

**Radical Innovation in the Transatlantic Economy:
Is a Silicon Valley Possible in Europe?**

Jorge L. Vela

A thesis submitted to the University of North Carolina at Chapel Hill in partial fulfillment of the requirements of the degree of Master of Arts in the Transatlantic Masters (TAM) Program in the Department of Political Science.

Chapel Hill
2009

Approved by:
Liesbet Hooghe
John Stephens
Gary Marks

ABSTRACT

JORGE VELA: Radical Innovation in the Transatlantic Economy: Is a Silicon Valley in Europe Possible?

(Under the direction of Liesbet Hooghe, John Stephens, and Gary Marks)

In this paper I will discuss the role of institutional frameworks and public policy in spurring technological, “radical” innovation in Coordinated Market Economies (CMEs) such as France. The main question asked is whether high-technology start-ups can be successful in Europe. This study will start by first explaining in detail the elements of the successful “Silicon Valley” model of technological innovation. I will then examine institutional frameworks in both CMEs and in Liberal Market Economies (LMEs) such as the U.S. and analyze the factors that are relevant to technological innovation. Building on this information, the third section will provide an analysis of the possibilities for radical innovation in Europe. Finally, this study will examine these possibilities through a case study of France. Public policy starting in the 1990s to the present will be given special attention, and examples will be drawn to prove that radical innovation is possible in Europe.

ACKNOWLEDGEMENTS

I have always been interested in Europe. As an undergraduate at Boston University, I majored in European History and International Relations. Yet even then, I knew I had a lot more to learn. The University of North Carolina at Chapel Hill has had a huge role in furthering my knowledge about Europe. Being part of the Trans-Atlantic Masters Program at UNC has helped me to draw more extensive conclusions from Euro-American relations and comparisons. Therefore, I must thank all of the professors at UNC for all of their lessons and insights about the old continent. In particular, I must thank John Stephens for his lessons on comparative welfare states. I must also thank Milada Vachudova for enlightening me on the history and politics of Eastern Europe, an area of the world about which I knew little before coming to UNC. Christiane Lemke's class on European Integration was also essential in furthering my understanding of key integration theories. And, of course, I must thank Liesbet Hooghe for her expert guidance in writing this thesis. Her comments helped me look at this subject from perspectives that I would not have considered otherwise. In addition, her feedback throughout the length of my thesis writing helped me to refine my arguments and improve my writing.

In addition, I want to especially thank Deborah Hoeghe. She provided both time and insightful advice through several readings of my thesis drafts at various points in my writing. Lastly, I want to thank Sarah Hutchison, the Program Administrator for the Trans-Atlantic Masters Program. Her answers to numerous questions about the entire thesis process, as well as her outstanding efforts in informing us about important information throughout the entire Masters program, have been invaluable.

PREFACE

I wrote this thesis with the purpose of exploring a topic that has interested me ever since I started studying Europe as an undergraduate. I had two main goals in writing this text. First, I wanted to prove that the successful technological economy that has revolutionized American industry can also be encouraged and developed in other parts of the world. In particular, I wanted to prove that Europe has what it takes to encourage technological innovation, too. I also wanted to point out the accomplishments that Europe has already achieved. For example, while many may recognize technology giants such as Google and Microsoft as American, few people know that the internet application Skype originated in Luxembourg or that the French pioneered an early Internet-like communications technology called Minitel. It is through this study that I want to dispel the notion of Europe as a technological laggard. Second, I also hope that this thesis will be used to further knowledge about our transatlantic partners. I believe that learning about others is important to learning about ourselves, and thus I hope that papers like this one can be used to further knowledge about how to improve both public policy at home and cooperation abroad.

TABLE OF CONTENTS

I.	Introduction.....	1
II.	The Silicon Valley Model.....	5
III.	Institutional Frameworks and Innovation: The Varieties of Capitalism Approach.....	8
	a. <i>The Institutional Framework of Liberal Market Economies (LMEs).....</i>	11
	b. <i>The Institutional Framework of Coordinated Market Economies (CMEs).....</i>	13
IV.	Comparative Institutional Advantage and Radical Innovation in Europe.....	16
	a. <i>The Possibilities for Radical Innovation in Europe.....</i>	18
V.	Radical Innovation and the Transformation of French Institutions.....	21
	a. <i>Reasons Behind France’s New Innovation Push.....</i>	23
	b. <i>Policy Activism in Support of Technology Start-Ups.....</i>	25
VI.	Conclusions: Radical Innovation in CMEs?.....	37
VII.	Bibliography.....	39

Introduction

The United States and the European Union have the largest economies in the world, and the transatlantic economy is the world's most important in almost every sense. Thus, leaders on both sides of the Atlantic understand it is important that the US and the EU work together to deepen transatlantic economic relations, bolster the competitiveness of EU and US firms, support job creation and promote economic recovery on both sides of the Atlantic. The US and EU economies are already intimately intertwined. European investment accounts for 3.6 million jobs and over 71% of foreign investment in the United States; American investment plays an equally important role in Europe. The value of goods and services traded in both directions amounts to approximately \$900 billion annually. Without a doubt, Europe and the U.S. are each others' primary commercial partner.

Yet this strong economic relationship hides a growing economic divergence on both sides of the Atlantic. While the US economy remains the most technologically innovative in the world, European innovation is focused mainly on manufactured and consumer goods. America values the success of its world-beating biotechnology and information technology start-ups which are incubated at Silicon Valley and at other technology clusters and which rely on *radical innovation*—that is to say, single, strategy-changing breakthroughs or discoveries—to succeed in the market. Meanwhile, European industrial breakthroughs are focused mainly on manufacturing sectors such as automobiles, trains, machinery and other sectors that rely on *incremental innovation* for productivity improvement. This has led many academics to argue that the American and European economies are more complementary than in direct competition with one another. At the same time, policymakers in Europe are intent on terminating the American dominance of high-technology sectors. Given that the 2002 Lisbon Agenda for economic

development hopes to make Europe the strongest “knowledge-based economy in the world,” based on human capital, technology and growth from innovation, many think that such a challenge is imperative. Yet many argue that European research and higher education have not attained the goals necessary to propel Europe as a high-technology hub. In the meantime, the financial crisis has put into perspective the need for economies to diversify and innovate in order to stay competitive for the future.

Although it is difficult to speak of European economies as non-innovative, one point is certain: Europe is struggling to recreate the so-called “Silicon Valley model” of innovation, based on high levels of venture capital, helpful corporate governance arrangements, high-powered performance incentives for managers and employees, and flexible labor markets. This model is credited with radical innovation breakthroughs prevalent in industries such as software, biotechnology, and information technology. Europe’s failure to recreate this model is part of the reason why by the mid-1990s most European economies found themselves lagging behind the United States in the aforementioned “new economy” sectors. But what is the reality of the situation? Are Europe’s economies truly behind the United States in the race for innovation? Or do they just innovate in different sectors and/or in different ways? Many political scientists believe that the institutional frameworks of nations are crucial in understanding the differences in the results obtained on both sides of the Atlantic. Following this “varieties of capitalism” approach, we will explore the differences that arise from the fact that the U.S. is a market-oriented economy whereas European economies are “corporatist.” It is clear that the elements leading to the successful uptake of the Silicon Valley model—that is, venture capital available to finance projects, corporate legal governance arrangements, shareholder performance incentives, and flexible labor markets—are more prevalent in the liberal market economy (LME) than in coordinated market economies (CME). Most continental European economies possess none of these qualities. European companies are generally financed and governed along starkly different models than the model employed at Silicon Valley. Given their institutional framework, scholars

argue that most European economies would have to either invent new governance institutions associated with “new economy” sectors from scratch or transform existing institutions to meet the needs of high-tech start-ups.

Despite its institutional framework, can Europe still create a knowledge-based economy largely centered on new economy industries? In line with this thought, this study asks one central question: Can European governments successfully deploy policies to incubate the Silicon Valley model of organizing companies and, with it, encourage industrial success in biotechnology, software and other “radical innovation” industries? Or is the lack of success the result of long-standing national institutional frameworks that cannot be adopted to encourage commercial technological innovation? In short, the purpose of this study is to analyze the viability of the Silicon Valley model of radical innovation in Europe’s CMEs. Our hypothesis is that radical innovation in European CMEs faces three fundamental obstacles that stem from the institutional framework in place in most continental European states. First, rigid European labor markets as well as corporate and payroll legal regulations discourage industrial ventures. Second, entrepreneurship and risk-taking are not a norm in Europe, in contrast with a Silicon Valley culture that venerates risk-taking. This can be seen in the conservative financing as well as the stakeholder models characteristic of most European ventures. Lastly, the fragmentation of the European single market is a massive logistical problem that spreads resources too thin to be able concentrate knowledge.¹. This study will focus on the first two reasons given their relevance to institutional frameworks. Despite these obstacles, however, we believe that public policy changes in European CMEs can stimulate the creation of radical innovation in these economies, and we will use France as a case study to prove this point.

¹ For more information on the fragmentation of the European single market for research, read Crescenzi, Riccardo et al. (2007). *The Geographical Processes Behind Innovation: A Europe-Untied States Comparative Analysis*. Working Paper No. 81. Site: <http://host.uniroma3.it/dipartimenti/economia/pdf/WP81.pdf>.

We will explore transatlantic innovation in three sections. First, we will explain in detail the Silicon Valley model of radical innovation. Second, we will analyze the institutional frameworks of the U.S. and continental European economies in detail. In this section, we will use Germany as an example of a European economy since it is the most typical CME, Europe's largest economy, and both the world's biggest exporter and the biggest R&D expender in Europe. Finally, we will analyze if European economies can implement the Silicon Valley model—that is, how European economies innovate. We will do this through a case study of France, and consequently this section will pay special attention to the market-related change that has occurred in that country and which has propelled the Paris region to the top of the R&D charts in Europe.

The Silicon Valley Model

Before delving into a study of institutional frameworks and their effects on the innovative capacities of national economies, we must first define the Silicon Valley model which is one of the principal points of our study. This Silicon Valley model refers to a relatively standardized set of financing, governance, and organizational techniques used to package entrepreneurial ideas into new ventures. These techniques have been developed to manage the risks inherent with new technology industries such as biotechnology, software, and information technology.² The model is essentially one that supports entrepreneurship as well as innovation in industries that depend heavily on technological breakthroughs for financial success. It is a model based on high levels of venture capital, supportive corporate governance arrangements, high-powered performance incentives for managers and employees, and flexible labor markets. Radically innovative firms in these industries, in turn, are often small start-ups organized along business models that possess three important competencies that require further explanation: the management of high-risk finance, the ability to tap into human resources from an embedded social network and a flexible labor market, and the creation of sufficiently high-powered incentives for personnel.³

The first characteristic of Silicon Valley innovative firms is that they often create enormous financial returns and rely on risk-hungry investors for funding. The financial premiums at start-ups are due to the substantial financial risks produced by high-technological volatility, reliance on often unproven business models, and the danger of losing innovation races with competitors. In addition, technology start-ups also generally have high “burn rates”

² Saxenian, Anna Lee (1994). *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*.

³ Casper, Steven (2007). *Creating Silicon Valley in Europe: Public Policy towards New Technology Industries*. P. 15.

generated by large R&D costs coupled with low profitability during the early phases of a firm's development. These risks make it difficult for most start-ups to obtain credit from traditional lenders. Therefore, most startups rely on venture capitalists (VCs) and then later on the investment banking community and third-party investors through stock offerings for investment funds. In return, venture capitalists usually demand a strong hand in the governance of firms. Venture capital funding also impacts the strategic goals of start-ups by forcing the latter to have an orientation toward profitable markets in order to increase the viability of liquidating investments via initial public offerings (IPOs) or acquisitions by rival established firms.⁴

The second characteristic of Silicon Valley firms is their ability to tap into an embedded social network within a flexible labor market. Given the fast-paced and competitive nature of high-technology industries, managers need flexibility when it comes to hiring staff. To achieve this flexibility, managers must have access to a pool of technology specialists with expertise in particular areas that can quickly be recruited to work on projects. The success of these managers is partly based on their ability to entice skilled personnel to leave lucrative, "safe" positions in established firms in order to join new ventures. The presence of flexible labor markets in regional technology clusters such as Silicon Valley is essential to this strategy. In fact, regional technology clusters exist partially as a conduit by which social networks linking agglomerations of firms can develop. Within successful clusters, the strength of social networks makes it "safe" for individuals to change positions.⁵ In Silicon Valley, moving from job to job is not disruptive of personal and professional ties as it is elsewhere, argues Saxenian.⁶ It is thus no surprise that staff mobility within entrepreneurial start-ups is generally higher than at established firms.

⁴ Ibid. P. 21.

⁵ Ibid. Pp. 22-24.

⁶ Saxenian, Anna Lee (1994). *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*. P. 35.

The third characteristic of the Silicon Valley business model are the high-powered incentives used to attract exceptional employees. Successful Silicon Valley start-ups are associated with generating huge financial profits, and as a result, employees of successful technology start-ups are given financial rewards that far exceed those for equally skilled personnel working within established firms. These incentives are partially a response to the demanding work conditions associated with young start-ups trying to quickly innovate in highly competitive markets. In addition, high-powered incentives are also a response to risky knowledge characteristics within radically innovative industries. Most key discoveries within technology firms can be exploited by founding a new firm; therefore, large financial incentives are used to reduce holdup of innovations by persuading scientists or engineers to remain and work for a successful start-up. Radically innovative firms employ performance-based incentive schemes and employee ownership plans to reduce holdup risks and induce employees to commit to intense work responsibilities. Since most new technology firms have well-defined goals, large bonuses and stock options, can be tied to their achievement. The small size of most start-ups, particularly before initial success is achieved, increases the strength of ownership incentives. The existence of stock option grants in early-stage firms that have achieved success and obtained IPOs on the stock market has created huge sums of wealth for key employees. Distributing ownership of the firm across key employees and managers thus creates extremely high-powered incentives to work intensively within a firm.⁷

⁷ Casper, Steven (2007). *Creating Silicon Valley in Europe: Public Policy towards New Technology Industries*. Pp. 24-25.

Institutional Frameworks and Innovation: The Varieties of Capitalism Approach

The revered Silicon Valley model described in detail above is closely associated with the biotechnology and information and communication (ICT) industries found in American research clusters. Although continental Europe also possesses these industries, these sectors and their impact on the national European economies are on average much smaller than in the United States. Therefore, it is important to question why the Silicon Valley model is highly diffused in certain geographical regions of the world and why its presence is more limited in others.

Political scientists and economists studying corporate governance and welfare states argue that institutional frameworks within which firms operate is a central factor in explaining the structure of national economies. Their “varieties of capitalism” approach contains a positive theory of why divergence in the structure of American and European economies exists. In particular, the approach posits that divergence exists because specific national institutional frameworks create performance advantages for companies specializing in some industries, while creating obstacles in others. According to this logic, countries “develop patterns of industry specialization that conform to their *comparative institutional advantage*.”⁸ Thus, the main reason for selecting the varieties of capitalism approach is its usefulness in exploring how institutions impact and how firms and other actors strategize within their economy and its governance rules.

The varieties of capitalism approach makes clear distinctions between liberal market economies (LMEs) found in the US and the UK and coordinated market economies (CMEs) found in European states such as France and Germany (Soskice 1997). The approach explains the potential advantages and disadvantages of each set of institutional frameworks in organizing the

⁸ Hall, Peter A. and Soskice, David (2001). *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*.

economy. The LME model, a shareholder-dominated model, encourages the diffusion of each of the key practices associated with Silicon Valley firms. In particular, the success of Silicon Valley type firms in the US is the result of the existence of a financial system that encourages venture capital, corporate governance laws facilitating high-powered incentives structures within firms, and deregulated labor markets that encourage the generation of flexible labor markets. By contrast, most large continental European economies have developed elements of a stakeholder or “coordinated” model of capitalism. It is believed that national institutional frameworks within coordinated market economies (CMEs) can encourage strong industrial performance while imposing a system of “beneficial constraints” on companies by encouraging long-term employment and, with it, large company investments in industrial training and more consultative patterns of company organization common to German capitalism. This more collaborative model of company organization was buffeted by a system of financing focused more on bank credits than capital market financing, linked to stakeholder systems of company law which gave company insiders, including union representatives, seats on most company boards.⁹ The chart below highlights the main differences between these two types of institutional frameworks:

⁹ Casper, Steven (2007). *Creating Silicon Valley in Europe: Public Policy towards New Technology Industries*. P. 3.

Institutional framework architectures in CMEs and LMEs¹⁰

	LMEs	CMEs
Labor Law	Liberal (decentralized wage bargaining; competition clauses struck down by courts); few barriers to employee turnover.	Regulative (coordinated system of wage bargaining; competition clauses enforced); bias toward long-term employee careers in companies.
Company Law	Shareholder system (minimal legal constraints on company organization).	Stakeholder system (two-tier board system and codetermination rights for employees).
Skill Formation	Skill formation: No systematized apprenticeship system for vocational skills. Links between most universities and firms almost exclusively limited to R&D activities and R&D personnel.	Organized apprenticeship system with substantial involvement from industry. Close links between industry and technical universities in designing curriculum and research.
Financial System	Primarily capital-market system, closely linked to market for corporate control and financial ownership and control of firms.	Primarily bank based with close links to stakeholder system of corporate governance; limited hostile market for corporate control.

From this perspective, the appeal of the Silicon Valley model of organizing new technology firms represents a strong test to the varieties of capitalism theoretical approach. This section will establish the elements leading to a successful uptake of the Silicon Valley model in

¹⁰ Table borrowed from Casper, Steven (2007). *Creating Silicon Valley in Europe: Public Policy towards New Technology Industries*. P. 27.

national economies through the use of a “varieties of capitalism” approach to explain the different developments in technology innovation that occur in the United States and Europe. The first subset of this section focuses on the institutional characteristics a liberal market economy (LME), with specific attention on the architecture found in the United States. In the second subset, the LME model is contrasted with the coordinated market economies (CME) model of organization typical of large continental European nations. The different governmental and nongovernmental institutions available in both are discussed in depth.

The Institutional Framework of Liberal Market Economies (LMEs)

LMEs are characterized by shareholder-dominated corporate governance that favors high-powered incentives, extensive access to venture capital, largely deregulated labor markets, and low levels of firm-specific skill formation. Shareholder-dominated corporate governance is written in company law and property rights that are primarily financial in nature. At the firm level, owners (the shareholders) enjoy a high amount of autonomy in governing the firm. No legally stipulated rights of board representation for employees or other stakeholders in the company (e.g. the government) exist. Company boards are composed of the main shareholders and have a large amount of autonomy within the firm. One of the most common policies associated with this shareholder-dominated tradition is the creation of high-powered incentives for top management. This comes in the form of high salaries, the awarding of company shares, and stock options included in financial packages. Large bonuses in any or all of these forms create opportunities for top performers to quickly advance through firms, and at the same time reinforce the unilateral decision-making of the board. While this system rewards success handsomely, it also allows boards to quickly remove¹¹ top managers deemed underperforming.

¹¹ Casper, Steven (2007). *Creating Silicon Valley in Europe: Public Policy towards New Technology Industries*. P. 27.

Shareholder-dominated corporate governance in LMEs is complemented by the existence of large capital markets that can fund the activities of companies. Given the extensive access to funds, company formation and levels of entrepreneurship and creative management are generally high in LMEs.¹² Entrepreneurs in LMEs are often not deterred by substantial capital requirements when developing products and ideas. Since many of these entrepreneurs do not have sufficient funds to sustain projects during their formative stages, they must seek outside financing. The extensive access to venture capital—the private equity that individual or group investors make available to young companies seeking launch and/or early development financing—enjoyed by start-ups makes these projects feasible and attractive depending on the potential for success. Such financing tends to be short-term in nature, meaning that the value of company shares will rapidly decline if firms fail to meet growth or profitability goals or if products expectations fail to materialize in the marketplace. This system is reinforced by an active marketplace for corporate control, suggesting that controlling shareholdings in failing firms can easily be bought by other groups, who can then engage in radical restructuring including the hiring and firing of senior management. Companies that do meet growth or profitability expectations can raise substantial new funds through additional stock offerings or can use their shares as currency for acquisitions.

To support unilateral decision-making at shareholder-dominated companies and high employee turnover, LMEs possess deregulated labor markets. To preserve flexibility, top management at most firms offer limited employment contracts to managers and skilled personnel. A corporate governance system focused on short-term incentive contracts reinforces this system. Extensive career mobility also permeates the ranks of middle management and skilled personnel. In addition, company law in LMEs does not restrict the mobility of skilled personnel within a given industry. Courts often ignore “competition clauses” inserted into employment contracts to

¹² For more info on entrepreneurship and creative management in LMEs, read Koepp, Rob (2002). *Clusters of Creativity: Enduring Lessons on Innovation and Entrepreneurship from Silicon Valley and Silicon Fen.* & Drucker, Peter F. (2006). *Innovation and Entrepreneurship.*

prevent poaching. Therefore, poaching of personnel is widespread.¹³ At the same time, strong informal and formal networking, especially in clusters like Silicon Valley, means that inter-firm mobility is naturally high and that the risk of taking on short-term employment contracts does not dissuade employees.

As a result of short-term employment norms, education and skill formation are not firm-specific but rather general. The corporate governance structures of most public companies make it difficult for them to credibly offer long-term employment, and thus employees become unwilling to undertake roles within companies that lead to what economists call firm-specific skills, or knowledge that is not easily transferable to another company. At the same time, high employee turnover and poaching of personnel create incentives against significant company investment in the skills of their employees as well as a reliance on organization routines drawing on general skills that can be purchased in the marketplace. This leads to a lack of industry involvement in apprenticeships within LMEs as well as a system of professional training dominated by general purpose degrees paid for by individuals or governments.¹⁴

The institutional framework of Coordinated Market Economies (CMEs)

In contrast to LMEs, CMEs are characterized by stakeholder systems of corporate governance. Stakeholders in companies include management, employers and the unions that often represent them, banks, and other shareholders. The system is characterized by greater employee loyalty and more solidarity and consensus-building between employees and management. This stakeholder system of corporate governance, coupled with strong labor market regulation, promote long-term employment. Within large firms, managers and skilled personnel usually enjoy long-term employment, often after an apprenticeship or internship. In most CMEs, organized labor also enjoys power on supervisory boards as well as through formal consultative

¹³ Ibid. P. 29.

¹⁴ Culpepper, Pepper D. (2003). *Creating Cooperation: How States Develop Human Capital in Europe*.

rights over training, work organization, and hiring to obtain unlimited employment contracts. The main repercussion for this type of company organization, then, is that managers must try to create a broad consensus across the firm when major decisions will be made. Unilateral decision-making is limited, and it is difficult for senior managers to create high-powered incentives for individual employees. Performance rewards are targeted at groups rather than individuals, and bonus schemes are limited. Another implication is that career structures become well-defined and are primarily based on education and experience within the firm rather than on short-term performance. Promotions occur based on seniority and educational credentials rather than on short-term individual performance.¹⁵

Corporate governance rules also affect financial relationships and ownership within CMEs. Financial relationships in CMEs are characterized by bank or credit-based financial systems. Companies can obtain loans for long-term investments so that assets can be easily secured, such as land, capital investments, mergers, and acquisitions. However, funding for riskier investments, such as the human capital intensive R&D common in technology start-ups, is more limited; companies in CMEs must rely on retained earnings for such investments.¹⁶ In addition to a funding role, banks and other large financial actors (e.g. insurance companies) can also have a strong oversight role on firms through seats on supervisory boards and through continuing ownership ties in public companies. Thus, banks in CMEs adopt a long-term focus in part because they know that firms are able to offer long-term commitments to employees and other stakeholders in the firm, and because they can often monitor the status of their investments through seats on supervisory boards.¹⁷

¹⁵ Casper, Steven (2007). *Creating Silicon Valley in Europe: Public Policy towards New Technology Industries*. P. 29.

¹⁶ Ibid.

¹⁷ Deeg, Richard (1999). *Finance Capitalism: Banks and the German Political Economy*.

Lastly, heavy labor market regulation and long-term investing strategies by stakeholders in CMEs favor the development of firm-specific knowledge investments in employees that are not easily transferrable to other firms. These investments include extensive in-house vocational training following long apprenticeships or internships. Such arrangements tend to lock-in owners, managers, and skilled employees into long-term, organized relationships. Labor market regulations, such as legal obstacles to hire-and-fire, combined with consultative patterns of work organization, thus favor competence-enhancing human resource policies. Within CMEs management must treat employees as a fixed rather than as a variable cost, and thus there is a strong interest in developing long-term career structures for all skilled employees.¹⁸

¹⁸ Streeck, Wolfgang (1984). *Industrial Relations in West Germany: A Case Study of the Car Industry*. New York: St. Martin's Press.

Comparative Institutional Advantage and Radical Innovation in Europe

Each model of company organization thus possesses benefits and constraints when it comes to fostering technological innovation. Could it be true, then, that the CME institutional framework puts European states at a comparative disadvantage with the more liberal-market oriented United States? This is certainly what Peter Hall and David Soskice argue in their *comparative institutional advantage* theory.¹⁹ For these two political scientists, the pro-stakeholder corporate governance, the rigidity of labor markets, and the conservatism of the financial sector common to continental European states all contribute to the lack of an entrepreneurial and risk-taking culture that rewards individual performance. Instead, argue Hall and Soskice, the more regulative and organized national institutional model of CME stakeholder capitalism allows companies to pursue successful long-term, “incremental innovation” strategies within medium-technology industries, such as engineering, automobiles, and chemicals, due to its reliance on widespread industrial training and collaborative workplaces that are hard to sustain in the more short-term, shareholder-dominated liberal market model. In turn, LMEs lack appropriate institutions to support long-term success in these industries, leading to poorer performance in those areas, yet the natural access to venture capital, high-powered incentives and flexible labor markets means that the more radically innovative industries (e.g. biotechnology, information technology, and software) flourish in this system. Likewise, CMEs, given their adversity to high-risk finance, short-term employment and high-powered incentives for individuals, lack the elements necessary to support project-based firms pursuing failure-prone

¹⁹ Hall, Peter A. and Soskice, David (2001). *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*. Pp. 375-378.

technology strategies. Due to long-term employment expectations, consensus decision-making, and a lack of investment capital for risky ventures, most large firms within CMEs invest in cumulative, “incremental,” technology that is less likely to fail.

What does this mean for the place of Silicon Valley radical innovation in Europe? National institutional frameworks within CMEs clearly create obstacles to radically-innovative start-ups. For one, obtaining high-risk financing for start-up projects is difficult in CMEs. Capital markets within CMEs are underdeveloped and focus on large, established companies with predictable revenues. This severely limits the viability of IPOs for new technology companies, particularly during the early stages when earnings and profits are limited and most investment is poured into R&D. Therefore, venture capitalists (VCs) would lack a reliable method to liquidate successful investments quickly. VCs must therefore take a longer-term perspective, liquidating poorly performing companies and then waiting long periods for shareholdings within successful firms to become liquid through a friendly acquisition or an IPO. VCs in CMEs thus cannot adopt portfolio investments that promise relatively short-term returns, and the illiquidity of shares also dampens further outside investment funding.²⁰

Stakeholder systems of company law also create obstacles to the normal VC-dominated governance styles of technology start-ups. Firstly, the norm of taking into account the opinions of stakeholders in the decision-making process means that boards, owners, and other shareholders are denied the flexibility to execute the decisions they think are best. Secondly, such cooperative system of governance might detract many VCs who hope to have a decisive voice in company affairs from investing. Lastly, even if start-ups imitate the Silicon Valley model of governance at first, as firms grow, consensus-based company governance take place in these developing companies. When firms start seeking IPOs, they must adopt company law structures mandated for public companies, which undoubtedly include employee representation in all CMEs.

²⁰ Casper, Steven (2007). *Creating Silicon Valley in Europe: Public Policy towards New Technology Industries*. P. 34.

A rigid labor market also presents many obstacles for technology start-ups in CMEs. First, long-term employment strategies used by large firms within CMEs limit the ability of start-ups with substantial failure risks to recruit experienced managers and skilled personnel and also limit “hire-and-fire” strategies” used to manage technological viability. Second, compared to an LME, the risk of moving to a start-up is substantial in CMEs. If most individuals expect to be employed by one company for a long time, they will not be actively seeking jobs. An individual leaving a “safe” job has no guarantee that he/she will find employment there again if the start-up which he/she joined failed. In addition, there is also the risk that upon moving firms, his/her firm-specific skills will be devalued. CME labor regulation thus limits the size and growth of labor markets for skilled personnel.

Lastly, the difficulty of providing high-powered incentives for individuals also does much to limit the success of technology start-ups in CMEs. This is due to the fact that start-ups in CMEs must design incentive schemes for employees in the shadow of the practices and norms of large firms within the economy. Large firms within CMEs avoid creating high-powered incentives for managers, unilateral decision-making structures, and opportunities for rapid career advancement because these organizational structures go against the logic of established institutional frameworks and would risk alienating long-term stakeholders to the firms.²¹ Yet if they wish to lure away skilled personnel from more established competition such as large firms or the public sector, start-ups have to offer incentives strong enough to make the risk of leaving a “safe” position worthwhile.

The Possibilities for Radical Innovation in Europe

Given all the institutional framework obstacles to radical innovation within CMEs, is it possible to foster world-beating radically innovative industries in continental European CMEs? As mentioned before, scholars who favor the varieties of capitalism approach argue that

²¹ Ibid. Pp. 35-37.

institutions within CMEs advantage more cumulative (incremental) technological trajectories in which long-term employee commitment and training and so-called patient finance is important. Sustained patterns of vocational training within firms, consensual decision-making, long-term employment, and patient finance are all linked to the systematic exploitation of particular technologies in a number of medium technologies characteristic of many engineering and chemical markets. Yet while conventional varieties of capitalism scholarship would argue that LMEs and CMEs possess comparative advantage in certain economic sectors and therefore complement each other better than they compete, one could also argue that management practices and entrepreneurial cultures have as much to do with technological innovation as institutional frameworks. A more comprehensive approach would thus include both institutional frameworks *and* policies designed to improve financial incentives and labor mobility as well as to develop an entrepreneur-friendly environment.

One of the principal policies associated with the success of the Silicon Valley model is the widespread use of ownership share options. Options may also be viable within CMEs, in that they create a collective incentive across all employees of the firm; if the firm becomes publicly listed and thereafter sees its share price increase, then all owners of the firm profit. If senior management of companies can credibly disperse share options as a tool to reward individual performance, they could create high-powered incentives as seen within LMEs. Small companies in their start-up phase seem more likely to do this, as they are farthest removed from employee representation laws that tend to conduce toward lower powered, collective employee incentives.

An obstacle for CMEs promoting radical innovation that can be solved through public policy is the lack of employee mobility. While national institutional frameworks within CMEs clearly create labor market and corporate governance obstacles to start-ups, it is possible to develop regional technology clusters and sustain patterns of flexible labor market coordination in CMEs that are more conducive to flexible personnel policies within technology start-ups. Unlike LMEs, where deregulated labor markets make inter-firm mobility naturally high, within CMEs

start-ups must circumvent dominant patterns of labor market coordination and career management.²² Regional clusters, such as Cambridge's Silicon Fen and France's Sophia Antipolis, can overcome this obstacle by building on successfully intertwined networks of managers, skilled personnel, and investors.²³

Lastly, some scholars argue that the regulatory and administrative environment of CMEs within which firms operate can be enhanced through public policy. Regulations regarding stock options, as mentioned before, can be amended so that these may be used as a high-powered incentive for skilled personnel, but one could also amend the tax environment in which firms operate. In addition, public policy can support research linked to important technological innovations through large sums of state funding. Meanwhile, the administrative burden on small firms can also be lightened through reform. All of these options can and have been tried to some extent in European CMEs, and there is much evidence of its success in certain cases, pointing to the fact that radical innovation, while not natural to coordinated economies, can be supported through policy activism.

²² Ibid. Pp. 36-37.

²³ Saxenian, Anna Lee (1994). *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*.

Radical Innovation and the Transformation of French Institutions

An interesting case study for the viability of radical innovation in CMEs is France. This section will demonstrate how institutions in France have adapted to market demands in order to facilitate radical innovation in a corporatist market framework. I concentrate on France as it is a major representative of corporatist states in Europe. This study will draw heavily on the works of Elisabetta Bertero, Pepper Culpepper, Michel Goyer, Trumbull Gunnar, Mary O'Sullivan, Vivien Schmidt and others who have written extensively on the transformation of French corporate governance in the 1990s and early in the millennium as well as on the changes in corporate governance in the past two decades in general. These academics point out that the French corporate regime has morphed substantially to facilitate research and innovation for companies and universities. French reforms have also focused on increasing the access of technological start-ups to venture capital and other sources of private equity. In addition, the French financial market has become more market-oriented in order to serve the needs of firms that are conducting more and more research into radical innovation fields. From the French experience, we hope to discern whether a Silicon Valley is a possibility in Europe.

Reform of French innovation policy first emerged in the mid-1990, and these changes had to overcome a French tradition of state involvement in the economy. The French state historically played a central role in developing and commercializing new technologies. In addition, the state was also the primary sponsor and user of new technologies. The new technologies served the power and purposes of the state in two ways. First, their complexity meant that firms required extensive government support in the promotion of new research. The elite *Centre national de la recherche scientifique* (CNRS) created a network of research labs intended to support basic research in the national interest. Therefore, through CNRS the postwar

French state was able to direct the development of new technologies. Secondly, the technologies often had explicit national goals. Military research allowed France to manufacture advanced weapons. Space launch technology gave France worldwide surveillance capabilities. And an aggressive nuclear power program allowed France to reduce its energy dependency on the Middle East. These new technologies thus served to concentrate and reinforce the French state's control over key sectors of the economy.²⁴ Meanwhile, large firms cooperated willingly because of the complexity of their projects. French industrial innovation projects had been ambitious and largely successful because of high levels of government financial and research support for large state-run companies that carried them out. Thus Airbus (commercial aircraft), Dassault (military jets), Areva (nuclear reactors) and Groupe Bull (computers) all succeeded in the post-war economy because of their collaboration with the French state. Large firms were favored over smaller ones, since the latter presumably lacked the market power and economies of scale necessary to promote economic efficiency.

The features of the French political economy that so closely aligned the interests of the technology sector and the state also posed challenges for promoting innovation in the new information and communications sectors. France's tradition of state-initiated innovation tended to concentrate France's technical elite within the state-run sectors. Those with the greatest capacity for technological innovation were mainly working for the government. Secondly, the success of earlier government-funded innovation projects had led French citizens to associate innovation with government initiative, yet the rapid pace of technological and market development in the new information and communication technologies (ICT) did not favor government initiatives but rather small and flexible start-ups. Thirdly, the dominant role of the central government had weakened local authorities that could have promoted decentralized private-sector innovation projects. France's postwar economic trajectory concentrated expertise,

²⁴ Gunnar, Trumbull (2004). *Silicon and the State: French Innovation Policy in the Internet Age*. P. 5.

political responsibility, and institutional capacity at the state level.²⁵ This posed real problems for cultivating technology-intensive innovation in small firms.

French politicians expressed great concern about whether their country could adopt the institutions necessary to promote high-tech start-ups without importing all of American-style capitalism. France possessed few of the necessary liberal economic institutions associated with information and communication revolutions. France's civil code legal system and strong regulatory tradition, for example, placed brakes on company creation and failure, while "Anglo-Saxon" common law legal system and its tradition of laissez-faire regulation imposed low costs on company creation and failure. Many also believed that moving to a decentralized model of innovation required risky changes in policy. This high level of risk would drive a rapid cycle of company formation and failure that would challenge France's traditional emphasis on job security and the socialization of risk. In addition, the French public feared that high-powered incentives necessary to draw scientists and investors into risky ventures would widen inequalities. France's efforts to promote a French Silicon Valley therefore generated a heated political debate focused on its compatibility with France's social contract.²⁶

Reasons Behind France's New Innovation Push

Despite the risks, French innovation policy underwent radical changes. The new emphasis on promoting high-tech start-ups in France addressed two economic concerns: France's poor performance in new economy sectors, the loss of skilled workers, and high unemployment. With regards to the first, French leadership was responding to concerns over an apparent innovation lag in France. By the 1990s, France had issued fewer patents and possessed relatively fewer researchers than most of its OECD partners (5.9 percent of the workforce, compared to 7.4

²⁵ Ibid. P. 6.

²⁶ Ibid. Pp. 6-7.

percent in the US and 8.3 percent in Japan).²⁷ The government was particularly concerned about innovation in the high-technology sectors, like ICT and biotechnology. The lack of commercial success of French start-ups in these fields was particularly worrying. French science research prospered, but entrepreneurs failed to translate laboratory findings into commercially viable technologies. Commercialization of these new technologies appeared to depend on the context of new and dynamic firms funded through private venture capital and other non-government sources. Also, both ICT and biotechnology sectors appeared to rely on small, dynamic firms to create and commercialize new products. France needed both private money and small firms.

France in the late 1990s also confronted concerns about a brain drain. The number of French citizens living abroad had grown, from 1.64 million in 1995 to 1.78 million in 1998. Over half of those lived in other countries in Western Europe, and 20 percent had moved to the U.S.²⁸ This trend was of particular concern to France's leaders because the emigrants were overwhelmingly young and highly educated; France's technically trained elite was increasingly moving to join vibrant start-ups that were developing overseas. In addition, the flight of France's technically skilled youth also represented a loss of tax revenue. At the same time, the most highly educated graduates who remained in France continued to favor traditional career paths. A preference for pursuing a professional career with an established employer was strongly felt. Apart from providing a stable source of income, France's largest employers—including the state—offered a position of status in French society. Preoccupied by a growing technology lag, and driven by the fear of losing highly trained technicians to foreign firms or to the civil service, France was determined to create a domestic analog to Silicon Valley.

Lastly, the prospect of new job creation that the small-firm sector offered was also attractive. Newly-created firms in technology sectors were seen as a particularly important

²⁷ France, for example, contributed only 2.5 percent of the total cost of research to the human genome project, compared to 33 percent from Britain and 55 percent from the US.

²⁸ Gunnar, Trumbull (2004). *Silicon and the State: French Innovation Policy in the Internet Age*. P. 18.

source of new jobs by Jospin's administration. And that faith was well-placed, since a 1995 study showed that technology companies formed by researchers created three times as many new jobs as did other kinds of new companies.²⁹ The promotion of a new high-technology sector dominated by successful small firms offered not only the prospect of rapid new job creation, but also a set of new high-wage, high-skill jobs.

Policy Activism in Support of Technology Start-Ups

Although reform faced many challenges given the nature of the CME-like institutional framework in place in France, support came from three places. First, the governments in power supported reform as a way to increase their visibility in ending France's unemployment and brain drain problems. Second, technocrats in France's civil service, many of them engineers from the *Ecole Polytechnique*, also enthusiastically supported the revolution in information technology in French government services in the late 1990s. Lastly, entrepreneurs supported government activism in innovation, not least because they hoped that government policy would facilitate research into new technologies as well as increased dissemination of technology into market products. Consequently, many entrepreneurs joined *Croissance Plus*, a new advocacy group designed to impose a new model and culture of entrepreneurship in the country.³⁰

In order to remain economically competitive against the United States and the United Kingdom, the co-habitation government of President Jacques Chirac and Premier Lionel Jospin put in place a vast array of new policies designed to promote new information and communications technologies in France that were both efficient and as inexpensive as possible. These changes included substantial reform of the regulatory framework within which small start-ups operated to encourage entrepreneurship, the growth of private resources available for R&D and initial funding of technology start-ups, a stronger public sector commitment to research, the

²⁹ Desjardins, Thierry (2000). *Arrêtez d'emmerder les français!* P. 219.

³⁰ *Croissance Plus*. Web Site : <http://www.croissanceplus.com/>

decreasing of the administrative burden imposed on small companies, the improvement of government-business communication through technology, and the creation of public infrastructure to support key technological fields.

The first important sphere which the French government reformed through its innovation policies was the regulatory framework available to entrepreneurs. Starting in the mid-1980s, French policymakers worked to create an *entrepreneuriat*, a new class of risk-taking, educated business leaders who would promote new company creation in high-tech sectors. One prominent program aimed at the entrepreneur class, called *Aide aux chômeurs ou repreneurs d'entreprises* (Aid to Unemployed Founders of Companies, ACCRE), granted a special exoneration from social security payments to the formerly unemployed who chose to start their own businesses. Started in 1984, the program had a noticeable impact on firm creation, with a 2001 survey of company owners reporting that 36.2 of them had been unemployed before they created a new company.³¹ Yet subsequent government increasingly saw ACCRE as an inefficient way to encourage new company formation. Especially in new technology sectors, entrepreneurship appeared to require high levels of skill, expertise, and creativity.

France's new focus of high-tech start-ups therefore shifted to a strategy of cultivating entrepreneurship among France's most technically skilled workers: those who took jobs either in government labs or in France's largest companies. This was a challenge since French corporate governance still lacked the high-powered incentives for employees of start-ups common to LMEs. It was little wonder, then, that France's highly trained elites went from elite *grandes écoles* into secure positions in the R&D departments of large established firms. The Jospin government hoped to lure technically skilled personnel out of safe government or industry positions by providing the possibility for attractive compensation to offset the risks of entrepreneurship. The primary strategy focused on reforming the regulation of stock options. French policymakers believed that stock options were a valuable tool in compensating

³¹ Gunnar, Trumbull (2004). *Silicon and the State: French Innovation Policy in the Internet Age*. P. 12.

entrepreneurs for the high risks associated with creating new start-ups, thus creating a high-powered incentive to support the development of small technology firms. In addition, stock options could be used to align management interests with those of shareholders, and thus give managers a personal interest in raising the value of the company.

The first step towards reforming stock option regulation centered on creating a favorable tax status for stock options and removing a ceiling on the number of options any individual employee could receive. Edouard Balladur achieved this during Chirac's first term, and he thus opened the way to use stock options as a component of executive compensation. But in 1992, stock option liberalization was revoked when Jean Artius, Juppé's finance minister, raised the tax on stock-option earnings.³² In 1997 Alain Juppé also increased the social contributions due on stock options by raising the tax on capital gains on stocks to 40 percent held for over five years and to 54 percent during the time period before.³³ Then the government of Jospin proposed reversing this trend toward overtaxing stock options. In 1999, Dominique Strauss-Kahn (DSK), Jospin's finance minister, proposed lowering the tax rate on stock options to 26 percent, equal to the standard tax rate for all capital gains in France. He also proposed reducing the mandatory holding period required to receive this favorable tax treatment from five to three years. To ensure transparency, companies would be required to list managers receiving stock-option packages so that share-holders could monitor their levels of compensation. French companies had by that time become heavy users of stock options, with 93 percent of CAC40 companies offering stock-option plans and CAC40 company employees exercising €2.6 billion worth of stock options in 1999; these figures made France the second largest user of stock options in the world, behind

³² Leparmentier, Arnaud, "Les bases d'imposition de l'épargne sont élargies pour taxer l'argent qui dort," *Le Monde*, 22 September 1995.

³³ Graham, Robert. "The soft option: The compromise reached over the taxing of executive share incentives in France suggests far-reaching corporate reform may be some way off." *Financial Times*, 28 April 2000.

only the United States.³⁴ Yet despite their popularity and wide spread use, stock options were still regarded with suspicion in France since they could lead to excessive compensation packages for top executives. In the end, Strauss-Kahn's plans were scuttled because Meder, France's largest employer association, opposed the legislation on grounds of lack of transparency.

In anticipation of such strong political opposition, Strauss-Kahn made plans for a similar compensation instrument. Nearly identical in function to the traditional stock option, the new instrument, the *Bons de souscription de parts de créateurs d'entreprise* (BSPCE), were highly restrictive in their application. They were available to companies less than seven years old, with 75 percent individual ownership, and that were not yet traded on a stock market. The 1999 law on innovation and research extended the BSPCE considerably, and by 2002 they applied to companies up to fifteen years old, with only 2.5 percent individual ownership, and traded on any of Europe's high-tech stock exchanges. For entrepreneurs, the BSPCE offered a workable solution for a critical need. More important, this novel stock option format allowed the political left and right to come together around a consensus that compensation was acceptable in the context of genuine risk-taking.³⁵

Another place in which the French government mobilized political support was in the cultivation of private resources for risk investment. Among the primary sources for private investment was to be the French citizen. In an effort to tap France's high savings rate to promote technological innovation, the Juppé government proposed tax incentives for ordinary French households to invest in venture capital in 1996. The so-called *Fonds communs de placement dans l'innovation* (Mutual Funds Invested in Innovation, FCPI) offered tax advantages for individual investors who placed their funds in highly innovative firms. These funds, run by private fund managers, were required to invest 60 percent of their capital in medium-sized firms focused on

³⁴ Jacquin, Jean-Baptiste *et al.* "Nouvelles fortunes, nouvelles moeurs." *L'Expansion*, 14 September 2000. http://www.lexpansion.com/economie/nouvelles-fortunes-nouvelles-moeurs_15241.html.

³⁵ Gunnar, Trumbull (2004). *Silicon and the State: French Innovation Policy in the Internet Age*. P. 25.

innovation that were either not publicly listed or listed on France's high-tech stock market, the *Nouveau Marché*. The terms of the FCPI were fiscally attractive. If the FCPI was held for five years, earnings and value added were exempt from tax, although they were susceptible to a 10 percent social contribution. To qualify for these exemptions, target companies had to show that they were "intensely innovating," and this could be shown by companies through spending at least one-third of their revenues over three consecutive years on R&D or, for younger companies, by receiving certification from the state innovation agency, the *Agence nationale pour la valorisation de la recherche* now *Agence française de l'innovation* (ANVAR). ANVAR became a gatekeeper for private funding to new innovative companies. Of all high-tech start-ups created in France between 1987 and 1999, 84 percent had enjoyed ANVAR support, and out of these, 70 percent stayed in business for at least ten years. In addition to the private funds it raised, the FCPI program raised a new generation of venture capital fund managers, many of which were recruited from the private sector or from the civil service.³⁶

Despite the rise of the individual investor, the bulk of French private equity for innovation would still come from traditional institutional investors. Some of these institutional investors, like private pension funds, were foreign and thus often negatively depicted because of perceptions that they favored shareholder value over employment security. Yet the bulk of private equity investment was to come from French banks. Banks had always funded French innovation, often through direct loans to start-ups that were guaranteed by the state. For example, the state-owned *Banque du Développement des Petites et Moyennes Entreprise* (Development Bank for Small and Medium-Sized Enterprise, BDPME) offered guaranteed funding, and commercial banks were also increasingly investing in venture capital funds. Private banks like *Crédit Agricole* also created their own funds (*Crédit Agricole Création*) to fund start-up projects so as to not miss out on important investment opportunities.

³⁶ Ibid. Pp. 45-49.

A third and increasingly important institutional source of capital for French start-ups was France's large corporations. Liberalization of French corporate governance and the decline of bank-funded innovation for France's large technology firms forced them to adopt more cost-effective approaches to innovation. Often this simply meant acquiring companies as a means of obtaining new technologies. For truly new technologies or markets, however, French companies increasingly began taking equity stakes in small start-ups, especially those pursuing work in areas related to their own core businesses. To this end, many of France's large technology firms created their own corporate venture capital funds. Large companies with their own venture capital branches included Schneider and Pinault-Printemps-Rédoute (PPR).³⁷

At the same time that the private sector was investing heavily in radical technology, the French state solidified its commitment to innovation and research. In 1998, Dominique Strauss-Kahn allocated €153 million from the sale of France Télécom stock to create a fund that would promote high-tech sectors in France. Indeed one of the reasons for the partial privatization of France Télécom had been precisely to raise funds that could be invested in new technologies. A large share of these funds, €91 million, went to a government-funded venture capital program: the *Fonds public pour le capital risqué* (Public Funds for Venture Capital, FPCR). This money was supplemented by €46 million from the European Investment Bank (EIB), and the combined €137 million fund was managed by France's state financial institution, the *Caisse des Dépôts et Consignations* (CDC).³⁸ And the FCPR was only one of several domestic investment fund structures provided by the French state. Today, France also provides fiscal incentives for private equity and venture capital investments through the *Fond Commun de Placement dans l'Innovation* (FCPI), and the *Fond d'Investissement de Proximité* (FIP).³⁹

³⁷ Ibid. Pp. 50-52.

³⁸ Ibid. P. 53.

³⁹ European Private Equity & Venture Capital Association. "Benchmarking Tax and Legal Environments - 2008." Accessed on 4 September 2009 from <http://www.evca.eu/uploadedFiles/Benchmark.pdf>. P. 59.

The French state also provides several fiscal incentives for business R&D expenditures and capital expenditure, cooperation between firms and universities/research institutes, and for the creation or spin-out of innovative firms from parent firms. Key among these is the *Crédit d'impôt recherché* (CIR), which applies to expenses related to R&D operations and since 2008 amounts to 30% of research expenses lower than or equal to €100 million, and 5% of research expenses above this threshold. The expenses cover human and material resources dedicated to an eligible R&D program, such as staff expenditures and subcontracting costs. France was also the first European country to launch a fiscal incentive scheme to support young and innovative companies in 2004, the *Jeune Entreprise Innovante* (JEI) scheme. The state provides a special company tax rate of 15% for small and medium-sized enterprises (SMEs) on the first €38,120 of profits, with any excess taxed at the standard rate.⁴⁰ Lastly, the 1999 Law on Innovation and Research eliminated the restriction that prohibited public researchers from taking a stake in a private company. It also permitted employees to take a *congé creation d'entreprise* (company creation holiday), granting up to six years' leave of absence, including social security coverage, with a guarantee of receiving one's old job upon return.⁴¹

Another key area which the French government prioritized was lowering administrative barriers to new firm creation. France had long been criticized for bureaucratic excess and regulation, and this was increasingly a problem for company formation. Therefore, the state's reforms took two forms. The first, more ambitious reform sought to lower the administrative burden of company interaction with the French government. One of the greatest burdens faced by French companies was submitting reports to the government on the status of their business and work force. Ninety percent of all reports sent by companies to the government were mandatory labor- and welfare-related declarations. Company registration was also slow, as it took about 15

⁴⁰ Ibid.

⁴¹ "Loi sur l'innovation et la recherche du 12 juillet 1999." *Ministère de l'Enseignement supérieur et de la Recherche*. Web Site: <http://www.enseignementsup-recherche.gouv.fr/technologie/mesur/loi/inovloi.htm>.

weeks to register a company in France in 1999, compared with at most eight weeks in Germany, four in Britain and two in the United States.⁴² This burden of paperwork fell disproportionately on small employers without specialized accounting departments, as well as on heads of new companies. Not only was the administrative burden for new companies an impediment to entrepreneurs, it also might have depressed hiring among small firms who did not want to deal with the excessive paperwork involved in the process.⁴³ Red tape thus stifled entrepreneurship.

France's effort to reduce the administrative burden on small companies focused less on deregulation and more on streamlining business interaction with the government. For instance, the Jospin administration opened regional offices across France to consolidate the procedures for registering new companies. These *Centres de formalités des entreprises* (Centers for Company Procedures, CFE) were located in regional chambers of commerce and were designed to centralize advice and paperwork dealing with French companies. These *guichet uniques*, or single access points, for business-government interaction provided all the information necessary to create or modify a legal corporation, thus substantially speeding up company registrations.⁴⁴

The Internet and e-government facilities proved especially useful for implementing the *guichet unique* strategy. The French government aggressively embraced the Internet in the hope of easing the administrative burden on companies and individuals. The government website www.service-public.fr made almost all government forms and information available online. By embracing the use of electronic means for registration paperwork, the French government greatly simplified the company creation process and even drew favor from unions and small business associations for this simplification. These rapid advances put France at the forefront of

⁴² "France's Economy: Now for the hard bit," *The Economist*, 6 July 2000.
http://www.economist.com/world/europe/displaystory.cfm?story_id=E1_QSNT.

⁴³ Gunnar, Trumbull (2004). *Silicon and the State: French Innovation Policy in the Internet Age*. P. 28.

⁴⁴ *Ibid.* P. 30.

e-government.⁴⁵ One reason e-government was pursued so successfully was that it allowed the government to ease the administrative burden on small companies both at a low cost and without instituting a politically difficult program of deregulation.

A second legal reform that was introduced by the Jospin government was a new flexible type of company, the *Société par action simplifiée* (simplified stock company, SAS), adapted to the needs of technological start-ups.⁴⁶ This new type of company differed markedly from the two common legal forms of company existing in France at the time: the *Société anonyme* (SA) and the *Société à responsabilité limitée* (SARL). For both of these types of companies, government regulation set the precise relationship between owners, managers, and shareholders. At the time, most start-ups were being formed as limited-liability SARLs. Therefore, the government first started its reforms by lowering the costs of creating this latter type of company, which would now be spread over five years. Also, social payments by new SARLs were reduced by 30 percent for the first year and 15 percent during the second year of operation.

However, the SARL corporate form limited shareholder control over management. Many feared that this separation could be damaging to high-technology start-ups, whose potential creditors, in particular venture capitalists, might invest only if they could partially guide the decision-making process of the new company. With this in mind, the Jospin administration created a new legal form for high-tech start-ups, a variant of the SAS. This form of joint-stock company was established to provide established companies with the framework for undertaking collaborative projects. The *Loi sur l'innovation et la recherche* of 1999 (Law on Innovation and Research) created a revamped SAS for technology start-ups that could be formed by individual entrepreneurs.⁴⁷ Although the new SAS was limited to privately-owned companies that could not

⁴⁵ Ibid.

⁴⁶ Ibid. P. 28.

⁴⁷ “Loi sur l’innovation et la recherche du 12 juillet 1999.” *Ministère de l’Enseignement supérieur et de la Recherche*. <http://www.enseignementsup-recherche.gouv.fr/technologie/mesur/loi/inovloi.htm>.

issue stock publicly, the “technology” SAS offered other advantages. It permitted companies to create their own rules for management and stockholders. This allowed different classes of shares to be granted different voting rights, a necessary condition to attract initial rounds of venture capital. Furthermore, the new SAS format allowed new start-ups to issue stock options, something not permitted under the SARL format. Finally, the new SAS format eliminated work councils in company management, thereby streamlining decision-making.⁴⁸

In addition to enhancing the corporate framework, the private funding, and the administrative environment in which start-ups operated, the government also provided public infrastructure for start-ups. Jospin’s government tried to rationalize the system of government research centers in order to create better communication among communities of researchers, entrepreneurs, and industrialists working with similar technologies. Their goal was to place researchers and practitioners in close contact with one another, so that new ideas could cross the boundary from laboratory to industry. French restructuring supported two different visions of technology transfer: the idea of the research network, and the model of the technology park. Both approaches were designed to bring together state research labs and private companies working in related fields of technology. With regards to the former, the Jospin government set out to create sixteen innovation networks that linked existing researchers with industry, by sector. The network model was embodied in the new *Réseaux de recherché et d’innovation technologique* (Networks for Research and Technological Innovation, RRIT). The goal of these networks was to help direct government research funds to worthy projects. In the absence of an independent agency, like the National Science Foundation, to distribute research funds, the RRITs played the role of such an agency. By 2002, France had created thirteen of these networks, all in technical fields in which the government believed important commercial advances could be made.⁴⁹

⁴⁸ Gunnar, Trumbull (2004). *Silicon and the State: French Innovation Policy in the Internet Age*. P. 33.

⁴⁹ Ibid. P. 35.

A second effort emphasized the importance of technology clusters, *technopôles*, in promoting the skills, infrastructure, and communication necessary for technical innovation. Existing and new research facilities were grouped by technological fields into twelve technology research centers throughout France. These technology parks were the site of collaboration between government labs and national champions pursuing major technological projects. Toulouse, for instance, became a major center of French aerospace research and activities. Grenoble became the center of French semiconductor research through government collaboration with Thomson-CSF.⁵⁰ These *technopôles* were integrated into a new set of *Centres nationaux de recherche technologique* (National Centers for Technological Research, CNRT). Unlike the research networks, these new CNRTs were intended to promote technologies requiring expensive platform technologies. They also provided a way to balance concerns about regional development in France with the new technology incentives of the government. Lastly, they provided a cluster of interaction within which formal and informal networks of innovation could be formed, thus injecting some flexibility into skilled personnel markets.

All of these reforms had a positive effect on the success of radical innovation firms in France. For example, since the 1990s the environment for technological innovation in France has improved significantly. By 2008 the country was ranked first in Europe for access to venture capital and other sources of private equity for investment. The overall tax and legal environment for financial innovation investments in France is also very favorable. Pension funds and insurance companies are free to invest in assets, and many therefore invest in technology firms that are looking for funding or that are listed on the *Nouveau Marché*. In addition, France offers a good environment to incentivize companies to innovate, and R&D incentives are also available.⁵¹ Perhaps most importantly, France now ranks 6th on INSEAD's Global Innovation Index for the

⁵⁰ Ibid. P. 37.

⁵¹ European Private Equity & Venture Capital Association. "Benchmarking Tax and Legal Environments - 2008." Accessed on 4 September 2009 from <http://www.evca.eu/uploadedFiles/Benchmark.pdf>. P. 54.

speed of starting up a business and 4th for the overall quality of infrastructure that it offers its innovating companies, results that speak volumes about the reforms.⁵²

There is much debate among academics of French corporate governance about the implications of institutional change. The idea that the French financial system in the early 21st century has undergone a systemic shift towards an outsider, market-oriented system is often found in academic and popular discourse. Goyer, for example, argues that the “transformation of the French system of corporate governance is nothing short of impressive: in less than a decade, France shifted from an insider to an outsider model.”⁵³ From this perspective, state control has decreased and the demands of financial markets, especially those of foreign institutional investors, now strongly influence the actions of French corporations. Therefore, it would seem that France has developed a financial system similar to that of an LME. If this interpretation is correct, the question that naturally arises is whether the rest of French capitalism is in tune with this shift. Schmidt, in contrast, rejects the notion that French capitalism has become systemically incoherent as a result of the transformation of its financial institutions. She argues that “while France’s state capitalism has been transformed through market-oriented reforms, it has become neither market capitalist nor managed capitalist. Rather, it has moved from ‘state-led’ capitalism to a ‘state-enhanced’ capitalism, in which the state still plays an active albeit much reduced role.”⁵⁴ This study supports the latter view, but does not rule out the possibility that marketplace demands might have supremacy over certain decisions.

⁵² INSEAD (2009). “Global Innovation Index 2008-2009.” Web Site: <http://www.insead.edu/facultyresearch/centres/elab/documents/GIIFinal0809.pdf>. P. 113.

⁵³ Goyer, Michel (2001) “Corporate Governance and the Innovation System in France, 1985-2000.” *Industry and Innovation*, P. 148.

⁵⁴ Schmidt, Vivien A. (2003) “French Capitalism Transformed, Yet Still a Third Variety of Capitalism.” *Economy and Society*, P. 526.

Conclusions: Radical Innovation in CMEs?

Despite all the institutional framework obstacles to radical innovation within CMEs, it is possible to spur radically innovative industries within the confines of that framework. This paper has provided a concrete example of this through the case study on France. By enhancing the corporate framework in which technology start-ups operate, increasing the private funding options on which they depend, decreasing the administrative burden that stifles them, and supporting them both with public infrastructure and with government funds and fiscal incentives, France has succeeded in creating a welcoming environment for technology entrepreneurs within a traditionally corporatist state. In addition, the traditional patterns of vocational training within firms, consensual decision-making, long-term employment, and patient finance linked to the systematic exploitation of particular technologies still exist alongside radically innovative technologies and the framework in which they operate.

Thus, some of the aspects associated with the Silicon Valley model can be adopted by CMEs. Stock options may be viable within CMEs, provided that they create a collective incentive across all employees of the firm. Labor mobility, though not legally enshrined, can be somewhat achieved through the clustering of firms and research as well as through the creation of high-powered incentives (stock options) to attract state and/or large firm employees. Lastly, public policy can enhance regulatory and administrative environments in the favor of technological start-ups. Tax laws can be amended, research and fiscal support granted, private sources of venture capital and private equity can be identified and harnessed, and bureaucratic procedures simplified. All of these options have been tried in several CMEs. These systems have innovated in an atmosphere that afforded them a different kind of comparative institutional advantage. The lesson is thus clear. If the Lisbon Agenda goals are to be met at any point in the

next few years, it is imperative that Europe's CMEs keep producing imaginative and innovative public policy that will allow them to support technology start-ups and the entrepreneurs and institutions behind them.

Bibliography

Allianz Economic Research and Development (2009). *European Growth and Jobs Monitor 2009: Indicators for Success in the Knowledge Economy*. Web Site: <https://www.allianz.com/static-resources/en/images/egjm2009.pdf>

Audretsch, David B. et al. (2002). *Entrepreneurship Determinants and Policy in a European-U.S. Comparison*. New York: Kluwer Academic Publishers. Web Site: <http://site.ebrary.com.libproxy.lib.unc.edu/lib/uncch/docDetail.action?docID=10053311>.

“Benchmarking Tax and Legal Environments -2008.” *European Private Equity & Venture Capital Association*. Website: <http://www.evca.eu/uploadedFiles/Benchmark.pdf>

Bertero, Elisabetta (1994). “The Banking System, Financial Markets, and Capital Structure: Some New Evidence from France.” *Oxford Review of Economic Policy*, 10(4), 68–78.

Businessweek (2008). “Special Report on European Innovation.” Web Site: http://www.businessweek.com/globalbiz/europe/special_reports/20080428europeaninn.htm.

Casper, Steven (2007). *Creating Silicon Valley in Europe: Public Policy towards New Technology Industries*. Oxford: Oxford University Press.

Center for Economic Performance (October 2006). “Boosting Innovation and Productivity Growth in Europe: The hope and the realities of the EU’s ‘Lisbon agenda.’” Paper No'

CEPPA007. Web Site: <http://cep.lse.ac.uk/pubs/download/pa007.pdf>.

Coniez, Hugo (2008). *La Faillite des Universités Françaises?* Paris: Ellipses Edition.

Crescenzi, Riccardo et al. (2007). *The Geographical Processes Behind Innovation: A Europe-Untied States Comparative Analysis*. Working Paper No. 81. Department of Economics, Università Degli Studi Roma Tre. Web Site: <http://host.uniroma3.it/dipartimenti/economia/pdf/WP81.pdf>.

Crossance Plus. Web Site : <http://www.croissanceplus.com/>

Culpepper, Pepper D.; Palier, Bruno; and Hall, Peter A. (2006). *Changing France: The Politics that Markets Make*. New York: Palgrave Macmillan.

Culpepper, Pepper D. (2005) “Institutional Change in Contemporary Capitalism: Coordinated Financial Systems since 1990.” *World Politics*, 57, 173–199.

Culpepper, Pepper D. (2003). *Creating Cooperation: How States Develop Human Capital in Europe*. Ithaca, NY: Cornell University Press.

Deeg, Richard (1999). *Finance Capitalism: Banks and the German Political Economy*. Ann Arbor, MI: University of Michigan Press.

Desjardins, Thierry (2000). *Arrêtez d'emmerder les français!* Paris: Pion.

DG Education and Culture, European Commission (April 2009). "Higher Education in Europe" from *Europa - The European Union On-Line*. Web Site:
http://ec.europa.eu/education/policies/educ/higher/higher_en.html.

Drucker, Peter F. (2006). *Innovation and Entrepreneurship*. New York: Harper Paperbacks.

European Private Equity & Venture Capital Association. "Benchmarking Tax and Legal Environments -2008." Accessed on 4 September 2009 from
<http://www.evca.eu/uploadedFiles/Benchmark.pdf>.

Eurostat, European Commission (2008). *Science, Technology, and Innovation in Europe*. Luxembourg: Office for Official Publications of the European Communities, 2008. Web Site:
http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-30-08-148/EN/KS-30-08-148-EN.PDF.

"France's Economy: Now for the hard bit," *The Economist*, 6 July 2000. Retrieved 4 September from http://www.economist.com/world/europe/displaystory.cfm?story_id=E1_QSNT.

Global Entrepreneurship Monitor (2008). "GEM 2008 Global Report." Web Site:
<http://www.gemconsortium.org/>.

Goyer, Michel (2007), "Institutional Investors in French and German Corporate Governance: The Transformation of Corporate Governance and the Stability of Coordination." (Center for European Studies Program for the Study of Germany and Europe Working Paper Series 7.2) Retrieved 4 September from http://aei.pitt.edu/9282/01/Goyer_revised.pdf.

Goyer, Michel (2003), "The Transformation of Corporate Governance in France," *The Brookings Institution: US-France Analysis Series*. Washington, DC: The Brookings Institution. Retrieved 4 September from
http://www.brookings.edu/~media/Files/rc/articles/2003/01france_goyer/goyer.pdf.

Goyer, Michel (2001) "Corporate Governance and the Innovation System in France, 1985-2000." *Industry and Innovation*, 8(2), 135-158.

Graham, Robert. "The soft option: The compromise reached over the taxing of executive share incentives in France suggests far-reaching corporate reform may be some way off." *Financial Times*, 28 April 2000.

Griliches, Zvi (1992). "The search for R&D spillovers." *Scandinavian Journal of Economics*, 94, S29-47.

"Gross Domestic Expenditure on R&D." *OECD Factbook 2008*. Web Site:
http://www.buconero.eu/wp-content/uploads/2008/10/oecd_research_exp.pdf.

Gunnar, Trumbull (2004). *Silicon and the State: French Innovation Policy in the Internet Age*. Washington, D.C.: Brookings Institution Press.

- Hall, Peter A. (1986) *Governing the Economy: the Politics of State Intervention in Britain and France*. Cambridge, Polity Press.
- Hall, Peter A. and Soskice, David (2001). *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*. New York: Oxford University Press.
- INSEAD (2009). “Global Innovation Index 2008-2009.” Web Site: <http://www.insead.edu/facultyresearch/centres/elab/documents/GIIFinal0809.pdf>.
- Jacquin, Jean-Baptiste *et al.* “Nouvelles fortunes, nouvelles moeurs.” *L’Expansion*, 14 September 2000. http://www.lexpansion.com/economie/nouvelles-fortunes-nouvelles-moeurs_15241.html.
- Koeppe, Rob (2002). *Clusters of Creativity: Enduring Lessons on Innovation and Entrepreneurship from Silicon Valley and Silicon Fen*. West Sussex, UK: John Wiley & Sons, Ltd.
- Larany, Geoffroy, “Créateurs d’entreprise: ce que l’Etat fait pour vous,” *Creascopie*, 21 September 2000. Retrieved 4 September from <http://www.creascopie.net/contenu/creascopie/1109.phtml> .
- Lazonick, William and O’Sullivan, Mary (2002). *Corporate Governance and Sustainable Prosperity*. New York: Palgrave Macmillan.
- Leparmentier, Arnaud. “Les bases d’imposition de l’épargne sont élargies pour taxer l’argent qui dort.” *Le Monde*, 22 September 1995.
- “Loi sur l’innovation et la recherche du 12 juillet 1999.” *Ministère de l’Enseignement supérieur et de la Recherche*. Web Site: <http://www.enseignementsup-recherche.gouv.fr/technologie/mesur/loi/inovloi.htm>.
- Lundvall, Bengt-Åke (1989). “Innovation as an interactive process – from user-producer interaction to national system of innovation.” In Giovanni Dosi, Christopher Freeman, Richard Nelson, Gerald Silverberg and Luc Soete (eds.), *Technical change and economic theory* (Chapter 17). London: Pinter Publishing.
- Organization for Economic Cooperation and Development (2009). “Highlights from Education at a Glance 2008.” Paris: OECD Publishing. Web Site: <http://browse.oecdbookshop.org/oecd/pdfs/browseit/9609011E.PDF>.
- Organization for Economic Cooperation and Development (2009). “Competitive regional clusters: national policy approaches.” Paris: OECD Publishing.
- Organization for Economic Cooperation and Development (2000). *Economic Survey: France*. Paris: OECD Publishing.
- O’Sullivan, Mary (2007). “Acting Out Institutional Change: Understanding the Recent Transformation of the French Financial System,” *Socio-Economic Review*, 5, 389–436, doi:10.1093/ser/mwm005.
- O’Sullivan, Mary (2005). “Analyzing Change in Corporate Governance: The Example of France.” In Keasy, Kevin; Thomson, Steve R.; and Wright, Mike (eds.), *Corporate Governance:*

- Accountability, Enterprise, and International Comparisons* (Chapter 15). Malden, MA: John Wiley & Sons.
- O'Sullivan, Mary (2001). *Contests for Corporate Control: Corporate Governance and Economic Performance in the United States and Germany*. New York: Oxford University Press.
- Palier, Bruno and Martin, Claude (2008). *Reforming the Bismarckian Welfare System*. Malden, MA: Wiley-Blackwell.
- Potter, Jonathan (2008). *Entrepreneurship and Higher Education*. Paris: OECD Publishing.
- Pro Inno Europe: DG Enterprise and Industry, European Commission (2008). "European Innovation Scoreboard 2008: Comparative Analysis of Innovative Performance." Web Site: http://www.proinno-europe.eu/EIS2008/website/docs/EIS_2008_Final_report.pdf.
- Saxenian, Anna Lee (1994). *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*. Cambridge, MA: Harvard University Press.
- Schmidt, Vivien A. (1996) *From State to Market? The Transformation of French Business and Government*. New York: Cambridge University Press.
- Schmidt, Vivien A. (2003) "French Capitalism Transformed, Yet Still a Third Variety of Capitalism." *Economy and Society*, 32(4), 526–554.
- Smith, Helen Lawton (2006). *Universities, Innovation and the Economy*. London: Routledge.
- Scott, Allen J. (1988). *New Industrial Spaces: Flexible Production Organization and Regional Development in North America and Western Europe*. London, Pion.
- Soskice, David (1997). "German Technology Policy, Innovation, and National Institutional Frameworks," *Industry and Innovation*, 4, 75-96.
- Streeck, Wolfgang (1984). *Industrial Relations in West Germany: A Case Study of the Car Industry*. New York: St. Martin's Press.
- Streeck, Wolfgang (March 1996). *German Capitalism: Does It Exist? Can It Survive?* (The Kellogg Institute Working Paper #218). Retrieved 26 August 2009 from <http://www.nd.edu/~kellogg/publications/workingpapers/WPS/218.pdf>.
- Vitols, S. (2001). "Varieties of Corporate Governance: Comparing Germany and the UK," in Peter Hall and David Soskice (eds.), *Varieties of Capitalism*.
- Vogel, Steven K. (1996). *Freer Markets, More Rules: Regulatory Reform in Advanced Industrial Countries*. Ithaca, NY: Cornell University Press.
- Wixted, Brian (2009). "Innovation System Frontiers: Cluster Networks and Global Value." Berlin, Heidelberg : Springer-Verlag Berlin Heidelberg.
- Ziegler, J. Nicholas (1997). *Governing Ideas: Strategies for Innovation in France and Germany*. Ithaca: Cornell University Press.