came with the acquisitions. Cisco developed its system when technical personnel were highly mobile, but, with its stock price rising steadily as it gained more control of router markets, it was able to achieve low levels of employee turnover. Only in 1998-2000 did Cisco have to contend with the hyper-

mobility of “talent” that characterized the “dot.com” economy, a period in which a overly repaid increase in the value of stock options may increased rather than reduced labour turnover. And only since the end of 2000 has Cisco had to operate its stock-based remuneration system in the face of significant declines and general volatility in the market price of its shares. Learning processes are, moreover, much more complex in optical networking than in Internet equipment. Under such conditions, even in a company that has a systematic broad-based program, the stock-based remuneration of different people who need to cooperate in the organizational learning process (and who indeed may be doing similar jobs with similar qualifications) can vary dramatically depending on the vagaries of when and under what conditions their stock options were rewarded and are exercisable. We can hypothesize that, prior to the onset of this stock-market volatility, stock-based remuneration at Cisco was much more effective at *both* reducing labor mobility and motivating capability improvement. In the recent boom, however, one would expect that the mobility function of such remuneration became a more significant determinant of its use, while with the decline in stock prices that the main problem in the use of stock options has been their negative impact on employee motivation.

The vulnerability of optical networking companies in the downturn was greatly exacerbated by the practice of using corporate stock as a compensation currency. In 2001, employees found that the options that they received during the boom were deeply “under water”, and stood a good chance of remaining worthless for the remainder of their contractual life. As of May 24, 2002 Cisco’s stock price was \$16.57, and virtually all stock options issued after early November 1998 – about 55 percent of Cisco’s options outstanding -- are under water.

The problem of stock options in a period of falling stock prices is graphically highlighted in the 2000 Annual Report of Sycamore Networks, a Massachusetts startup founded in February 1998 by Gururaj “Desh” Deshpande, who had previously founded Cascade, which had been (as already mentioned) sold to Ascend before the latter was sold to Lucent. With Deshpande’s track record, as well as a number of former Cascade executives and scientists recruited from MIT’s Lincoln Labs, Sycamore’s stock price soared after it went public in late October 1999. At the end of 1999, with 148 employees and a total of just \$11m from just one customer (Williams Communications) since its founding, Sycamore’s market capitalization was \$24.2b and rising, which placed it 117<sup>th</sup> in the Financial Times ranking of US companies by market capitalization -- just behind Emerson Electric with almost 120,000 employees and revenues of \$14.3b! In its October 1999 IPO and a secondary issue of March 2000 when its stock price was \$150, Sycamore raised \$1.2b from the speculative stock market. These funds have enabled Sycamore to continue operating as an independent company through the industry downturn of 2001-2002.

During 2000 Sycamore expanded, increasing employment to more than 1000 people. But the fall in its stock price wreaked havoc on its systematic stock-option program, especially disadvantaging employees who came to the company in the first nine months of 2000, when the company’s stock price remained high. From an adjusted price of \$62 on the close of business on its first listed day in October 1999, Sycamore’s stock rose to a peak of almost \$200 on March 2, 2000. Between that date and July 31, 2000 the stock fluctuated between \$51 and \$151, and by the end of 2000 only those who had received options before the IPO could gain by exercising them.

By August 2001 stock price had fallen to around \$5, and has subsequently remained at or below that level (on May 24, 2002, the stock closed at \$3.57). If they are still with the company, which cut employment severely in 2001, those who received options after the IPO – but perhaps only a month of two later than pre-IPO employees – risk never seeing their options rise “above water”.

In the last half of 2000, with its stock price steadily falling, Sycamore sought to recruit and retain people by offering more options and in 2001, Sycamore tried to make some adjustments to its stock option program. At a recent talk, Dr. Deshpande, still chairman of Sycamore Networks and the biggest shareholder, stated that in the current environment, stock options had become less important for employee motivation than they were in the boom, so it is “back to basics” with employee incentives.<sup>24</sup>

In response to similar developments, Cisco's chief executive, John Chambers, announced in March 2001 that the company was considering a stock buyback program to revive its share price. Under existing FASB rules, stock option grants were not counted as remuneration. An exception occurred when a company chose to lower the “strike price” at which granted options could be purchased. The option had then to be booked as current remuneration, thus resulting in a reduction of reported earnings. Besides the effect that lower reported earnings could have on a company's stock price, the repricing of options can itself prompt a sell-off of a company's stock since it is a sign to shareholders that the company lacks confidence in the future price of its stock and that employees themselves need not be overly concerned with a fall in stock price. As a result the motivation function of stock option grants is called into question.

After its stock fell in April 2000, Microsoft found a way around the problem by simply doubling the number of stock options granted to employees. These were granted at a lower (current) strike price. Cisco announced that it would consider similar action in response to the sharp fall of its share price. Nortel also planned to scrap up to 111 million worthless stock options, and to replace them with a reduced number of options at a lower exercise price. The fact that the plan would not apply to directors and executives allowed Nortel to avoid a shareholder vote otherwise required by Canadian rules. Defending the decision, Nortel's senior vice-president of human resources claimed that the market for top talent, representing 10 to 20 percent of Nortel's workforce, remained tight. About 50 percent of the staff were eligible for the new options. By canceling and reissuing these Nortel avoided damaging accountancy charges on its income statement that would have appeared from repricing.

In *ad hoc* stock-option programs, changes in labor market conditions, technological opportunities, and acquisition strategies can lead to important changes in the types of technical and managerial specialists within the company who are awarded stock options and the amounts of awards that they, at times on the basis of individual and informal negotiation, receive. During the boom, Nortel, Lucent, and Alcatel found that, especially in the high-tech industrial districts of Silicon Valley and Route 128, stock options awards had become crucial to both retaining employees from acquired companies and dissuading current employees from joining start-ups. In reply to a

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<sup>24</sup> S. Quimby, “Notes on Deshpande presentation,” University of Massachusetts Lowell, April 4, 2002.



question concerning the impact of the purchase of Bay Networks, John Roth, Nortel's CEO replied that "stock options was probably one of the most significant changes we made. We had never as a company given stock options as deeply as Bay did. There's basically nobody who's ineligible to get a stock option (now). The attention to the success of the company that that gives is fabulous."<sup>25</sup>

Alcatel found that it was necessary to distinguish North American employees from the rest of the organization in awarding non-executive stock options. Alcatel CEO, Serge Tchuruk acknowledged that "unless you win the battle in the US, don't even think of being a global player."<sup>26</sup> In the five years following 1995, Alcatel managed to increase its US sales from \$300m to \$4.5b, largely due to a series of seven North American acquisitions costing \$16b. The company's head of North American operations, Krish Prabhu, who joined Alcatel as part of its acquisition of Rockwell in the United States, led a "creating shareholder value" campaign within Alcatel that resulted in the introduction of a company-wide stock option in early 2000. The Chairman's message in the 1999 Annual Report echoed this theme, opening with the statement that "Alcatel is more committed than ever to creating value for its shareholders." Alcatel's stock-option program, launched in early 2000, was linked to a share purchase program and was offered to three groups of employees. The company offered 1.8 million options to 120,000 Alcatel employees worldwide and a further 3 million options to 3,000 employees deemed to be of significant importance to the company. Finally, 5,000 North American employees alone were offered 2.4 million options. This geographic differentiation in the stock-option plan was particularly important for the integration of Newbridge Networks, acquired in early 2000. Based in Ottawa, Canada, it represented Alcatel's most significant opportunity to enter the data networking market.

Like Nortel and Alcatel, the acquisition of newer companies and the mobility of current employees to startups compelled it to award stock options to non-executive employees. And like Nortel and Alcatel, it has revealed very little about what types of employee (by functional specialization, hierarchical position, or geographical location) get such stock-option awards and how awards are distributed. In related research on skill formation and labour mobility at Lucent's systems-integration plant in Massachusetts (Lazonick et al. 2002), a Lucent manager told one of the authors that in the summer of 2000 the company offered him stock options individually (rather than as part of a plan) as a preemptive action at a time when many Lucent managers and engineers were being recruited by Cisco and Nortel, which had opened their own systems-integration facilities nearby.

When, as was the case of Cisco before stock market investors discovered it as the Internet boom unfolded, a company's stock price is rising gradually and on a sustained basis, then stock option awards may serve as an important element in the employment relation for both managing the labour market (ensuring low employee turnover and hence promoting the cumulation of innovative capabilities) and managing the learning process (motivating employees to work collectively in the innovation process). Our study of the optical networking industry in the boom, however, suggests that the stock prices of Cisco, Nortel, Lucent, and Alcatel were

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<sup>25</sup> Wall Street Journal Europe, September 19, 2000.

<sup>26</sup> Forbes, May 15, 2000.

rising too quickly and, especially for the three “old economy” companies, stock option awards were allocated too individualistically to assist in the effective performance of these management functions. Given the hypermobility of administrative and technical personnel during the boom, strategic managers in these companies may have become so focused on managing the labour market through stock-based compensation that they undermined their abilities to structure employee incentives -- which even for Cisco with its systematic program went beyond stock option grants – in ways that could promote cumulative and collective learning.

A further problem with the use of stock option plans for large numbers of employees is the dilutive impact it can have on existing shareholdings. If the use of stock option awards motivated employees to work harder and better for the company, one might expect that higher future enterprise earnings would offset the issue of shares when employees exercised their options, so that a diminution of earnings per share would not occur. The experience has been, however, that even for the most profitable companies that have extended stock option awards to a large proportion of their employees, these plans have been dilutive. In terms of dilution caused by a stock option plan, it was one thing for a company such as Microsoft to have a broad-based stock option plan in effect in 1986 when it had just over 1000 employees. It is another thing for it to have such a plan in place when in 1997 it employed about 27,000 people and still another in 2001 when it employed about 47,600 people. In order to fund its stock option plan without causing undue dilution of shareholding, in the period 1997-2001, Microsoft had to repurchase \$19.6b worth of its stock from the market, of which \$4.9b in 2000 and \$6.1b in 2001. (By way of comparison, over this five-year period Microsoft spent \$15.6b on R&D.) That is, the use of stock as a compensation currency meant that, in terms of the cash function of the stock market, Microsoft supplied cash to the stock market rather than vice versa.<sup>27</sup>

At the same time, however, when employees exercise their stock options, US income tax rules allow a company to take a stock option income tax benefit equivalent to the amount of capital gains tax that the employees pay to the Internal Revenue Service. Over this five-year period the value of this benefit to Microsoft was \$13.1 billion (or 67 percent of the amount that it spent on stock repurchases), which represented an average of 24 percent of Microsoft's net income before taxes for the period 1997-2001 (Microsoft Annual Reports and Form 10K SEC filings).

#### ***5.4 Combination***

Another characteristic feature of the “new economy” was the use of stock as a currency in mergers and acquisition. Mergers combine control over the assets of two or more firms into one distinct business enterprise, while acquisitions transfer control over the assets of one company to another company. Whether a combination takes the form of a merger or an acquisition, a combination entails a change in control over business assets; it does not in of itself entail investment in new productive

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<sup>27</sup> In aggregate, the extent to which companies engage in stock repurchases is of great importance for analysing the cash function of the stock market, especially since many if not most attempts to estimate the importance of the stock market as a source of funds have used net issue figures that offset cash raised through the issue of stock with the value of stock withdrawn from the market through repurchases and the retirement of stock in cash-based M&A activity. See Lazonick and O'Sullivan 2002a.

capabilities. The main advantage of the use of stock rather than cash as a combination currency in M&A is that it has no immediate negative impact on cash flow. The inflation of stock prices in a boom tends to enhance this advantage as the purchasing power of stock increases relative to the purchasing power of cash.

Stock-based mergers and acquisitions have occurred throughout the history of the modern US stock market, but during the “new economy” boom of the last half of the 1990 the importance of the use of stock rather than cash for M&A activity may have been without historical precedent. As the CGEP national and industry studies show, in the 1990s the stock market became much more important than had previously been the case in providing the “currency” with which corporations could engage in M&A activity. By one estimate for M&A activity in the United States, stock was used as the mode of payment in M&A for only seven percent of the value of the deals in 1988, but 67 percent in 1998 (Rappaport and Sirower 1999). At the same time over this period the value of M&A transactions increased (in nominal terms) about eightfold. Between 1990 and 1999, the value of M&A activity rose 16.5 times, while the number of transactions rose only 2.3 times, with the average value per transaction at \$48.5m at the beginning of the decade but \$354.4m in 1999 dollars and \$278.0m in 1990 dollars at the end of the decade – an increase of 5.7 times in real terms. With the US economy in a slump at the beginning and boom conditions at the end of the 1990s, one would expect both the value per transaction to have risen over this period. But, in financial terms, it is doubtful that the value of transactions could have reached their elevated levels in the late 1990s if corporations had been relying on cash rather than stock as the combination currency.

There is evidence that, given the availability of inflated stock to do the acquisitions encouraged acquirers to pay much higher prices to acquire control of another company than would have been the case if they had had to use cash for the transaction. For example, in 1998, Steve Ballmer, the president of Microsoft, made the following statement about two acquisitions that the company had made, each for about \$400m in stock:

We've had to step up and either make or not make big investments on Internet time. Like WebTV. Like HotMail. Some of them, I think, will prove smart. Maybe some of them won't prove smart. But they're not huge decisions. We have a currency [with our stock price] that makes them relatively small decisions. These deals [WebTV and HotMail] were both done for stock. I still think it's real money, whatever it is -- \$400 million or so per acquisition. But I can stop and say, “OK, that's half of one percent of Microsoft.” That's probably a reasonable insurance policy to pay. (quoted in Cusumano and Yoffie 1998, 302)

Recently, Vivendi, a French company with its roots as a water utility that remade itself into a major global multimedia enterprise through stock-based acquisitions in the “new economy” boom, has stated explicitly that it views the use of stock as a qualitatively different currency than cash in making acquisitions. In a press release on its 2001 results, issued on March 5, 2002 in the wake of the decline in its stock price by about 45 percent from its peak in January 2001, Vivendi sought to rationalise a write-down of €12.64b in acquired assets including €6.0b for its Canal+ Group,

€3.1b for its music division, €1.3b for its Universal Studios Group, €1.3b of its international telecommunications properties, €0.6b for its environment division, €0.3 b for its Internet division. The press release went on to say (in bold type, moreover) that “[t]his is a **non-cash charge that has no impact on value**”, and then expanded on this point by stating: “Given that the acquisitions impaired were virtually paid in shares not in cash, **this non-cash charge does not represent any value destruction.**”<sup>28</sup>

As in the case of the use of stock as a compensation currency, in the CGEP project, we have investigated the use of stock as an acquisition currency most thoroughly for the case of the optical networking industry. This industry's experience over the past five years illustrates the possibilities and problems for innovation and performance of using stock as an acquisition currency.<sup>29</sup> Cisco Systems had pioneered the “growth through acquisition” business model, using stock to acquire 73 companies from 1993 through 2001 as well as to award stock options as a systematic component of its compensation system for both current and “acquired” employees. Founded in 1984 and taken public in 1990, Cisco used the growth-through-acquisition model to become and remain the dominant producer of Internet routers as well as, beginning in 1996 with its acquisition of StrataCom, to enter optical networking. In August 1998 Nortel followed the Cisco model, acquiring BayNetworks (itself a previous merger of Massachusetts-based Wellfleet with California-based Synoptics) for over \$7b in stock -- about 30 percent of Nortel's market capitalization at the time -- in order to gain control of technologies that could connect its optical transport systems with data communication capabilities. Similarly, in June 1999 Lucent acquired Ascend for \$24b in stock, primarily to gain control of Cascade, a company that Ascend itself had acquired for \$3.7b in stock in 1997. In 2000 Alcatel joined the attempt to integrate capabilities in optical networking and data communications by doing a \$7.1b stock acquisition of Ottawa-based Newbridge Networks, a company with which Siemens had previously built a strategic alliance. The fact that Alcatel was listed on NYSE, using an equity-based security known as American Depositary Receipts (ADRs), made its stock more attractive to the shareholders of the North American companies that it acquired (see O'Sullivan 2001b). Alcatel is the only incumbent telecommunications company outside of North America that, in the “new economy” boom of 1998-2000, was able to use its stock as a currency to acquire companies and compensate non-executive employees on a significant scale. For example, unable to use its stock as an acquisition currency, in 1999 Marconi expended \$6b in cash for two US companies with data communications capabilities.<sup>30</sup>

From 1998 through 2000 the total market value of acquisitions by Cisco, Nortel, Lucent, and Alcatel was \$109b, and the “currency” for 97 percent of this amount was acquiring company's stock. During these years, Cisco made 59 acquisitions, Nortel 20, Lucent 24, and Alcatel eight. Previously, Cisco had made 21 acquisitions since

<sup>28</sup> Vivendi Universal, “Vivendi Universal reports 2001 results,” press release, Paris, March 5, 2002, emphasis in original.

<sup>29</sup> The following material on the use of stock as an acquisition currency is drawn from Carpenter, Lazonick, and O'Sullivan (2002), where complete references can be found.

<sup>30</sup> In describing the ‘rise and fall’ of Marconi (which was GEC until December 1999), the ex-chief executive designate, John Mayo (2002) has written that “what is not widely realised is that the US acquisitions had to be made for cash as GEC was not compliant with the US Foreign Corrupt Practices Act and so could not list in the US”. The Foreign Corrupt Practices Act makes it unlawful to bribe foreign government officials to obtain or retain business.

1993, Nortel six since 1990, Lucent four since 1996, (before which it had been part of AT&T), and Alcatel (which had been a conglomerate) six in telecommunications since 1991. The prices paid for these acquisitions during 1998-2000 were highly inflated compared with previous periods. The average price that Cisco paid for acquisitions in 1993-1997 was \$340m -- and \$124m excluding the \$4.7b acquisition of StrataCom, with 1200 employees, in 1996 through which Cisco became a player in optical technology -- while in the 1998-2000 period the average price was \$558m. When, in 1993, Cisco acquired Crescendo, a company with \$10m in revenues, for \$95m in shares, Wall Street analysts downgraded Cisco's stock. But, 39 acquisitions later in 1999, with Cisco an unquestioned success and in the midst of the speculative boom, Cisco's stock price rose when it acquired Cerent, a company with 130 employees and \$10m in revenues, for \$6.9b in stock. Indeed, as the Cerent case indicates, at the peak of the boom, in the quest to gain control of the latest technologies, revenue-less startups were being acquired for billions of dollars in stock; dramatic examples include Nortel's acquisition of Xros for \$3.25b and Lucent's acquisition of Chromatis Networks for \$4.5b, both completed in June 2000.

Under any conditions, the integration of acquisitions poses formidable organizational challenges to a business organization (see Haspeslagh and Jemison 1991), especially for "old economy" companies just as Lucent, Nortel, and Alcatel that have historically relied on internal development processes to accumulate innovative capabilities and that are attempting to innovate in the presence of what Clayton Christensen (1997) has called "disruptive technology". Drawing primarily on the evolution of the computer industry, Christensen argues that established companies are very good at generating innovations for a *known* customer base but tend to neglect innovations that need to be developed for an *unknown* customer base. Christensen's point is not that the incumbents are being badly managed, but rather that new ideas that have as yet to be developed into viable products for substantial markets tend to be ignored by strategic managers of large established enterprises who have to maintain the financial viability of their substantial organizations and hence have to innovate for substantial markets to which they have relatively certain access. In Christensen's model, personnel in incumbent corporations who want to develop technologies for as yet undeveloped markets leave to form startups. When successful these new ventures can generate products that, through improvements, can attack the incumbents' established markets. Hence what Christensen calls, from the perspective of the incumbent, "the innovator's dilemma".

On the face of it, the experience of the optical networking industry does not fit well with Christensen's model. Using stock as an acquisition and compensation currency to acquire startups, it was characterized by the attempts by major incumbents such as Nortel, Lucent, and Alcatel to follow the strategy that allowed Cisco to move from its Internet base into optical networking. Rather than ignore innovative startups, many of which had been launched by people who had gained experience with the incumbents, these companies sought to acquire them and integrate them into their organizations.

Did the attempts by Nortel, Lucent, and Alcatel to adopt the Cisco model to extend their capabilities into data communications technology represent a new type of corporate growth strategy that integrates the development of capabilities of incumbents for existing markets with the capabilities of startups for new markets? As we shall see, there is considerable industry evidence to suggest that the exuberant

financial markets of the late 1990s led these incumbents to overestimate the growth of the market for next-generation optical networking technology, leading them, among other things, to overextend vendor financing to “next-generation” service providers, some of whom went bankrupt as the final demand for their state-of-the-art infrastructure could not justify the investments that had been made. It may well be the case that many of the incumbents’ acquisitions that performed poorly represented attempts to break into unknown markets while many of those that performed better enabled the incumbents to upgrade their capabilities to innovate for existing markets, in both cases consistent with Christensen’s “incumbent” model of innovative management.

It will require further access to non-public information through company-level research before to assess completely the performance of the high-technology acquisitions done by Lucent, Nortel, Alcatel, and Cisco during the boom period of 1998-2000. During these three years, as we have seen, these four companies used their shares as the acquisition currency for 97.6 percent of a combined three-year total of \$108.8b. From the perspective of “maximizing shareholder value”, the amount of shareholder wealth expended on multibillion dollar acquisitions -- in some cases for revenue-less startups -- during the boom, and especially during its peak in the first half of 2000, make it virtually impossible for those shareholders who bought stock at the inflated prices that then prevailed ever to realize positive returns on their investments, no matter how positive a revenue-generating contribution the acquisitions concerned might make to the acquiring company over the long run. For example, briefly, in March 2000, with its adjusted stock price at over \$80 per share, Cisco sported the highest market capitalization of any company in the world. At \$67 per share in early May 2000, Cisco’s stock price stood at 130 times what Wall Street estimated its 2000 earnings per share would be. Thomas Donlan (2000, 34), an editor at the financial news weekly, Barron’s, calculated that to justify this stock price from the point of view of current shareholders, Cisco would have to experience a growth rate in earnings that would increase its 1999 profits of \$2.5 billion to \$2.5 trillion in profits in 2010!

A young high-tech company, starting from a small earnings base, might envision a future that would justify a current price-earnings ratio on the order of 130. But when a company has already experienced high rates of earnings growth, and has thus grown large, it generally becomes more difficult to maintain its past growth rate. The problem is that the inherent uncertainty of the growth process means that shareholders, like everyone else, only see these growth rates after the fact when the company has already, by virtue of its growth performance, attained a large size in terms of revenues and earnings. By this time, high rates of growth of revenues and earnings become difficult if not impossible to sustain.

What may be difficult to achieve in practice may be attained through “creative accounting.” “Generally accepted accounting practices” (GAAP) set by the Financial Accounting Standards Board (FASB) encouraged stock-based acquisitions by permitting “pooling of interests” accounting when a company used stock instead of cash to make an acquisition. If cash had been used, the acquirer would have had to value the acquisition at its market price, and then amortize the difference between the purchase price and the book value of the acquisition, thus lowering reported earnings over the “life” of the acquisition. But if the acquirer used stock it could simply record

the cost of the acquisition on its balance sheet as the book value of the company acquired. Without deductions from earnings for the amortization of goodwill, the acquirer could report higher earnings, thus ignoring the existence of the inflated stock that had changed hands and the dilution of shareholders' earnings as a result. It is generally agreed that these higher reported earnings increased demand for the company's stock, contradicting the notion that stock-market investors would be sophisticated enough to see through this sleight of hand.

When, as was the case during the late 1990s speculative boom, stock prices, and with them the market value of stock-based acquisitions, are rising rapidly, pooling of interests accounting results in a huge gap between the price paid in stock for an acquisition and the cost of the acquisition on the acquirer's balance sheet. Hence, in May 2000, at the peak of the boom, Donlan, questioned the foundations of Cisco's high market capitalization. He argued that, while Cisco "is a great engineering company, brilliantly managed and technologically astute[,] . . . for the full story of Cisco's successes, it's important to realize that Cisco is a great financial-engineering company as well, and therein lies a host of dangers" (Donlan 2000, 31). By one estimate Cisco managed to suppress a total of \$18.2b of costs by using the pooling-of-interests method in accounting for the acquisitions made in the two years ended July 2000 (Briloff 2000), and it is generally presumed that Cisco's higher reported earnings helped to boost its stock price. In the face of such criticism Cisco, along with other acquisitive companies, lobbied vigorously for the retention of pooling of interests as a legitimate accounting method. With the actual collapse of stock prices that occurred in late 2000 and the first half of 2001, the proponents of "pooling-of-interests" lost legitimacy, and in July 2001 FASB banned the further use of this method of accounting for acquisitions.<sup>31</sup>

Another way in which optical networking companies sought to encourage demand for their stock during the boom was by becoming substantial creditors in order to secure customers for their products. "Vendor financing" was especially meted out to the new entrants among the telecommunications service providers. New companies such as Global Crossing, Level 3, and Winstar were not encumbered with legacy systems, and hence demanded "next generation" optical networks from the equipment suppliers. Sales to these companies in turn encouraged and justified the high-priced acquisition of technology startups that were engaged in developing the next-generation systems. The willingness of a vendor such as Lucent or Nortel to finance a high proportion of an equipment purchase on generous terms was often critical to landing the order. Nortel, for example, explained in its 1999 Annual Report that the competitive environment was such that significant amounts of medium and long-term financing had to be provided to its customers in order to assure the sale of the company's products and services. Previously, third-party lenders had supplied this financing. In 1999, Nortel signed customer-financing agreements amounting to \$2.5b. Yet the companies to whom such vendor financing was extended had yet to prove their own earning power, as a spate of bankruptcies in 2001 and early 2002 has shown. In its 1999 Annual Report, Lucent acknowledged that AT&T and the Baby Bells provided a substantial part of the company's revenues. It noted, however, that "new competitors will enter its markets as a result of the trend toward global expansion by US and non-US competitors as well as continued changes in technology and public policy." It

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<sup>31</sup> FASB news release: <http://accounting.rutgers.edu/raw/fasb/>.

continued by pointing out that purchasing behaviour was increasingly in the form of fewer and larger contracts and that customers were demanding long-term vendor financing in return for larger, longer-term purchase commitments. For example, using vendor financing, Lucent “won” a \$2b order from Winstar, a company with 1999 losses of \$900m. Winstar has since gone bankrupt. At the end of 2000, Lucent had made vendor financing commitments of \$7.0b of which \$1.6b had been drawn down by the buyers. Lucent’s commitments were an order of magnitude greater than those of the other three companies, for each of whom vendor financing was nonetheless substantial. At the end of 2000 Cisco had \$2.5b in commitments, of which \$625m had been drawn down; Nortel \$2.1b in commitments with \$1.4b drawn down; and Alcatel \$1.5b in commitments with the amount drawn down undisclosed.

Besides encouraging the use of dubious accounting practices and overexposure to financing risks, the use of stock as an acquisition currency appears to have distorted or disrupted the normal strategy process at the companies concerned, thus helping to account for a number of poor acquisitions that they made. In the press, Lucent has particularly been singled out for a change in the behaviour of its strategic decision makers during the boom. Toward the end of 2000, after its CEO Rich McGinn had been ousted, Lucent admitted to having declared \$679m of non-existent earnings, and is now exposed to SEC investigations and class-action shareholder lawsuits as a result.<sup>32</sup> The prime purpose of manufacturing these false earnings was to help boost the company’s stock price relative to that of its rivals, thus making its stock a more valuable acquisition as well as compensation currency. Besides encouraging such practices, McGinn himself was accused of taking a very large personal financial stake in a startup that was producing a competitive product and that had been founded by the ex-CEO of Ascend after that company had been acquired by Lucent for \$24b in 1999. Lucent was also embarrassed by revelations that when it acquired the revenue-less startup Chromatis Networks for \$4.5b in stock in June 2000, it already possessed, through its acquisition of Ignitus just three months earlier at a cost of \$240m, the same technology as Chromatis at a more advanced stage of development. In August 2000, having acquired Chromatis, Lucent cancelled further development of the Ignitus product. One year later, in August 2001, Lucent shuttered the Chromatis operations, which had failed to generate a commercializable product.

In the second quarter of 2001, Nortel declared a loss of \$19.2b on revenues of \$4.5 billion. Of the \$19.2b loss, \$12.4b represented the write-down (or “adjustment to intangible assets”) of four acquisitions completed between January 2000 and February 2001. These four acquisitions had consumed over eight percent of Nortel’s outstanding shares, and the write-down constituted 78 percent of the market value of the shares used for the purchases. Another of Nortel’s acquisitions, Clarify, which was purchased for about \$2.1b in stock in October 1999, was sold for \$200m in cash in October 2001.

The significant loss in value of these acquisitions raises the question of under what conditions a high-technology company such as Nortel, Lucent, Alcatel, or Cisco should choose to develop a new technology internally rather than acquire it externally. For example, Lucent’s Bell Labs developed an optical switch, the LambdaRouter that

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<sup>32</sup> See, for example, [www.milberg.com/lucent](http://www.milberg.com/lucent) for a lawsuit that potentially includes anyone who “purchased shares of Lucent Technologies Inc. during the period from October 26, 1999, through December 21, 2000”.



was deployed for testing in September 2000 and which was generating revenues by May 2001 (although its first customer was the “next-generation” service provider, Global Crossing, which by early 2002 had gone into bankruptcy). To access the same technology, Nortel acquired  $\chi$ ros, a startup with an unproven technology and 90 employees, for \$3.25b in June 2000, or an average of over \$36b per employee. When the  $\chi$ ros acquisition was announced in March 2000, Clarence Chandran, head of Nortel’s service provider and carrier group (and who subsequent to the completion of the acquisition was promoted to Chief Operating Officer at Nortel) was quoted as saying, “We’ve paid a very, very fair price for this” (Heywood 2000a and 2000b). In June 2001 the value of the  $\chi$ ros acquisition was substantially written down.  $\chi$ ros never did generate a commercializable product, and, in March 2002 Nortel cancelled the development of the  $\chi$ ros product. What capabilities have Nortel retained from such an investment? As two editors of Light Reading (Jander and Saunders 2002) report that “[d]espite the canning of the  $\chi$ ros project, sources inside and outside the company say Nortel plans to make the best of what it bought. Efforts are underway to merge elements of the  $\chi$ ros crossconnect with smaller switch chips, they maintain. The results, of course, remain to be seen. Meantime, the waters have closed over the once-bright promise of Nortel’s ‘jawbreaking’ all-optical switch.”

As already noted, Alcatel was the only optical networking company outside of North America that was able to use its stock as an acquisition currency. Ironically its major failure in the United States was Packet Engines, an Ethernet equipment company in Spokane, Washington for which in October 1998 Alcatel paid \$315m *in cash*. Overall Alcatel appears to have fared better than Lucent and Nortel in its acquisition strategy, in part because it was unwilling or unable to dispense billions of dollars worth of stock to acquire startups during the acquisition mania of 2000. Which is not to say that the French company did not contemplate such acquisitions. In early November 2000, when stock prices had begun to come down, it was reported in Light Reading (Raynovich 2000) that Alcatel

is feverishly scouring U.S. turf for a metro optical networking startup, and is close to buying a private company for between \$1 billion and \$2 billion . . . The most likely candidate to emerge is Astral Point Communications Inc., although Alcatel is said to have also been talking to Alidan Networks Inc., Geyser Networks Inc., and Zaffire Inc . All of these companies are private. . . . Alcatel is looking for a startup that will give it optical technology for the metropolitan area, and a customer contract or two, but the company isn't willing to pay the lofty prices of deals struck in frothier times (see Sycamore to Buy Sirocco for \$2.9B and Chromatis Sold For \$4.5 Billion), according to sources. With the stock market working in its favor, and a shakeout under way among optical networking startups, there's a good chance the company could strike a deal for under \$2 billion. The stock market has knocked 50 percent off the value of emerging networking companies in the last month. In comparison, Alcatel, an established player, has fared comparatively well; its stock is only down around 25 percent from its high this year. “Alcatel appears to think the longer they wait the cheaper Astral Point will get,” said one source in the industry, asking to remain unnamed.

In January 2002, Light Reading (Jander 2002) followed up:

Good things come to those who wait. Over a year after Alcatel first put out feelers to purchase Astral Point Communications Inc., it's agreed to buy the startup for stock worth a mere \$135 million.

It was, as we have seen, Cisco that had been the pioneer in driving enterprise growth through stock-based acquisitions as it made its way from Internetworking to optical networking. As we show below, in the decline of 2001, Cisco performed far better than Nortel, Lucent, and Alcatel in terms of revenues and earnings. Nevertheless, given the high prices that it paid for its acquisitions, when the stock market came down Cisco also experienced a collapse in the estimated market values of the acquisitions that it made at the height of the boom in 1999 and 2000. According to a recent Light Reading assessment, five companies that Cisco acquired between November 1999 and June 2000 had by early 2002 lost almost \$11b of their original \$16b market value. In April 2001 Cisco discontinued Monterey's wavelength router product, and in May 2001 sold its South Carolina DWDM manufacturing facility, based on a product line acquired with the Pirelli purchase, to Solelectron, a major contract manufacturer. Cisco's recent announcements concerning its future acquisition plans point to a reduced level of activity and, in particular, an emphasis on acquiring only startups with revenue on their balance sheets.

In light of these experiences (and we have only provided a partial account here), one would be very hard put to argue that, in making these acquisitions in the boom, these optical networking companies were intent on "maximizing shareholder value". It is much more plausible to argue that their acquisition strategies were aimed at securing technological and market leadership in a rapidly changing and highly competitive environment, and that Lucent, Nortel, and Cisco sought to take advantage of a speculative stock market in implementing their competitive strategies. There is also a certain amount of evidence, however, that can only be corroborated by in-depth company-level studies, that the availability of this "funny money" may have led strategic decision-makers at best to misjudge the technological, market, and competitive conditions of the "new economy" in optical networking or at worst to engage in individual opportunism to the detriment of the business organizations that they were mandated to lead.

## **6. The Changing Functions of the Stock Market and European Policy Debates**

As stated at the outset of this Policy Report, it was the promise of the "new economy" that it would generate innovation and growth that in the last half of the 1990s brought the debates on corporate governance from the United States to the EU. Central to this promise was a more enhanced role of the stock market in the operation of the economy, and specifically in the influencing the investment strategies and organisational structures of industrial corporations. In the midst of the Internet boom, even many supporters of the European "social market" models found it difficult to resist the notion that "innovation" and "creating shareholder value" were inextricably tied to one another. Yet there existed neither a coherent theoretical framework not a robust body of empirical evidence to show that such was the case.

The research that we have done in the CGEP project has shown that if one wants to understand the new role of the stock market in the economy and its implications for

innovation and performance, then one needs a framework for analysing a) the functions that the stock market can perform in the industrial corporation, and b) the relation between these functions and the innovation process. The starting point of the CGEP project was a theory of innovative enterprise that stresses three social conditions – strategic control, financial commitment, and organisational integration – and their interaction in the innovation process. The intellectual foundations for this theory of innovative enterprise, including its relation to the literatures on strategy, finance, and learning were elaborated in the CGEP Perspectives Report. The subsequent CGEP research on national systems and industry dynamics has enabled us not only to enrich the theory of innovative enterprise but also to connect it explicitly to an analytical framework on the four functions of the stock market. While there is nothing new about the fact that the stock market can perform control, cash, compensation, and combination functions in the industrial corporation, the CGEP project has broken new ground in both integrating these four functions explicitly into a framework for carrying out empirical analysis of the role that the stock market plays in different times, places, and industries as well as in showing how this changing role can influence the innovation process. Through our national and industry studies, moreover, we have shown how this research can be carried out and the types of insights it can yield.

We should emphasise, and caution, that the framework for analysing the relation of the stock market to the innovation process does not yield answers that can be abstracted from the historical – institutional, organisational, and industrial – contexts that shape this relation. Indeed, we believe that an important strength of our approach is our insistence on the integral relation between theory and history – including, as is evident in our industry studies, the present as history that is unfolding as we try to analyse it. In effect, in a world of innovation in particular, and socioeconomic transformation more generally, it is imperative to employ a research methodology that enables us to stay abreast of the process of change if we are to devise informed policies to affect the course of that change. As Lazonick (2002, 4) has recently argued in an article that derives in part from work done on the CGEP project:

A theory of innovative enterprise requires an understanding of the historical process that is sufficiently broad and deep so that the assumptions and relations that form the substance of the theory capture the essential reality to which the theory purports to be relevant. The development of relevant theory requires an iterative intellectual approach in which theoretical postulates are derived from the study of the historical record and the resultant theory is used to analyze history as an ongoing and unfolding process.

We now have a far clearer understanding of the relation between the stock market and the innovation process than at the outset of the CGEP project. By the same token, we would argue that the research on this relation must be ongoing if the EU hopes to devise policy approaches that regulate the role of stock market to support the innovation process in ways that contribute to stable and equitable economic growth. We do not at this point claim to have a set of policy proposals for the European Commission, and indeed we would only feel justified to draw upon our research for that purpose through an interaction with the relevant policy making bodies. As we stated in the very first sentence of our original proposal that resulted in the CGEP

project, “[t]he objective of this project is to make the analysis of the innovative enterprise central to current debates on corporate governance.”

We conclude this Policy Report, therefore, by summarizing our findings on the relation between the four functions of the stock market and the innovation process, while showing as well that, at present, a theory of innovative enterprise plays little if any role in the current European policy discussions on corporate governance in general and the role of the stock market in particular. These discussions – they can hardly be termed “debates” – continue to be dominated by a “shareholder value” perspective on the role of the stock market in the industrial corporation that, as we have shown in the Perspectives Report, contains no theory of innovative enterprise, and, more importantly, ignores an analysis of the changing role of the stock market in the innovation process. In supporting this argument, we consider the key policy documents promulgated by or circulated within the EU in recent years that deal with each of the four functions of the stock market that we have identified: control, cash, compensation, and combination.

## **6.1 Control**

For innovation to occur, insiders to the organisation must control the allocation of resources and returns. It is impossible for outsiders to understand the collective and cumulative learning processes that characterise the innovation process, and hence one cannot depend on outsiders to make decisions concerning the allocation of resources to that process. Hence the central role of insiders as strategic managers in making allocative decisions that can result in innovation.

Who are these strategic managers and what is their relation to the stock market? In publicly traded companies, strategic managers may be large shareholders. These owner-managers may be founders who have maintained the integration or ownership and control or they may be managers who have accumulated shareholdings as a result of their salaried positions. Large shareholders in strategic management positions may also be outsiders to the corporation who have taken control by agglomerating shares on the stock market and have attempted to transform themselves into insiders. Or these strategic managers may be former owners who have maintained positions of managerial control even as their ownership stakes have been reduced to small fractions of the total. Or they may be managerial personnel who as salaried employees of the corporation have worked their way up and around the organisation to positions of strategic management. Alternatively strategic managers may have been recruited from outside the company, based on their experience and performance in other posts. Those who occupy strategic management positions as salaried employees may exercise managerial control through the protection of large shareholders, in some cases the state, in other cases a family-run holding company, and in still other cases a group of stable shareholders (“noyau dur” in France), who delegate strategic decision-making power but have no interest in making allocative decisions. Finally strategic managers may exercise this control over allocative decisions by virtue of the fragmentation of shareholding on liquid stock markets, as was, for example, the case in US corporations from the early decades of the twentieth century.

Our studies have shown that these different relations between ownership and control can coexist, in some cases even among companies in the same industry based in the

same nation. Moreover the evidence shows that, even when one holds industry and nation constant, the same ownership-control relation has resulted in innovation in some cases but not in others. That is, there is no simple relation between ownership-control and the innovation process. This is not to say that the ownership-control relation is unimportant; it is only to say that its influence on the innovation process must be analysed as one relation in what we have called “the social conditions of innovative enterprise” (Lazonick and O'Sullivan 2000b).

In addressing the relation of corporate control to innovation, and the influence of the stock market on that relation, the critical policy issue is: what ensures that those who are in positions of strategic control in high-technology companies have the abilities and incentives to make innovative allocation decisions? This question is not addressed by the perspective that argues that shareholders are the principals in whose interests the enterprise should be run precisely because one cannot assume that shareholders as such have the abilities or incentives to assess innovative strategy, with all its complexities and uncertainties. This problem is implicitly recognised in the academic literature on agency in which shareholders as “principals” need to delegate decision-making power to managers as “agents”. But the problem posed by agency theory is how, in the face of “hidden information” and “hidden costs”, shareholders as principals monitor managers as agents to ensure that they act in shareholders interests, not how managers engage in innovative strategies. In the innovation process, the basic problem is *not* that information and costs are “hidden” – that is, there are asymmetries of information among participants in the innovation process. The problem is rather that, because of the technological, market, and competitive uncertainties that are inherent in the innovation process, the relevant information and costs are unknown to the participants in the process and are only learned through their interaction in that process. This is not to say the problematic of asymmetric information posed by agency theory is not a real-world phenomenon that needs to be studied. Rather it is to say that information asymmetries are not the basic problem that confronts the relations among participants in the innovation process.

In providing both liquidity and limited liability to shareholders, a major role of the stock market is to enable outsiders to invest in shares without having to assess the potential costs and prospective returns of an innovative strategy. Of course, many public shareholders do try to make these assessments, and indeed an industry of research analysts (currently in somewhat ill repute) has arisen to assist them in this endeavour. But the fact is that if they do not like what they see, they have the easy option of exit simply by selling their shares on the market. Alternatively, if they actually want to influence the strategic process that allocates resources to innovation, they will have to be able and willing transform themselves from outsiders to insiders. As strategic managers, they will then be confronted with the challenge of how to allocate resources to productive investments in the face of technological, market, and competitive uncertainty.

There thus remains a major unresolved, and generally poorly comprehended, corporate governance problem: How can societies that depend heavily on industrial corporations to invest in innovation ensure that strategic managers have the abilities and incentives to make such investments? In the case of the United States, which has generally been held up as a model of best corporate governance practice, there is evidence that before the “new economy” boom of the late 1990s major “old economy” corporations were operating in a “downsize-and-distribute” restructuring regime that shifted massive amounts of income from labour to capital, without

necessarily putting in place the foundations for renewed innovation (Lazonick and O'Sullivan 2000b). In the "new economy" boom, there is also now evidence, some of it contained, for example, in the CGEP research on the telecommunications industry but more generally revealed to the public through investigations and reports in the wake of the Enron bankruptcy, that strategic managers of major corporations used the ideology of "shareholder value", and the stock market speculation that this ideology fed, to engage in investment strategies that were touted as "innovative" but which benefited a small number of insiders at the expense of employees, suppliers, governments, and other stakeholders, including of course shareholders. In effect, stock market speculation in the name of "maximizing shareholder value", especially in the case of "technology" stocks, gave strategic managers a license to use stock as an overvalued compensation and combination currency ostensibly to engage in innovation. There is considerable evidence that such strategies entailed ill-conceived acquisitions, over-investment in capacity, the hypermobility of personnel that disrupted collective and cumulative innovation processes, and opportunism on the part of top managers who made huge amounts of money even as both shareholder value and employment opportunities in these companies were being destroyed.

To our knowledge, the European Union does not at present have a set of principles of corporate governance that can guide public policy in dealing with such managerial behaviour, much less with providing a constructive set of guidelines for influencing strategic management to promote the innovation process. In the fallout from the collapse of the "new economy" boom, public attention is focused on better disclosure, more transparent accounting methods, and the regulation of the investment banking sector, in particular the separation of investment activities from trading activities. But little attention is being focused on how corporate structures can ensure that managers as insiders allocate resources and returns to support the innovation process. Moreover, there remains a tendency, inherited from the "new economy" euphoria over "maximizing shareholder value" to view "old economy" structures such as codetermination and works councils as out of step with the demands of the "new economy" for flexibility and rapidity in decision making. Moving forward in the corporate governance debates, there is a need to rethink how the relation between managerial decision-making and the constituencies to whom management is responsible can promote the innovation process. In our view, the ideology of "maximizing shareholder value" was always a simplistic response to a complex problem of governing the corporate allocation process. From the perspective of 2002, it should be seen that it was in fact an irresponsible position to take, especially given that its proponents made little if any effort to show empirically the role that stock market played in the industrial corporation, much less how that role could contribute to, or undermine, the quest for stable and equitable economic growth.

## **6.2 Cash**

During the 1980s, it was common to portray the stock markets as short-sighted and to herald so-called bank-based financial systems such as those of Germany and Japan as providing the model of "patient capital". At the same time, as we have already mentioned, studies of corporate finance showed that funds raised on the stock market represented only a relatively small proportion of the total financial resources that industrial corporations had available to them. In the 1990s, however, there was a marked shift toward the assumption that the stock market is an important source of cash for corporations, and that those corporations that did not show sustained

increases in their stock price would be starved of new investment funds. The spectre that began to haunt Europe was that large institutional investors, particularly those from the United States who were used to getting high returns on their portfolios, would not invest in the stock of European corporations that did not show themselves to be “shareholder-friendly”, and as a result Europe would be unable to participate fully in the “new economy” boom.

There are two major problems with this argument. The first problem is that when an institutional investor buys the shares of a company on the secondary market, it is not clear how these share purchases affect the flow of cash to the corporations concerned. Nevertheless, as we have documented in the CGEP national and industry studies, during the “new economy” boom many companies in both the United States and the EU did raise substantial amounts of cash by issuing shares on the primary markets. But that very fact raises the second problem with the argument that the stock market has become central to financing the innovation process. Particularly in the presence of speculative stock markets, it is possible for a company to engage in “marketing” or “repositioning” activities that boost its stock price but that have little if anything to do with actual investments in innovation. There is a need to look carefully at what companies that raise money on the stock market *in advance of their innovative efforts* actually do with the funds that they raise. There is also a need to consider the extent to which the superior stock-price performance of companies that have in fact shown themselves to be innovative has *resulted* from their innovative successes rather than from the a priori expectations of public investors that such companies would become innovative successes. From this perspective, precisely because the success or failure of an innovative strategy can only reveal itself after the commitment has been made to pursue that strategy, one would expect the causal relation to run from successful innovation to superior stock-price performance rather than vice versa. One could argue that for many companies that have proven to be innovative – the histories of Microsoft and Cisco would provide good examples – it is only after the success of an innovative strategy that the shareholding public comes to recognise that the company is indeed innovative, with its stream of earnings giving it a track record that becomes valued on the market. At that point, however, the company is less in need of external funds than it was when it embarked on the innovative strategy, and now it has the option of choosing, if need be, to leverage its retentions through debt markets rather than equity markets to reinvest in its growth. Public shareholders may now be quite willing to finance the further growth of such companies, but the companies may have no need or desire to issue more shares to the public.

There is, in fact, a surprising lack of systematic research on the role of the stock market as a source of cash as well as on the uses to which this cash is put once it flows into the corporation. Yet the European Commission (as many other policy-making bodies around the world) has issued high-level policy documents that proceed from the assumption that the role of the stock market as a source of cash to fund enterprise growth is a well-known, and indeed an obvious, fact. Two such documents are the “Initial Report of the Committee of Wise Men on the Regulation of European Securities Markets”, released in November 2000 (EC 2000) and “Risk Capital: A Key to Job Creation”, released in December 1999 (EC 1999).

The “Regulation of European Security Markets” (“RESM”) report states at the outset that “[t]he Committee<sup>33</sup> believes that there will be significant long term benefits if the European Union can integrate its financial and capital markets quickly.” (EC 2000, 4). Specifically, the report argues that an integrated European services and capital market would improve the allocation of capital in the European economy, reduce the costs of financial intermediation, and make the EU a more attractive location for investment from outside the EU (EC 2000, 4). In promoting this agenda, the report asserts that “[t]he raising of finance through the issuance of equity and corporate bonds has now overtaken bank loans as a source of corporate funds” but that “[n]evertheless, these sources of finance are still less developed than in the US.” (EC 2000, 9) To support this argument the report refers to the following table (EC 2000, 10):

Comparative data on financial systems (euro-zone, US) (% GDP, 1999)

	Euro-zone	US
Bank loans to corporate sector	45.2	12.4
Fixed income securities:	98.8	166.2
corporates	7.4	29.0
financial institutions	36.4	46.8
public sector	54.9	48.4
Stock market capitalization	90.2	179.8

Source: ECM monthly bulletin, July 2000.

The problem with this chart – as was explained in both the CGEP Perspectives Report and the CGEP National Systems Synthesis Report – is that stock-market capitalization as a percent of GDP is a very poor proxy for “the raising of finance through the issuance of equity”. This measure tells us nothing about the extent to which the stock market was actually used a source of funds in the Euro-zone or in the United States. In an accompanying figure, the report provides data on market capitalization as a percent of GDP at the end of 1999 for EU-15 as well as Japan and the US, with the figures ranging from 16 percent for Austria to 272 percent for Finland (EC 2000, 10), but again these figures provide no information about the differences across these countries in “the raising of finance through the issuance of equity”. The only other data on the role of the stock market as a source of finance that the report presents have similar problems. It states: “The most notable growth has to date been achieved in equity, where recent annual growth rates of volumes traded have exceeded 30% per annum over the period 1995-1999” (EC 2000, 9). Trading, however, is not the same as investing. The report goes on: “New securities and new listings have been a significant component in the growth of European stock market capitalization....The number of companies listed on EU-15 exchanges has grown steadily from 6401 in 1995 to 8111 in 1999 (with the bulk of this growth occurring in the Euro-11 markets – from 3475 to 4416)” (EC 2000, 9). Again, however, listing is not equivalent to fund-raising.

The “RESM” report also provides an Annex on “Recent academic work on the links between size and growth of financial markets and the growth of output” in which the report contends:

<sup>33</sup> The committee included Alexandre Lamfalussy, Cornelius Herkströter, Luis Angel Rojo, Bengt Rydén, Luigi Spaventi, Norbert Walter, and Nigel Wicks.



In the 1990s...an expanding theoretical literature has emerged [that] has tended to depart from the traditional focus on bank financing by examining the possible links between stock markets and long-run growth. For instance, liquidity and risk based models have been designed which show that greater international risk sharing through internationally integrated stock markets result in accelerated productivity growth by inducing shifts from safe, low-return portfolios, into high-return portfolios. Until recently, however, little empirical evidence was made available to sustain the theoretical predictions foreseen by these models. However, the findings of three recent papers, briefly discussed below, shed light on this issue by showing, using new methodology, the validity of the positive predictions of the theoretical models. (EC 2000, 40)

The three papers are Rajan and Zingales (1998), Levine and Zervos (1998), and Beck, Levine, and Zervos (2000). In the Annex, the “RESM” report does not claim explicitly that any of these three papers argue that the stock market has actually been an important source of finance for long-run growth, although the statements, quoted above, imply that the reason why “an expanding theoretical literature [in the 1990s]...has tended to depart from the traditional focus on bank financing” is because “internationally integrated stock markets” have permitted a shift to stock market finance. If such is the impression that one might take away from this Annex and from the “RESM” report, it should be noted that none of the three papers that the report cites make that claim.

Levine and Zervos (1998, 538) distinguish between stock markets and banks in the process of economic growth for the sake of an empirical analysis of “whether measures of stock market liquidity, size, volatility, and integration with world capital markets are robustly correlated with current and future rates of economic growth, capital accumulation, productivity improvements, and savings rates, using data on 47 countries from 1976 through 1993.” But all of their measures of the role of the stock market pertain to its “liquidity” – that is, the value of trading on stock markets – not to its roles in financing investment. Indeed, they conclude that, in the process of growth, “banks provided different financial services from those provided by stock markets” because “measures of *stock market liquidity and banking development* both enter into the growth regressions significantly” (Levine and Zervos 1998, 554, our emphasis). Beck, Levine, and Loayza (2000), in seeking to show the empirical relation between “financial intermediary development” and the sources of growth make no conceptual distinction between bank finance and stock-market finance, while their empirical models only include measures of “private credit”. In a paper that does confront the issue of source of external finance, Rajan and Zingales (1998, 559) ask “whether industrial sectors that are relatively more in need of external finance develop disproportionately faster in countries with more-developed financial markets.” They can measure domestic credit allocated to the private sector directly. But they use stock market capitalisation as a percent of GDP as their measure of stock-market finance, not because they believe that this measure is the most appropriate, but because of the lack of a measure of funds actually raised from the stock market. As Rajan and Zingales (1998, 569) summarise the problem:

Unlike domestic credit, stock market capitalization does not reflect the amount of funding actually obtained by issuers. Instead, it reflects a composite of retained earnings, the investing public's perception of the corporate sector's growth prospects, and actual equity issues. One could argue that the amount of money raised through initial public offerings and secondary offerings is more suitable for our purpose. Unfortunately, these data are not widely available.<sup>34</sup>

One cannot assume that one of the benefits, if not the main benefit, of the stock market is that it funds economic growth if one does not have a reasonable measure of the extent to which this is the case. As a foundation for EU policy that seeks to structure and regulate the stock market to support innovation and growth, there is a need for systematic research on the role of the stock market as a source of funds for industrial corporations as well the uses of the funds that these companies raise on stock markets.

The "Risk Capital" report, which the Commission adopted in October 1999 as the Communication for the Implementation of an Action Plan (EC 1999, 2), argues that "risk capital is an essential element of growth and job creation" and that "risk capital is developing in Europe, but not fast enough and its allocation remains sub-optimal" (EC 1999, 1). Amplifying this argument, the "Risk Capital" report goes on to state:

While venture capital investment more than doubled in Europe over the last four years, only €7 billion was invested in Europe in 1998, compared with €12 billion in the USA, and the difference is even stronger in early stage investments: €1,6 billion compared with €4.5 billion in the USA. The European stock markets for high growth companies have grown strongly, but they remain dwarfs compared to the American Nasdaq.

There is no doubt about the strength of US venture capital industry and its importance to high-tech innovation in the United States. Nor is there any doubt that a liquid stock market -- one on which shares are readily bought and sold -- is of critical importance to the venture capital process. But how does the venture capital process work, and what is its relation to the stock market? This is a critical question that the "Risk Capital" report simply does not address.<sup>35</sup>

In fact, a liquid stock market is very important to the venture capital process. It is the existence of a liquid stock market that is willing and able to absorb the shares of a company when it does an initial public offering (IPO) that enables venture capitalists to cash out and reap returns on their original investments. But the venture capital process itself is not a market process. It works best at transforming innovative

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<sup>34</sup> Rajan and Zingales (1998, 569) go on to say that "actual financing" may be a misleading measure as well because "[t]he net amount raised from U.S. equity markets by large firms was negative in the 1980's". But then, one needs gross figures for the stock market as a source of funds rather than net figures that subtract out stock repurchases and the retirement of stock from cash-based mergers and acquisitions (see Lazonick and O'Sullivan 2002a).

<sup>35</sup> The report contains one paragraph on "business angels", stating that there could be between 125,000 and one million of them in Europe, followed by a page of data on the stage of an enterprise's development at which private equity investments have been made in Europe (EU 1999, 3-5).

strategies into high quality, low cost goods or services that are competitive on product markets when the venture capitalists are deeply rooted in the industry and closely involved with the entrepreneurs whose ventures they are funding. Nor is the ability of a new venture to do an IPO (and hence for the venture capitalists to cash out) a sign that the innovative strategy has been a success. It is revenues generated on product markets, not revenues generated on stock markets, that prove that in fact an innovative investment strategy has resulted in goods or services that users of these products want and at prices that they are willing to pay. In the presence of speculation, there is no necessary connection between these two types of success.

Indeed, there is a tension within the venture capitalist industry, and within many of its constituent firms between being a “patient capitalist” who waits until the company has proven itself on product markets before doing the IPO and being a “financial engineer” who looks for the best opportunity to do the IPO, regardless of how far the new venture has progressed in the innovation process. When stock markets are speculative – that is, willing to absorb companies that have not proven themselves in the innovation process of the speculation that they will -- and when institutional investors, who supply the venture capitalists with funds, are pressuring the venture capitalist firms to take advantage of this opportunity for cashing out, the industry will tend toward “financial engineering”. This tendency is, of course, greatly exacerbated when, as we now know to have been the case in the “new economy” boom in the United States, investment banks and their institutional investors conspire to pump up the price of a newly floated “technology” company. Unsophisticated investors, seeing the “opportunity” that they have missed by not buying the stock at the outset (an opportunity that in fact they did not have), are then prone to snap up the stock as it reaches its peak and, as those in the know sell, heads into a steep decline.

Although the recent US experience is not the first time that the “financial engineering” model has become evident in the US venture capital industry, it is clear that the contribution of venture capital to the innovation process has been rooted in the “patient capitalist” model (see Wilson 1995; Kenney 2000; Lee et al. 2000). Judging from the “Risk Capital” report, in the attempt to reproduce the outcomes of the US venture-capital experience, European policy-makers have over the past few years devoted too much attention to the creation of “new markets” – with the dangers of encouraging “financial engineering” that such markets in and of themselves entail -- and not enough attention to encouraging the development of the “patient capitalist” model for mobilising finance to help transform new ventures into going concerns.

### **6.3 Compensation**

A key feature of the “new economy” has been stock options, not only for high-level executives but also for non-executive personnel, especially highly-educated professional, technical, and administrative personnel. We have already seen that there is considerable ambiguity about what function stock options actually perform in the innovation process: Are they used to manage the labor market or manage the learning process? Do stock option awards encourage or undermine the collective and cumulative learning processes that are the essence of innovative organisations?

We have also seen that very little research has been done on the relation of stock options to the learning process. Yet there has been much talk of the need to import

the practice of awarding stock options into Europe and, for the sake of innovation, making them central to the way in which corporate employees are rewarded. For example, the “Risk Capital” report (EC 1999), to which we have already referred, devotes one and a half pages to a discussion of the subject, in a box entitled “the benefits of employee ownership schemes such as stock options”. In particular, the “Risk Capital” report (EC 1999, 12) argues:

*“There is considerable theoretical as well as empirical evidence pointing towards the strong contribution of employee share ownership schemes to economic growth.”* (italics in original)

What is this evidence? Firstly, the report argues (without, however, citing any sources) that stock options can play both capital-saving and labour-mobility functions for innovative companies:

For young high growth companies, stock options are a tool to attract talents they need, but cannot afford paying (sic) the high salaries large companies can offer. Granting stock options helps young companies preserve start-up capital for expenditures other than high salaries. It increasingly is a prerequisite for hiring and keeping the most innovative and entrepreneurial employees.

Secondly, the report turns to the issue of employee motivation, citing work by Douglas Kruse and Joseph Blasi<sup>36</sup> that shows “higher employee commitment among employee-owners but mixed results on satisfaction and motivation” and “a positive association between employee stock ownership plans (ESOPs) and firm performance (higher productivity and profitability), but without automatic connection.” But the “Risk Capital” report (EC 1999, 12) recognises that while “[t]here is considerable evidence of the relationship between *employee stock ownership* and firm performance,... *[u]nfortunately such work still needs to be done on stock options.*” (our emphasis).<sup>37</sup> It should be added that besides the basic question of the relationship between stock options and innovative capabilities, about which little is known, the experience of the past few years points to the need to understand the phenomena in the presence of volatile stock markets that, as we have seen, can upset the reward systems of even the most innovative companies.

## 6.4 Combination

If there is one issue that is central to the current EU policy agenda that requires an understanding of the role of the stock market in the innovation process, it is the use of stock as a combination currency. As the *Financial Times* put it in February 2002, in the wake of the release of the European Commission’s “Report of the High Level Group of Company Law Experts on Issues Related to Takeover Bids” (European Commission 2002): “Common rules for corporate takeovers have become a test for Europe’s capacity to reform itself.”<sup>38</sup> The main thrust of the proposals is that

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<sup>36</sup> J. Blasi, and D. Kruse, “Employee Ownership, Employee Attitudes, and Firm Performance,” NBER Working Paper, 1995.

<sup>37</sup> Earlier in this Policy Report, we cited some recent work on stock options that appeared in the *Journal of Employee Ownership, Law, and Finance*, but for a topic on which there has been so much discussion there has been very little systematic research thus far.

<sup>38</sup> “German takeover”, *Financial Times*, February 27, 2002.

restrictions on corporate takeovers that violate “shareholder democracy” must be dropped. In particular the takeover directive seeks to compel companies to seek shareholder approval before managers try to defend the company against a takeover bid. The authors of the “Takeover Bids” report<sup>39</sup> argue that takeover bids in Europe should be guided by two principles: 1) “In the event of a takeover bid the ultimate decision must be with the shareholders”; and 2) “the holder of the majority of risk-bearing capital should be able to exercise control” (EC 2002, 2-3, 20-22). In support of the first principle, the report contends:

Defensive mechanisms [to block takeover bids] are often costly in themselves, apart from the fact that they deny the bidder the opportunity to create wealth by exploiting the synergies after a successful bid. Most importantly, managers are faced with a significant conflict of interests if a takeover bid is made. Often their own performance and plans are brought into question and their own jobs are in jeopardy. Their interest is in saving their jobs and reputation instead of maximising the value of the company for shareholders. Their claims to represent the interests of shareholders or other stakeholders are likely to be tainted by self-interest. Shareholders should be able to decide for themselves and stakeholders should be protected by specific rules (e.g. on labour law and environmental law). (EC 2002, 21)

In support of the second principle the report states:

In the Group’s view, proportionality between ultimate economic risk and control means that share capital which has unlimited right to participate in the profits of the company or in the residue on liquidation, and *only* such share capital, should normally carry control rights. All such capital should carry control rights in proportion to the risk carried. The holders of these rights to residual profits and assets of the company are best equipped to decide on the affairs of the company as the ultimate effects of their decisions will be borne by them. This report will use the term ‘risk bearing capital’ to refer to this concept. (EC 2002, 21, emphasis in original)

As is evident in these statements, an unqualified acceptance of the shareholder perspective on corporate governance provides the starting point for the High Level Group’s consideration of reform of the European takeover code. As Frits Bolkestein, the European Commissioner for the internal market put it in an interview with the Financial Times:

We are in the business of drafting a new [takeover] directive. This is important because who makes the running in a company? Is it the board? Yes, they are the managers of a company, but what about the shareholders? I want to have a European market in shares, a shareholder democracy, one share one vote....[I]f I accept

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<sup>39</sup> The chairman of the high level group of company law experts was Jaap Winter, and the other committee members were Jan Schans Christensen, José Maria Garrido Garcia, Klaus J. Hopt, Jonathan Rickford, Guido Rossi, and Joëlle Simon.

the recommendations of Jaap Winter [chairman of the High Level Group], it would be a big step. If you have a liquid market for shares, it is efficient. We would make some headway in our competitive struggle with the US.<sup>40</sup>

When Bolkestein was asked, “Do you think managers are too dominant in European countries?”, he responded:

Yes. They run the company and, of course, nobody else is going to run the company but the management. But on issues like big pay-offs for managers who have left whopping big losses behind, or whether or not to accept a [takeover] offer, shareholders must come into their own.

While, as we have stressed from the outset of the CGEP project, the problems of entrenched management that proponents of the shareholder perspective on corporate governance have stressed is a very real issue that should be central to the policy debates on corporate governance. But an analysis of the evolution of “shareholder value” ideology in the United States since the 1980s clearly shows that, given the inherent dependence of the corporation on strategic managers (as Commissioner Bolkestein recognises), the ideology of “maximizing shareholder value” only entrenches this position further, as the “payoffs” to those strategic managers who end up in control become bigger and bigger (see O’Sullivan 2000a; Lazonick and O’Sullivan 2000a). In our view, the European takeover directive confronts a real problem, but invokes a perspective for solving the problem that from both an economic and social point of view has proven itself to be problematic in the United States – the nation that is supposedly providing the model of good corporate governance to Europe.<sup>41</sup>

For example, a restriction on “shareholder democracy” that the takeover directive would strike down is the 14 percent shareholding the Lower Saxony has in Volkswagen, thus potentially exposing the company to takeover. But, as is clearly shown in the CGEP study on Volkswagen (Jürgens 2001), that company has performed very well behind this protection. While one could perhaps argue that the threat of having that protection dropped has motivated Volkswagen employees to work harder and better, the fact is that there is no reason to believe that the company would achieve superior performance if there were no barriers to its being taken over.

At the same time the much-needed debate over corporate governance and economic performance in the EU is not advanced by the response to the EU takeover proposals

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<sup>40</sup> Francesco Guerrera and Simon Targett, “Generating shareholder power,” *Financial Times*, February 25, 2002.

<sup>41</sup> A failure to engage in a critical assessment of the experience of the United States under the “shareholder value” corporate governance regime is evident in the *Financial Times* interview when, Commissioner Bolkestein remarks that “[t]he Enron scandal has highlighted the importance of corporate governance” only to go on to say: “But, in Europe, the rejection of the takeover directive last July in European Parliament was a big setback.” Later in the interview, when asked about his views on the €100m pension that Percy Barnevik received from ABB without shareholder approval, Bolkestein responded that “if I were a shareholder in ABB, and I learned that Percy Barnevik – having left behind a whopping big loss – gets €100m tax fee, I’d be very upset.” Yet the fact is that in Europe, negative public opinion, not ABB’s shareholders, ultimately forced Barnevik to give back about half of the payout, something that to our knowledge has never occurred in the United States.

of the Wallenberg family, who make use of different classes of shares with different voting rights to maintain control of their holding company, Investor. According to the takeover proposals, a vote by shareholders on whether the board should try to defend the company from a takeover bid would be based on one-share one-vote, even in cases where the company has a dual voting rights system. According to the Financial Times: “Mr [Jacob] Wallenberg said the proposals could violate the European Convention on Human Rights as they would breach the right of owners of some of the shares to exercise their vote.”<sup>42</sup> It may be that the EU will have a debate about whether or not “shareholder rights” and “human rights” should prevail in the matter of corporate takeovers. But unless the debate asks whether or not the protection that the Investor voting structure provides to the Wallenbergs promotes or undermines the abilities and incentives of the Investor enterprises to generate higher quality products at lower unit costs, it will have nothing to do with the relation between corporate governance and economic performance.

The “Takeover Bids” report reflects the perspective of a number of influential members in the European Commission. The irony is that, in advocating shareholder rights in takeover bids, the report makes no mention of the reason why takeover bids have become just a potent mechanism of changes in corporate control over the past few years – the use of stock rather than cash as a combination currency. It can plausibly be argued that it was this use of the stock market that, taking advantage of speculation, drove the “new economy” to unsustainable heights, making the subsequent collapse in stock prices inevitable. In calling for a new “shareholder democracy” in Europe or any other reform in the governance of corporations, would it not make sense for the European Commission to launch a full-scale programme of research into how corporations make use of the stock market – for control, cash, compensation, and combination? As we have shown in the CGEP project, given the uncontested fact that the stock market has become more important in the EU, is it not a high priority to know what functions it performs for the corporations whose shares it lists and trades? It is clear that the control, cash, combination, and compensation functions of the stock market interact to influence the innovation process. Policy initiatives should *start* from an understanding of this relation. They should not start from a perspective on corporate governance that has systematically ignored the relation between corporate governance and innovation, and that, in its arguments for “shareholder democracy” and “shareholder value” fails to even identify the functions that the stock market performs. To allow such a perspective to guide the future of corporate governance in the EU is, in our view, a very dangerous prospect.

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<sup>42</sup> Christopher Brown-Humes and Francesco Guerrera, “Wallenberg attacks EU over takeover proposals,” Financial Times, January 31, 2002.

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(Note: all CGEP Project Reports, Papers, and Documents can be accessed at [www.insead.edu/cgep](http://www.insead.edu/cgep))

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