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Competing Interests and Strategies in the Information Society

1.1 Introduction

This is a book about how visions of the information society are interacting with the profound technological changes in information and communication technologies. These interactions will shape our lives and work in the opening decades of the twenty-first century. Our primary attention is devoted to Europe, the place where *we* live and work, but neither visions nor technologies stop at border crossings. European developments are powerfully influenced by understandings of the visions of other societies, notably the United States, and by the global character of technological developments. Distinguishing the European character of the information society¹ vision from other visions is one of the major themes of this work. In making this distinction, we are guided not only by the public expressions of policy-makers in Europe, but also by the objective distinctions of Europe, in social, cultural, technological, and economic development, from other areas of the world. While these distinctions highlight the differences between Europe and the United States or Japan, they also emphasize important similarities between Europe and many other areas of the world. Within Europe there are major disparities in economic development, populous as well as small countries, and a diversity of political economies and social orders. Thus, while we expect this work will interest American and Japanese readers, we hope that readers in other countries and regions will find the European experience particularly relevant to their own situations.

The profound technological change that is our subject is also known as the information revolution which had its origin following World War II in the innovation of the modern digital stored-program computer. A reasonable date to assign to the

This chapter draws upon research that was summarized in Bernard *et al.* (1997; 1996); Cattaneo *et al.* (1998).

¹ Throughout this work we utilize the term 'information society' to refer to statements about the use of information and communication technologies and the related social, economic, political, and cultural developments linked to the growing availability of new forms of information and means of communication. In some instances we use the term to highlight statements about the European information society originating from the European Commission, the European Parliament, or the Information Society Forum. The first two of these institutions are politically accountable while the third has a broad membership and considerable linkage to political process. The statements of these institutions therefore are taken to represent a measure of policy consensus about a specific vision of the information society in Europe.

beginning of this revolution is the summer of 1946.² Much has been written and remains to be written about the progress of this revolution over the past half century from the viewpoints of technological and business history. This book is, however, about the *use* of information and communication technologies rather than about the history of their *production*. Moreover, our concern is with relatively recent times during which that use is becoming widespread. The process through which information and communication technologies are becoming ubiquitous artefacts follows the widespread commercialization of the personal computer during the 1980s. Yet, it is only during the last decade of the twentieth century that the cascades of innovations in information and communication technologies accumulated to yield the complex social and economic interrelationships that are the principal subject of this book. Most of our attention is devoted to this last decade, a decade marked by new beginnings in western Europe with the formal establishment of the European Union, and in eastern Europe, by a transition towards market economies.

A decade of new beginnings inevitably will produce new visions of where those beginnings might be leading. One such vision is that of the 'information society'; the idea that the information revolution opens a path to new opportunities for sustainable growth and development, new potential for social inclusion and representation, and new ways to achieve social and cultural expression. This vision, and our analysis, cannot be separated, however, from the course of social, economic, and technological developments that make these new opportunities possible. The course of these developments need not be, nor is it, a smooth and easy passage. There are many obstacles, blockages, rapids, whirlpools, and waterfalls in the stream of developments. These are providing the potential for catastrophe, for contests over control of the journey, and for all of the other dramas of travel. Throughout this work, we identify many of these hazards and their consequences and we indicate where the course of the journey appears to be smooth and rapid. Although we are convinced that every journey, including the journey towards the information society, is certain to have unpleasant moments, we acknowledge at the outset that this is a journey that will be undertaken; we can only benefit by charting the troubled waters as well as the smooth. Every journey, and every vision, has a beginning. Although the journey towards the information society has many such beginnings, a good place to commence our analysis is with the vision articulated by the European Commission shortly after the

² This date is chosen because a summer school at the Moore School of Electrical Engineering entitled 'Theory and Techniques for the Design of Electronic Digital Computers' was attended by twenty-eight individuals from the United Kingdom and the United States and both countries were also represented on the lecture staff (M. R. Williams, 1985: 303). British attendees and their colleagues at their home universities were the first to construct working machines at the University of Manchester in 1948 and Cambridge University in May 1949 (ibid. 334). The American effort at the Moore School was slowed by departures of key individuals as a result of disputes over patent rights and opportunities to pursue corporate careers. The Moore School team did not complete the machine initially envisaged as the first stored program digital computer until 1952 while two of those who had left, John Mauchly and Pres Eckert, achieved the first North American machine late in the summer of 1949 (ibid. 1985: 353, 363). Although the idea of the stored program computer predates the summer workshop, a considerable amount of information about war-time developments and ideas remains secret and the whole subject of the invention of the stored program idea continues to be controversial.

implementation of the Maastricht Treaty and the inauguration of the European Union.

1.1.1 A Vision for the Future

The 1993 European Commission White Paper *Growth, Competitiveness, Employment: The Challenges and Ways Forward into the 21st Century* has proven to be the most influential and enduring policy statement articulating the vision of the information society yet produced (European Commission, 1993*b*). Its influence is indicated by the extent to which it is referenced by subsequent policy documents.³ Its endurance can be partially explained by its timing. It was issued in December 1993, one month after the Maastricht Treaty came into force and was, therefore, the European Commission's first high-level statement of policy for the European Union subsequent to the Treaty. While this timing assured the historical significance of the White Paper, its continuing influence stems from the way that it articulates the relationships between pressing policy concerns and builds a case for a specific set of policy actions. The centrality of information society issues in the analysis contained in the White Paper served to highlight the particular significance attributed to these issues by policy-makers as well as the priority of actions responding to the opportunities and challenges of the information society. From this perspective, the White Paper's influence and endurance reflect the persistence of the central policy issues that it addresses.

The opening question of the White Paper is 'Why this White Paper?' The answer is succinct: 'The one and only reason is unemployment. We are aware of its scale and of its consequences too. The difficult thing, as experience has taught us, is knowing how to tackle it' (*ibid.* 9).

In the text that follows the heading 'There is no miracle cure', the Commission dispenses with protectionism, Keynesian deficit spending, reduced working hours and job sharing, and widespread wage reductions as possible solutions. A brief analysis highlights how the coincidence of cyclical, structural, and technological influences acts to exacerbate the extent of the unemployment problem.

The White Paper linked reducing unemployment to building the information society by noting the significance of information and communication technologies for stimulating growth and employment. Indeed, the 'dawning of a multimedia world (sound—text—images)' was seen as a 'radical change comparable with the first industrial revolution' (*ibid.* 13). This bit of hyperbole clearly was meant to convey the dynamism and excitement of technological developments rather than to stand as an

³ Many of the major European Commission reports following the White Paper refer to it, usually as a 'touchstone' or starting-point, see European Commission (1995*f*; 1996*m*; 1997*e*; 1997*f*). For example European Commission (1997*f*: 16) characterizes the White Paper in the following terms: 'A range of Community initiatives have attempted to give a concrete form to the impact of the social and societal implications of the information society following the landmark White Paper in 1993, and the Bangemann Report published the following year.' The latter is discussed below.

opening to a precise historical analogy. A more insightful explanation of the expected linkage appears in the supporting (preparatory) work to the White Paper:

The competitiveness of the European economy will to a great extent depend both on the conditions of utilization and on the development and application of these technologies. Since they are amongst the highest growth activities in industrialized countries, and they are also highly skilled labour activities, their potential for employment creation is considerable, in particular for the creation of new services. At the same time, potential drawbacks of widespread use of these new technologies, such as the risk of non-skilled people being left behind by progress in information technologies, should be combated through positive policies. (ibid. 197)

The last sentence of this paragraph links the promotion of the information society to the very strong commitment that the White Paper makes to issues of solidarity between the employed and unemployed as well as between the genders, generations, regions, and the poor.⁴

The motives for promoting the stronger development of information and communication technologies in Europe in the White Paper, therefore, are apparently straightforward. Within a context of fiscal discipline and stringency, the potential for information and communication, and other new technologies (biotechnologies and eco-technologies are also mentioned), to enhance European growth and competitiveness, is seen as central. Job creation is expected to follow the enhancement of growth and competitiveness. The White Paper vision of the information society is, therefore, in the first instance, an invocation of improved growth and competitiveness through technological progress that pledges to seek mitigation for any negative impacts of the technology that might threaten a broad commitment to social solidarity. Although information society developments have failed to provide the engine of growth that is contemplated, this has not yet led to a rejection of their value. For example, the unemployment issue was to persist throughout the 1990s and unemployment remains the defining European public policy issue.⁵ Instead of disappointment with information society developments, citizens and policy-makers have attributed responsibility for slow employment and output growth to the barriers to change within European society. These barriers include factors such as the inflexibility of employment contracts, the difficulties of establishing new enterprises, and the persistence of market power in the European economies.⁶

⁴ With regard to the poor, the White Paper specifically highlights the 50m. Europeans subsisting below the poverty line (European Commission, 1993b: 15–16).

⁵ The UK and The Netherlands made substantial progress in reducing unemployment during the years following the White Paper. Two-thirds of the EU countries that had substantial unemployment in 1994 (ten of the fifteen; Denmark, Luxembourg, and Austria are the three other exceptions) have continued to suffer from unemployment rates exceeding or approaching 10% of the total labour force.

⁶ For economists, market power is, in the first instance, the ability to raise prices above the level that would prevail in a fully competitive economy. Price increases are possible when there are effective arrangements for restricting competition or output such as implicit or explicit cartels, restrictive distribution arrangements that limit entry, or government regulations that limit competitive behaviour. A more general understanding of market power is the existence of the ability to establish arrangements that will influence the perceived profitability of potential entrants and thereby affect their behaviour or limit the willingness of financial markets to provide capital investment.

The information society vision presented by the White Paper, however, is considerably more detailed than the basic argument that appears in its opening pages. Two further sections, one within the body of the White Paper and one in Part B (which reports on supporting work), develop richer foundations for the information society vision.

The White Paper visualizes an information society in which the advance of new technology is inexorable: 'it would be fruitless to become embroiled in a fresh dispute about the "machine age", as was the case with the first industrial revolution. Worldwide dissemination of the new technologies is inevitable' (ibid. 23).⁷ Yet, it is also one in which some form of social regulation may have a role: 'The aim must be not to slow down this change but, instead, to control it in order to avoid the dramas which marked the adjustments in the last century but would be unacceptable today' (ibid. 23).⁸

The positive features of the inexorable movement towards the information society are emphasized. The information society means new methods of production involving changes in the organization of companies, in managers' responsibilities, and in the relations with workers. In particular, changes are anticipated in work hours, the growth of remote working relationships (teleworking), and the terms of labour contracts and compensation. For enterprises, possibilities for 'forging forms of partnerships and *co-operation* on a scale never possible before' (ibid. 22, emphasis added) are anticipated. And 'it is in Europe's interest to meet this challenge since the first economies which successfully complete this change . . . will hold significant competitive advantages' (ibid. 23). Indeed, these advantages may be reinforced by the fact that 'Europe holds comparative advantages from the cultural, social, technological and industrial points of view' (ibid.) in comparison to its leading competitors.

The White Paper attempts to weaken the case for negative outcomes from information society developments, either by making them seem uncertain, that is, 'concern has been expressed about employment, but it is difficult to assess this factor precisely' (ibid.) or by emphasizing the necessity of making changes to the existing order. With

⁷ In this respect, the White Paper echoes the sentiments of Ricardo (1821: 271): 'The employment of machinery could never be safely discouraged in a state, for if a capital is not allowed to get the greatest net revenue that the use of machinery will afford here, it will be carried abroad, and this must be a much more serious discouragement to the demand for labour than the most extensive employment of machinery; for while a capital is employed in this country it must create some demand for some labour; machinery cannot be made but with the contribution of their labour; by exporting it to another country the demand will be wholly annihilated.'

⁸ From the historical perspective, however, Ricardo (ibid. 266) observes that the introduction of new machinery may also reduce demand for labour. While Ricardo was primarily interested in the general principle of whether labour reduction was possible, Babbage (1835: 229) followed the process of adjustment in a way familiar to contemporary economists: 'One of the most common effects of the introduction of new machinery into manufacture is to drive out employment of the hand labour which was previously used. This, for a time, produces considerable suffering among the working classes . . . It is almost the invariable consequence of such improvements ultimately to cause a greater demand of labour; and often the new labour requires a higher degree of skill than the old; but, unfortunately, the class of persons who have been driven out of the old employment are not always qualified for the new one; and in all cases a considerable time elapses before the whole of their labour is wanted.'

regard to the latter issue, 'Europe's main handicaps are the fragmentation of the various markets and the lack of major interoperable links. To overcome them, it is necessary to mobilize resources and channel endeavours at [the] European level in a partnership between public and private sectors' (ibid.). This approach to potential shortcomings or problems with information society developments takes the progressive qualities of these developments as given. The view is not that information society developments are necessary, but they are likely to create deep shocks and displacements that we must anticipate and move to ameliorate. It is, instead, that information society developments are necessary and their disruptive influence will create new opportunities for progressive change as well as some negative effects that must be mitigated to preserve social solidarity. Identifying information society developments as part of the solution to long-standing European economic and social issues rather than as another source of problems, increases the priority that can be attached to information society policies and provides a positive view of future European prospects.

The White Paper fully embraces the American metaphor of the 'information highway' with suitable adjustment of vocabulary. Thus, the communication networks of the information society will have 'motorways with several lanes, and access roads and service areas allowing motorists to drive wherever they choose' (ibid. 25). The White Paper endorses the paramount importance of infrastructure development as the enabling feature for new service development.

What will be the new services in the information society? A major focus of the White Paper is its emphasis on the role of information and communication infrastructures in overcoming distance. Of the seven services emphasized as providing the basis for diversification and growth, three are principally concerned with remote access—teleworking, telemedicine, and teletraining. The centrality of these applications is surprising given the historical development of information and communication technologies in which workplace, medical, and educational applications are first implemented at the local level. The emphasis on the 'distance' feature of these applications serves an important purpose, however. If cast only as local developments, the case for European-level programmes rather than initiatives at the Member State level is much weaker. Overcoming boundaries between organizations is emphasized by two more of the services, electronic mail and links between administrations. With electronic mail it is the need for 'interoperability' to support the initiatives of smaller firms that is emphasized while electronic services of administrations promise smoother operation of the single market and easier access by the public to the administrations' information. Finally, two services (which appear first on the list) emphasize the potential of scale in collective endeavour, that is, the development of electronic images and databases for widespread access.

Conspicuously absent from this list are the development of information services that seek to provide new forms of interaction among individuals sharing common interests, the role of communication networks in creating new markets for goods and services (electronic commerce), and the implications of such networks for

creating new data resources.⁹ The absence of these three applications that were to become quite significant in driving subsequent developments is puzzling if no account is taken of the difficulties of arguing for European versus Member State initiatives. In each of these applications, there is the problem of the level of government at which initiative should be taken. The services that *are* listed transcend Member State boundaries and provide a basis for European-level action. Those that are not listed are, arguably and in their initial development, examples of actions that can be undertaken on a smaller scale, within Member States or within groups of states sharing common or similar languages.¹⁰ Substantial progress has been made since the publication of the White Paper in constructing a case that electronic commerce is a European-wide issue and substantial attention has been devoted to directives for a common European framework on electronic commerce (European Commission, 1999a).

This interpretation of what is included and what is omitted from the information society vision is reinforced by a consideration of the actual initiatives proposed. These fall into four categories: (1) information highways, (2) interconnected advanced networks, (3) general electronic services, and (4) telematics applications (European Commission, 1993b: 27). In each area, the proposed initiative involves the development of enabling technologies. A budget of 67 billion ecu (becu) is proposed for supporting these developments, more than half of which is assigned to networks—a high-speed communication network (20 becu) and consolidation of the integrated services digital network (15 becu). These items are followed by telematics applications with collective proposed expenditure of 20 becu. For general electronic services, 10 of the 12 becu of proposed expenditure was to have been devoted to electronic images and interactive video services with electronic mail and access each accounting for 1 becu. The proposed expenditures are, of course, indicative of relative priorities.

The proposed funding levels for enabling technologies are loosely related to an action plan that was produced for the European Commission's March 1994 meeting in Corfu. Subsequently, it has been referred to as the Bangemann plan.¹¹ The priorities suggested for that action plan were: (1) promoting the use of information technologies, (2) providing basic trans-European services, (3) creating an appropriate regulatory environment, (4) developing training on new technologies, and (5) improving industrial and technological performance. Promoting the use of information and communication technologies was linked to fostering teleworking, public service uses of telematics applications, and closer involvement of users in

⁹ The service entitled 'electronic access to information' specifically contemplates 'bringing together information (administrative, scientific, cultural or other data) in databases to which all users in the community should have access' (European Commission, 1993b: 25–6).

¹⁰ England and Ireland, France and portions of Belgium, Germany, and Austria (the last was not at that time part of the European Union), and to a lesser extent the Scandinavian countries and the countries sharing stronger Latin influences in their languages such as France, Italy, Spain, and Portugal.

¹¹ Martin Bangemann was the chair of the 'High-Level Group on the Information Society' which included nineteen other members with senior standing in government and industry.

drafting and implementing technology policies. The items detailed in the second and third priorities are straightforward and generally consistent with the aims of market liberalization for telecommunication services. The more difficult issues of the fourth and fifth priorities included little guidance as to how they might be implemented except through Research, Technology, Development and Demonstration (RTD&D) policies of the Fourth Framework Programme that ran from 1994 to 1998.¹²

Hastening the advance of the technologies supporting the information society remains the principal theme of the more detailed discussion that appears in Part B of the White Paper. The principal features of the information society are the use of information and communication technologies to restructure the production of goods and services and to support the growth of new services. To make this structure possible, a complex techno-social infrastructure is envisaged. Within this infrastructure, a community of users who are 'not only trained in operation of the applications, but are also aware of the potential of ICTs [information and communication technologies] and of the conditions required for optimum use thereof' (ibid. 109) are seen as complements to the networked technological components. This view of users as the extension of the technological network is problematic as it strongly supports the view that technology can lead the process of change.

The issue of the global versus European character of the information society is also raised. The White Paper sees the development of the information society as a global phenomenon in which widespread co-operation, openness in standards for constructing technical infrastructure, and genuine reciprocity are to be pursued. The 'system' characteristics of the information society should, however, also be those which 'take due account of European characteristics: multilingualism, cultural diversity, economic divergence, and more generally the preservation of its social model' (ibid. 110). How these goals might be accomplished is not stated and the statement holds no specific implications other than a recognition of the need for mitigating actions to prevent social exclusion.

The human or user side of the issues is specifically examined in the section that underlies the setting of a priority for developing training on new technologies. The White Paper makes it clear that this area is a challenge, noting that 'the competitive pressures on European industry require from all staff an increasingly high level of skills and an ability to use new technologies effectively' (ibid. 113). This challenge is carried forward to each of several groups:

¹² The Fourth RTD&D Framework Programme (1994–8) had a total budget including the Euratom Framework Programmes that amounted to 13,215m. ecu. This amount is far smaller than the estimated 67b ecu required for priority projects between 1994 and 1999 in the European Commission's White Paper (White Paper, 1993b: 26). The Fourth Framework followed two previous programmes: the Second Framework Programme ran from 1987 to 1991 and the Third Framework Programme from 1990 to 1994. The Fifth Framework and Euratom Programmes (1998–2002) have a budget of 14,960m. euro, 4.6% higher in absolute terms than the Fourth Framework Programme, see Community Research and Development Information Service (CORDIS) at www.cordis.lu/src/I_006_en.htm and www.cordis.lu/src/I_005_en.htm, accessed 19 Oct. 1999.

Managers need specific training to make them aware of the potential of ICTs and their organizational and socio-professional implications. Technicians and other workers need to have specific ICT-related aspects better integrated into the training for their basic trade. Schoolchildren and students should learn to use ICTs, in particular in order to resolve general education and training problems. Educating potential ICT users to enable them to make effective use of ICTs entails training as many people as possible in the basic skills and providing specialist training for some of them. (ibid.)

This statement of a widespread need for training is coupled to a specific criticism: 'Europe has made a big effort to develop basic training in computer science, but it does not have sufficient qualified staff, and *insufficient attention has been paid so far to the application of new technologies in training and education systems*' (ibid., emphasis in original).

A similar problem is identified at the level of companies: 'the introduction of computer systems must go hand-in-hand with the identification of companies' strategic objectives, the functions and support to be provided by the system, and appropriate work organizations. This is an area where the awareness of the user companies must be raised' (ibid. 112).

These passages suggest that users are a major constraint to the expansion of the technology and the benefits that use might bring in terms of growth and competitiveness, and the ultimate pay-off in increased employment. While the training requirements necessary to meet the challenges set out in this section might themselves be a significant source of employment growth, these initiatives, if undertaken, would have to occur at the Member State level. All of this puts those within the European Commission in the rather frustrating position of being convinced that a key solution to the most urgent political priority is being blocked by the failure of private-sector decision-makers and education authorities fully to realize the potential of the new technologies. This frustration is voiced in the conclusions to the section: 'Devising a policy to promote a common information area [the socio-technical network described above] requires in particular the setting-up of an *efficient system for co-operation* between the parties concerned. Because of the Community's political structure, this is much more difficult than in the USA or Japan' (ibid. 115, emphasis in original).

The White Paper's vision of the information society can therefore be summarized as follows:

- The process of technological change bringing networked information and communication technologies and multimedia information into greater utilization throughout the industrialized world is inexorable and irreversible.
- Advancing to the forefront of this process of change will bring benefits in economic growth and competitiveness that will translate into lower levels of unemployment.
- To advance to the forefront, proactive policies are required in regulation, technology policy, and investment to construct the information and communication

infrastructure supporting the exchange of information and the creation of new services.

- There are problems with the massive process of change implied by these processes that will require attention and mitigation to preserve the inclusivity of the information society and to reflect its European character.
- The recognition of the scale and importance of these developments is too narrow in Europe and substantial efforts must be made to convey their significance at all levels of society.

The human features of the information society are largely unarticulated in the White Paper. In this respect, the information society vision is clouded. The technologies are expected to bring major changes to the conduct of business, easing the process of globalization, corporate restructuring, and the redefinition of work at all levels of the enterprise. They are also expected to bring productivity improvements that will be beneficial particularly to small and medium-sized enterprises. Individuals, of course, will be affected by these developments. They will face a higher level of expectations with regard to their mastery of the new technologies and the identification of how to harness it to the best advantage in their social situations. They may expect to benefit from the emergence of new services generally, and tele-services in particular—telemedicine, teleworking, teletraining—and from improvements in transportation and access to public information services. Of course these are all significant issues. They do not, however, provide a very complete picture of life in the information society.

The processes of organizational and institutional change as well as changes in market structure and the position of existing companies in the information society are also not articulated in the White Paper. Some elements that are mentioned include the growth of international commercial partnerships, the support for globalization, and the evocation of change within organizations in the processes of production. The broad outlines of change contemplate a liberalized telecommunication sector and the emergence of new companies that will be active in providing new service offerings. It is assumed throughout the White Paper that improvements in the use of information and communication technology will strengthen the competitiveness of individual enterprises. Increasing competition is expected to strengthen the position of European firms in global markets and, because of the challenges in these markets, failure to reach the forefront will bring negative consequences. It is also the case, however, that the changes contemplated by the White Paper will influence the horizontal and vertical structure of production within Europe. This process will create structural adjustment issues, perhaps similar to those faced by Europe during the 1950s or at other points in history. Since the move towards the information society is seen as inexorable, these changes may be regarded as inevitable and, therefore, as ones that may have to be dealt with through policies of mitigation and adjustment as they emerge, particularly when they have untoward social effects.

Is there one information society for Europe defined by a technical infrastructure and human skills base that together operate as a system for the competitive

production of goods and services and innovation in services? Alternatively, are there many possible European information societies according to the rate at which new technological developments occur and are implemented, how these technologies are mediated and transformed by interaction with their users, and the actions taken by societies in other parts of the world of their own volition, or as a response to the developments in Europe? We believe that the answers to these questions are no and yes, respectively. There are many different configurations of the European information society. These configurations involve different industrial structures, different roles of users, and different approaches to policy in both the private and public sectors. The information society vision of the White Paper and subsequent articulations of policy by the European Commission are strongly influenced by the scope of action that the Commission is allowed and by prevailing views of the potential contribution of information society developments to important policy priorities. It is essential, therefore, to examine critically the features of the information society as it is developing in Europe and to compare and contrast these features with the information society vision offered by the European Commission and other policy-making institutions.

1.1.2 Expanding the Vision: Many Paths and Purposes

The European Commission has established a vision for the development of the European information society and has sought to reinforce this vision by funding RTD&D programmes whose magnitude is relatively small compared to private investments in research and development or in information and communication technologies. It would be highly unrealistic to assume that the European Commission could, through these actions, co-ordinate or lead all the activities that are needed to turn this vision into reality. This is one of the reasons why the Commission's vision is premised upon private-sector leadership of the actual building of the information society. The centrality of the private sector may be problematic because of the importance of the contributions from the educational, non-profit, and public sectors. It is, nevertheless, an area where initiatives are likely to be relatively rapid and on a large scale. The centrality of private-sector interests makes it necessary to analyse their interests and their interactions with other stakeholders. The importance of these dynamic relationships gives rise to our conceptualization of a threefold partition of countervailing and strategic interests which is outlined in the next section and applied in subsequent chapters of this book.

The vision of the European information society is built not only upon the idea of a better society but also upon a competitively fit society. It is therefore an open question as to what configuration of the countervailing and competing interests will best serve *both* goals, or for that matter, either of them when considered individually. We must look at the implications of developments in the market for the specific interests and the outcomes for stakeholders. It is also necessary, however, to consider these developments from the perspective of creating a socially better information society, one that is cohesive, inclusive, diverse, and competitively fit, that is, an information society that promotes initiative, wealth generation, and employment.

These are the themes of our work in this study—the standing of interest configurations, the effectiveness of social, economic, and technological developments for both a socially better and a competitively fit information society, and the specific contributions of the European Commission in sustaining the vision and reinforcing it through RTD&D efforts. Our thesis is that the path to the European information society is still being built, that it involves choices between many possible paths, and that several distinct paths may be followed simultaneously. An active and informed debate about the process may enhance the viability, the distinct value for Europeans, and the contribution to the ‘rest of the world’, of the path that eventually emerges.

Information and communication technologies are shaping the future path of social and economic development in Europe. It is not our thesis, however, that a single path has been set or that technologies are the prime movers of the process of development. The European information society is to be supported by advanced information and communication technologies and services and it will embrace (or exclude) many different groups of users. A consistent vision of a European information society that is compatible with the social and economic goals and aspirations of private citizens and corporate actors is only discernible from a great distance, a distance that obscures many of the conflicting aims and purposes of actual developments and policies. When initiatives are translated into practice, they have unanticipated and unintended implications for unemployment, working conditions, and the social fabric of everyday life. They are as likely to stimulate as to reduce the competitiveness of European industry or any of the other desirable features of the information society. There is, nevertheless, a considerable sense of urgency and purpose in taking initiatives that will support information society developments.

At the highest levels of government and industry in Europe it is now being recognized that the transition to an information society that is fully responsive to the aspirations of all Europe’s citizens is not easy. Disparities in all aspects of the economy, and especially in the resources devoted to innovative technology development, are substantial in Europe. However, the reality of the mismatches between the capacity for innovative technical development and deployment, and the institutional (legal, regulatory, and organizational) foundations of the European information society, is an even more serious problem. These mismatches will need to be mitigated or aligned if the potential benefits of the spread of information and communication networks and services are to accrue to all Europeans.

Resolving these mismatches involves an extension and reconstruction of social institutions as well as technological systems since these institutions provide the starting conditions and the initial alignment of producer and user interests. The differences in the development and use of information and communication technologies across the European Union, and between different social, cultural, economic, and political groups, do matter considerably. This is because they influence wealth generation potential and the extent of inclusion within new networking communities that is likely to occur locally, regionally within Europe, and globally.

The information and communication technologies and services that are being developed within and outside the European Union could support many *different* paths

towards a European information society. The supplier and user communities have different needs and interests, and, therefore, will push for different outcomes in the construction of the information and communication infrastructure. The contests between many of the actors involve incumbent firms in the telecommunication and established media and information publishing industries, a host of newer companies in the personal computer and software industries, and an even larger array of potential communities of 'virtual' information producers and users.

Our interest in constructing a social and economic account of change arises from the belief that analyses of issues of market restructuring and control, and the potential social and economic implications of these developments, matter for people in their varying capacities as citizens, employees, and consumers. Developing understandings of where we are heading can have an influence on the choices made both by policy-makers and those involved in creating and using the tools and institutions of the information society. We are particularly concerned with articulating some of the possible viewpoints of those who do not have ready access to the levers of opinion formation. They include citizens, consumers, and those running small businesses—whom we term 'virtual community' members—who will be the most numerous users of the tools and institutions of the information society. These individuals and small organizations have a smaller voice in the determination of outcomes about how technology is designed, deployed, and governed than the larger incumbent or the new insurgent producers of new technologies and services. Nevertheless, the capacity and will of the users of the new technologies and services to resist or transform developments favoured by larger interests are also influencing the path that is chosen and the outcomes achieved in the process of change. Some of the meeting-grounds for those with different interests occur within the institutions and processes leading to decisions taken in public policy and regulatory domains, in the standardization process, through measures to protect intellectual property, and in building trust in the security of advanced information and communication networks and services. We return to these issues of governance in later chapters.

Advanced information and communication technologies are being developed and used within a particular context of policies and business strategies. This context is strongly influenced by the trend towards market liberalization and the role of competitive entry that began in the United States and has extended at an uneven pace to other industrialized countries. Our analysis in this chapter suggests that there are reasons to be concerned about whether the outcomes expected from liberalization and market entry will stimulate the same degree of innovation and experimentation in Europe that is characteristic of the United States. In the United States, market changes appear to be creating a pluralistic information society in which the virtual communities of small businesses, individual citizens, education institutions, and other non-profit institutions have a major role. Despite major co-ordination problems, 'users' are assuming an active role in information society developments.

In Europe, the plurality of initiatives and interests that provide a foundation for

the interests of these virtual communities appears to be attenuated. As the Interim Report of the High Level Expert Group (HLEG) put it in 1996, the information society discussion 'has been dominated by technological issues and more recently the appropriate regulatory economic environment, neglecting by and large, some of the broader issues in the "society" notion' (European Commission HLEG 1996: 1, fns. omitted). Their call for greater attention to social issues received support within the European Commission and they announced in their final report that the task of increasing the attention given to these issues had been achieved.

Since the publication of our interim report, the Information Society Forum (ISF), a broad-based user expert group also set up by the European Commission, has produced its first annual report, arguing along similar and complementary lines. . . . At the end of 1996, the Commission adopted its own action programme 'Europe at the forefront of the global information society', pointing to the many social challenges brought about by the emerging IS [Information Society]. In other words, the field has expanded rapidly, with the social aspects of the emerging IS moving to the top of the policy agenda. We very much welcome this shift of priorities, and hope the HLEG interim report and the ensuing debate may have made a modest contribution to bringing it about. Perhaps somewhat presumptuously, we conclude that one of the first tasks we set ourselves has thus been achieved. (ibid. 1997: 14, fns. omitted)

There are several problems with this conclusion. First, the participation of high-level experts, regardless of where they are drawn from, is not the same as the widespread development of citizen and community initiatives and the active involvement of these communities in the processes affecting them. It is not clear that forums, however constituted, are likely to be effective in reshaping or redirecting technological developments. Second, when the proposals of the High Level Expert Group and the European Commission are examined, they prove to be largely expressions of concern or they are 'framing' ideas for action, rather than specific policy proposals that have the possibility of being implemented. The third problem, and the most severe from our viewpoint, is that these discussions occur largely apart from concrete analysis of technological developments and their deployment.

There are many very detailed discussions of technological developments in this book. The reason for our attention to technological detail is that we believe that social issues, with which we are also concerned, cannot be isolated as requirements or specification orders that are issued to the developers and users of technologies. Our view is that the social usefulness and value of technological developments evolves concurrently with the research responsible for new ideas and the processes of implementing these ideas in new products and services. This viewpoint has important implications for the members of a number of the communities who are involved in decision-making. It involves achieving a greater degree of integration between the technological communities and the socio-economic tradition of analysis that often stands apart from technological developments and assesses their social implications. We argue that the realization of socio-economic consequences lies in the ways that technologies are designed, deployed, or evolve according to the 'logic' of the incremental search

for better ideas and approaches. These processes of decision-making may or may not include a wide range of different stakeholders. The effectiveness of many of these stakeholders, and particularly those representing some virtual communities, in voicing their concerns would probably be very different if they were aware of the contexts and trajectories of the technological developments in which they have an interest. One of our main purposes, therefore, is to illustrate how, with a relatively modest level of resources, we and our colleagues have analysed important socio-economic processes that are influencing the European information society taking the technological dimension fully into account.

Our concern with the interactions between the process of technological development and its social and economic implications has led us to develop a tripartite analysis of incumbent, insurgent, and virtual community strategies and the various social and economic interests in the information society. The players who develop and implement alternative strategies and their probable successes in achieving expected outcomes are analysed, drawing upon insights developed within the framework of studies of the economics of technological change and innovation, the political economy of information and communication technologies, and the social dynamics of network formation and development. Our more particular concern is with enlarging the contributions of virtual community users, that is, the interests of those who are often depicted as 'users' from the perspective of the producers of new products and services. These users are also the *producers* of a major, if not the dominant, share of information content and communication within the information society and their interests in the path selected in the coming decades is substantial.

1.2 Dynamic Players and Emergent Communities

To . . . stimulate the creation of new markets, the Commission proposes to identify strategic TransEuropean projects. . . . The strategic projects would be carried out at each of three interdependent 'levels' that make up the telecommunication networks: the carrier networks for transmission of information, generic services and telematics applications. . . . With regard to the networks which serve to carry the information (voice, data, images) the objective would be to consolidate the integrated services digital network and to install the high speed communications network using advanced transmission and switching techniques (asynchronous transfer mode: ATM), which will help digitized multi-media services to make a breakthrough. (European Commission, 1993*b*: 95)

The European Commission's White Paper on growth, competitiveness, and employment called for economic and employment growth through the creation of seamless access to information and to interactive information and communication services providing a foundation for the Commission's Fourth Framework RTD&D programmes which encompassed the information and communication infrastructure and its applications. These programmes were expected to support and encourage the formation of a distinctively European information society embracing many different kinds of users. The visions of an information society that the White Paper and numer-

ous other policy documents of this period embraced were compatible with the social and economic goals and aspirations of most private citizens and corporate actors only at the level of the expression of broad policy initiatives. In practice, if the deployment of the new technologies and services was to contribute to alleviating unemployment and to improving working conditions and the social fabric of everyday life, far-reaching changes in social institutions would be needed alongside the evolution of new markets.

European policy-makers and industrialists argued at the start of this Framework Programme that differences between the Member States in the development and use of information and communication technologies were jeopardizing the competitiveness of companies operating in the European Union. The seriousness of these differences in the telecommunication segment of the market was emphasized by the European Round Table of Industrialists when Mr C. Benedetti argued in the Foreword to the Round Table's report that:

Europe today is a patchwork of incompatible communications networks marked by high costs, low quality of services, and very limited interoperability between systems. European communications costs are up to ten times higher than in the US and present a major obstacle to the introduction of new applications. National monopolies still persist in most European countries, restricting innovation and competition, whereas deregulation has brought about a dramatic development of the markets in the US and Britain. The European Union has launched a process of liberalisation, but it is too slow, and in many countries is being applied inadequately or not at all. (European Round Table of Industrialists, 1994: 5–6)

As the Round Table members pushed for the liberalization of telecommunication markets, they did so in the face of accumulating evidence that the information and communication infrastructure and the new applications were developing within and outside the European Commission's RTD&D programmes along many *different* trajectories. The principal reason for these different trajectories in the evolutionary paths towards the European information society is that the various producer and user communities have very different needs and interests. They therefore push for different outcomes in the construction of the information and communication infrastructure and in the ways in which this infrastructure supports social and economic activity.¹³

1.2.1 Strategic Design Configurations for the European Information Society

Three relatively distinct configurations of interests in the outcomes of actions leading to the organization of the information and communication infrastructure and related

¹³ It is difficult to draw clear distinctions between 'infrastructure' and 'services' because of the way digital technologies are becoming intertwined in innovative architectures where hardware, software, and content are combined in various ways to support functionality that may be provided as a 'service' that is accessed by users. For a discussion of this issue see Hawkins (1996). In this book, we use the terminology 'information and communication infrastructure', or 'information infrastructure', to refer to hardware and software that comprise various kinds of networks that support electronic communication and information appliances including personal computers. These may be used to support services that include various types of content and various types of interaction.

markets are emerging as the markets for information and communication technologies and services expand.¹⁴ Distinct economic incentives and social motivations can be shown to define these interests. These incentives and motivations arise from the specific and changing features of advanced information and communication technologies and the content and services that these technologies enable. The first and second clusters of interests are around the perception that the information infrastructure represents a new resource that will be controlled by a limited number of dominant players. The strategies of players that hold this perception tend to be differentiated by their respective approaches to controlling resources or assets.

One set of players, which we call the incumbents, is likely to adopt business strategies focused upon the control or ownership of key assets within the information and communication infrastructure. The most obvious of these assets is the communication network. While it is no longer possible to construct a monopoly in the control of telecommunication networks in Europe, it is possible to construct a dominant position in key access paths to the communication networks, such as the local telecommunication network or the high-capacity links over which long-distance communication flows. It is also possible to view emerging parts of the information and communication infrastructure, such as the Internet and compact discs, as new media for the mass distribution of content and services and to construct a dominant position in the ownership of content or the provision of specific services. Thus, incumbents may pursue strategies similar to those of major publishers or other media companies. They may engage in building stocks of content that will appeal to a mass audience or in constructing services that will interest participants in a mass market. The key point to bear in mind about the incumbent strategy is that it is built upon 'ownership' of irreproducible and difficult to imitate assets and 'scale' in the grouping of users into relatively homogenous communities that can be served by common products and services.

The second strategy is based upon the perception that the new information and communication infrastructure represents a resource that is subject to control. This is a strategy of 'insurgency'. Instead of seeing the information and communication infrastructure in terms of predefined resources or assets, the insurgent strategy is to create new resources or assets that can be controlled by a limited number of actors as the result of specific actions. These actions include efforts to stimulate a rapid pace of innovation, sophistication in anticipating or responding to user needs, and building networks of alliances that can substitute for exclusive ownership or control of

¹⁴ Membership in these categories is fluid in the sense that firms and users of information and communication technologies and services may adopt different strategies depending upon the market. The actors may shift their predominant strategies as a result of their changing economic, political, or social interests over time and they may actively pursue different strategies within different institutional contexts at the same time. This framework was initially developed in Bernard *et al.* (1996) and Mansell and Steinmueller (1996c). It has been reworked substantially for the present analysis to serve as an analytical framework that helps to articulate the strategic interests of the firms and other stakeholders within the European information society. This approach is in contrast to its original presentation as a taxonomy for classifying the players in the market.

the assets necessary for success. The prospects of the insurgent are greatly aided by the speed at which innovation is progressing in the evolving infrastructure; what Cusumano and Yoffie (1998) have referred to as 'Internet time'.¹⁵ They are also aided by the technological opportunities afforded by the convergence of telecommunication and computing applications which is (after considerable delay) proving to be a fertile source for innovation and growth. An insurgent is an aspiring incumbent, and, if successful in achieving a dominant position is likely to differ from the incumbent only in the extent to which the company adopting this strategy will appreciate from experience the possibility of displacement and therefore will seek to maintain a rapid pace of technological advance.¹⁶ In many cases, however, insurgents will not achieve a persistent dominant position because the assets that they control may be reproduced or imitated. The key point about the insurgent strategy is that it is based upon 'rapid mass adoption' and that it involves control of assets that potentially may be reproduced or imitated by maintaining a rapid pace of technological innovation.

The interests that incumbents and insurgents share, mass adoption and scale of use, are the basis for differentiating a third set of interests and its accompanying strategy. Virtual community interests lie in individualized and customized content and services. There are many ways in which individualization and customization can be expressed. As a business strategy, the aim of a virtual community participant is to build a sustained relationship with customers or to offer specialized services that satisfy a niche demand that is difficult to address with mass-produced content or with services aimed at a mass market. Virtual communities also emerge as a result of the non-profit motivations of their members such as the aim of exchanging better teaching materials, information about specific health care options, or publicly available research findings. Virtual community strategies involve approaches to solving the problem of building networks of interested people and preserving the individualized and customized character of the community if it attracts substantial interest. These strategies include measures to improve the quality of engagement of the user with the content or services available within the virtual community. A virtual community may have a prime mover or owner but its growth generally will be limited by the strategy of

¹⁵ Internet time is running at a faster pace than ordinary clock time because of the pace of change and the rate at which adoption of new innovations can occur due to the distribution capabilities provided by the Internet. As Cusumano and Yoffie (1998: 5) conclude, 'For companies competing in the new information economy, the Internet is forcing managers and employees to experiment, invent, plan, and change their ideas constantly *while* they are trying to build complex new products and technologies. The Internet also requires companies to face the reality that competitive advantage can appear and disappear overnight. This is because the Internet makes it possible to organize your business in new ways, to offer new products and services, and to distribute those products and services to tens of millions of people *almost instantaneously* via telephone lines, cable TV networks, and wireless communications. It was the electronic distribution capability of the Internet that allowed Netscape to burst onto the scene in 1994 and, in only a few months, emerge as one of the most serious threats Microsoft had ever faced. This sudden rise to prominence of new companies can and will happen again.'

¹⁶ e.g. Microsoft was once an insurgent in the operating systems market where, after contributing to the initial success of the IBM personal computer, it faced the efforts of IBM to capture control with the development of a rival operating system, OS/2.

deepening involvement with a specific group of users. Of course, the experience and knowledge gained through the construction of a virtual community may provide a basis for the definition of an insurgent strategy. The accumulation of resources within a virtual community eventually may make it possible to adopt an incumbent strategy. In terms of the social and economic implications for the way we live and work, however, virtual community developments are much more likely to have an impact due to their growing numbers than because of their transformation into incumbents or insurgents. Virtual community enterprises and institutions are less likely to have a voice in the discussion of policy and in the design and implementation of the information and communication infrastructure due to their relatively small size as compared to most of those companies pursuing incumbent and insurgent strategies.

It is important to observe that in our analysis, 'interests' are not synonymous with the actors who produce or use the information and communication infrastructure. It is possible to find citizens and those within public or private organizations as well as consumers embodying each or all of the interests that motivate the different strategies or any combination of the three strategies. For example, a major telecommunication network operator may be simultaneously an incumbent in its ownership of key components of the network, an insurgent in the market for Internet service provision, and a virtual community participant in encouraging its research workers to participate in international scientific and engineering communities. It is reasonable for our analytical purpose to consider the relative importance of each of these strategies and to identify the major telecommunication network operator, for example, as principally an 'incumbent' at a given point in time as a means of indicating that an operator's motives and behaviours will be shaped primarily by the relative importance of this strategy within the organization.

In the following subsections we develop the idea of a tripartite division of interests further and apply this framework to consider the strategies of some of the specific groups of stakeholders in the information society in Europe. Each of our configurations suggests a different institutional and market arrangement for the supply of the information and communication infrastructure and alternative prospects for stakeholders in meeting their goals and aspirations within the European information society.

1.2.1.1 The Incumbent Strategy

Many of the corporations pursuing an incumbent strategy have inherited the control of key assets from the historical activities of their organizations. The assets of the former European public telecommunication operators may have been privatized and their markets may have been fully open to entry since January 1998. Nevertheless, they retain enormous stocks of fixed assets that may constitute an effective barrier to new entrants. At a minimum, these assets allow the operators to choose from a diverse set of strategies in meeting competitive threats and exploiting competitive opportunities. A similar position has been inherited by broadcasters due to the allocation of the radio frequency spectrum through the licensing policies of Member States and the relatively recent arrival of a new group of incumbents, that is, the satellite broadcasters and cable

television operators. There are continuing uncertainties about the competitive opportunities available in the broadcasting area.¹⁷

Many large publishing and media companies also have achieved a significant incumbent position through a long history of building market reputation and controlling intellectual property rights to their stock of titles. All the types of organization mentioned so far have been aided in achieving their incumbency by specific government policies, which have served to limit entry. In some cases, these decisions may have been unduly restrictive as, for example, in delays in regulatory decisions enabling the entry of cable television companies in certain countries. In other instances, it is difficult to imagine the development of an effective market without the existence of government intervention to limit entry. For example, without copyright, it is highly unlikely that a successful publishing industry would have emerged. We do not take a normative view of the decisions that may have contributed to incumbent positions. We simply observe that these positions with respect to the information and communication infrastructure arose historically from specific forms of protection and, in many cases, have created additional opportunities to control key assets.¹⁸

The incumbent strategy need not be confined to situations where historical developments combined with specific forms of protection have led to the control of key assets. In the personal computer operating system market, Microsoft has achieved an incumbent position due to the enormous range of software that requires its operating system products. The case of Microsoft illustrates that the incumbent strategy is not the same as the strategy of a company that has achieved (or been granted) a monopoly. While Microsoft has achieved significant market power in the personal computer operating system market, this power is largely exercised for the purpose of protecting its position of incumbency rather than for raising prices. Although a conventional economic view of monopoly and market power may be appropriate for some markets in the information society, firms that have achieved a dominant position are unlikely to prevail for long if their strategy is confined to maximizing profit on their existing position. Instead, the strategies of these firms must involve retaining control of their dominant position through increasingly creative strategies for meeting competitive threats. Many responses to such threats will require substantial investment and reconfiguration of assets that in the past have proved to be stable sources of competitive advantage.

In European markets, the most important European incumbent players include public telecommunication operators, audiovisual companies (broadcasters and media companies), cable operators, and their international partners. Most of these companies traditionally have controlled or influenced the evolution of the

¹⁷ The pattern of cable installation is remarkably diverse in Europe, largely as the result of the history of policy decisions. Some countries, such as The Netherlands, have a very high percentage of cable households while others, such as Italy or Spain, have a very low penetration of cable television subscribers.

¹⁸ e.g. a concerted refusal by major publishers to deal with distributors and retailers who stocked 'pirated' versions of published works would be likely to create a *de facto* copyright system even in the absence of laws establishing and protecting copyright.

information and communication infrastructure. They have defined new services and installed new capacity within the frameworks of policy and regulatory systems in the Member States that are intended to serve a variety of public policy objectives including the promotion of cultural production, the achievement of universal telephony service, and new opportunities for employment creation.

Measures introduced via European Union directives and through the initiatives of the Member States have sought to encourage competition in the markets for these companies' services. The incumbent companies have had to develop new strategies to ensure that they can continue to play a central role in the design of the information and communication infrastructure for the information society. There are substantive differences between the strategies these companies are adopting to respond to the challenges presented by companies developing insurgent strategies. Incumbency, nevertheless, means that companies have substantial, and perhaps even unique, capabilities for extending and deepening the physical infrastructure for the information society in Europe. For example, such organizations as the British Broadcasting Corporation have moved aggressively to establish an Internet presence and British Telecom is seeking to become a major player in the Internet service provision market. Incumbent publishers and other media companies in the private sector have sought strength through alliances and mergers, and the former monopoly (or dominant) public telecommunication operators, to varying degrees, have acknowledged that more competitive markets bring the challenge to deploy aggressive strategies to retain market share in those aspects of their businesses that they chose to retain.

1.2.1.2 The Insurgent Strategy

One of the most dramatic developments in the information and communication technology and services industry in the last decade has been the increasing use of the personal computer as an information terminal for access to networks. The Internet revolution, which has proved to be the next stage of the personal computer revolution, is being supported by the growth of local area networks and the construction of on-line service networks including Internet–Intranet–Extranet services. The personal computer itself is a robust engine for the generation of a new market in multimedia information, distributed using Compact Disc–Read Only Memories (CD-ROMs) as well as the Internet. The personal computer is also the basis for a continuously expanding desktop publishing and image processing market as well as more traditional uses of the machine as a word processor, numeric analyser, and database manager. All of these applications are made possible by software and some involve the growth of new markets for peripheral devices.

These developments are only a small part of the future possibilities offered by access to networked information and the continuing growth in the personal computer's capability as an information- and communication-processing device. Each of the markets generated by the personal computer is a resource of the information society over which there is an active contest for control and domination

and this applies also to the market for personal computers. We characterize the strategy by which companies achieve a dominant position in these markets as an 'insurgent' strategy.

An insurgent strategy may involve the innovative definition of a new technology or service for the purpose of achieving mass-market acceptance. It also may involve a redefinition of an existing technology or service in a way that makes it possible to overturn established incumbent positions or to open new market opportunities, again with the aim of mass-market acceptance. In addition to the significance of the rapid pace of technological change in the information and communication infrastructure, many products and services that are the subject of the insurgent strategy offer positive network externalities—their value increases with the number of adopters. Positive network externalities are a more precise formulation of the mechanism often referred to in business circles as the 'virtuous cycle'.¹⁹ For example, the capacity to receive word-processor files from other users increases the value of choosing a software package that is able to read and edit such files. In other words, the value of choosing a software package may be increased by the size of the network of other users of the product. Similar principles apply with respect to the selection of other types of files and personal computers and peripherals due to the greater ease of finding parts or service. An insurgent strategy involves achieving a strong lead in the adoption of a particular domain of application and retaining that lead through innovative improvement and service to the adopting users.

An insurgent strategy gives those companies that select it an enormous forward momentum. Such companies as Microsoft, Netscape, Sun Microsystems, and Oracle, for example, have actively sought to become the architects of the global information society. Their strategies are predicated upon a model of innovative initiative and mass-market creation that has become identified with companies from the United States. American-owned firms do not necessarily have a unique technological capability with respect to their European or Japanese rivals, but they do appear to have an advantage in the speed at which they construct mass markets for new technologies and services due to the size and integration of their domestic market. As a product or service achieves mass-market success in the United States, the process of localizing it for other markets is often able to overwhelm domestic competitors and extend the advantage gained within the United States market on a global basis.

Those companies following the insurgent strategy appear to have unlimited aspirations and they design their technologies and configure their market presence in distinctive ways. These frequently depart from the previous generation of communication network architectures and from the organizational forms and tactical alliances of many of the incumbent firms in the telecommunication, broadcast, or computer industries. European companies are largely absent from the ranks of those companies that are adopting an insurgent strategy although there are some exceptions. Sweden's Telia, for example, has considerable aspirations and the company has adopted business

¹⁹ In the general formulation, intangible issues such as the effect of reputation or user expectations (bandwagon effects) may also support the growth of a leader's dominance.

strategies that bear many of the hallmarks of the insurgent strategy. In some instances, this strategy produces alliances with information and communication infrastructure and equipment suppliers, but, in most cases, it implies their subordination. The vision that underpins the insurgent strategy is playing a very major role in influencing the deployment of new information and communication technologies and services in European markets.

1.2.1.3 *The Virtual Community Strategy*

The virtual community strategy is simultaneously both the oldest and the newest of the three strategies that are vying for success as the means of organizing the new resources of the information society. It is old in the sense that it reproduces the practices of merchants and craftsmen from time immemorial in building communities of customers or users or in assembling groups of people with common interests to participate in the creation and use of common resources. What is new about this strategy is that the medium for constructing these communities no longer requires physical proximity. Those who gain membership within these communities can, in many cases, be serviced from any location at any time of the day or night. The elimination of time and distance as the most significant features in building networks of interested customers or citizens is not the defining characteristic of the virtual community strategy. The same opportunity is available to organizations developing incumbent or insurgent strategies. What enables and strengthens the virtual community strategy is the capacity to address the variety of interests and needs of users *in depth* and to specialize and customize products, services, or resources that address these issues.

The basis for the virtual community strategy is the Internet. The Internet, now the dominant mode for achieving internetworking, is a vast system of interconnected computers and telecommunication links that rivals the complexity of the public switched telecommunication network and differs from the traditional implementations of local area networks. The Internet has been constructed with the aid of a simple, and now somewhat aged, standard for inter-computer communication and process control (Transport Control Protocol/Internet Protocol or TCP/IP) and funding of the initial key backbone capacity by public authorities and the defence sector is rapidly being displaced by private-sector investors.²⁰ These companies may provide portal services, enable access to the Internet, or provide services and content, and they range in size from the smallest entrepreneurial or social services organization to those, such as e-Bay, Yahoo!, Amazon.com, and a host of others, that receive head-

²⁰ The Internet originated from the work of Licklider and Clark at the Massachusetts Institute of Technology who envisaged a global interconnected network accessible from any site. Davies and Scantleberg at the British National Laboratory are said to have been the first to use the term 'packet' for the type of switching that enables the new networks. Paul Baran at the RAND Corporation in the United States played a major role. The computer network concept was proposed in 1964 at RAND and the first installation commissioned by the Department of Defense, ARPANET, was hooked up at the University of California at Los Angeles in September 1969. A second node was established in October at the Stanford Research Institute. The electronic mail application was introduced in 1972. The TCP/IP was developed by Cerf and Kahn, see Leiner *et al.* (1998); Kizza (1998); and Zakon (1999).

line news attention because of their market capitalization. Within the ranks of these companies there are many that aim to become insurgent strategy leaders. As yet, however, the size of their user base combined with the vigour of technological innovation has limited the extent of their dominance. An exception may be Yahoo!, a search engine (for finding sites on the Internet) and portal service provider (a point of entry to regularly initiating connection to World Wide Web resources) that has achieved a very strong position in relation to its rivals. It would be premature to describe this company as dominant. Yahoo!'s experience, however, does demonstrate the potential for the insurgent strategy in the Internet service market. The large number of its users raises significant advertising revenues, allowing greater investment in services than some of its competitors, and the attraction of yet more users. This is the virtuous cycle associated with the insurgent strategy.

A predominant strategic goal on the supply side of this configuration is the formation of new virtual groupings or communities that are attracted to the Internet to engage in some form of electronic commerce, to gather public information, or to be entertained or educated. Although until recently the members who comprise these communities have been drawn from the education, government, and research communities rather than from the public at large, the numbers of the latter are growing as are the commercial uses of the Internet. In fact, Internet users are assembling themselves into virtual communities that are expanding as the amount of reference information and the number of available services multiply. In this process, their strategies are uniting members of supplier and user communities into common constituencies. Some of the users who adopt a virtual community strategy are indifferent to the technological principles of the Internet's operation, but others are highly technologically sophisticated. In addition, the suppliers and users of this strategy have been the most innovative with respect to creating new business models for the information economy that are not based upon direct sales or subscriptions. These new business models involve advertising support, indirect sources of revenue (such as subscriptions to organizations associated with the Internet services), and shareware (the purchase of software or information content after trial use with the encouragement of distribution of trial copies to other users). In the non-profit sector, support for an organization's Internet activities may occur as a by-product of other activities, for example, the funding for an Internet presence may be part of the organization's promotion or dissemination budget.

1.2.1.4 Summary

A social and economic account of information society developments requires an analysis of the relevant actors and interests. The tripartite division of interests into incumbent, insurgent, and virtual community strategies identifies the distinct economic incentives and social motivations involved in developing information society resources. Certain actors may be tightly or loosely associated with these specific strategies. A relatively tight identification is possible when the behaviour of the organization can be described unambiguously as being aligned with a specific strategy especially when the significance of that alignment with the organization's basic

purposes and goals is clear. Looser identifications are necessary for organizations that are pursuing multiple strategies including those organizations that are attempting to move their activities from one strategy to another. For example, in recent years, Microsoft has adopted an incumbent strategy in the personal computer operating system market but continues to pursue an insurgent strategy in dozens of other markets in which it operates. Similarly, Yahoo! originated in a virtual community context and has attempted to move towards the insurgent strategy.

The profit motive associated with incumbent and insurgent strategies is a powerful force of attraction for the companies. The competitive outcome of these strategies is, however, one in which the ‘winner takes all’ or achieves a dominant position in a mass market. Many virtual community participants are inherently unable to construct a mass market because the source of their appeal is specifically in the specialization and customization of the products, services, and resources that they offer. Other virtual community participants would like to target mass markets but are prevented from moving towards an insurgent strategy by the competitive vigour of similar communities and the fluidity of movement of the participants within these communities.

We do not assign normative values to any of the strategies in our tripartite division; each is capable of providing major social and economic benefits if it is tempered by the continuing growth of effective competition. However, we will not ignore the possibility that effective competition is in many cases unavailable or the reality that the incumbent and insurgent strategies are inherently anti-competitive. Movements towards greater levels of competition are often confused with the achievement of a competitive market when, in fact, substantial market power persists and may create adverse social and economic outcomes. We are also concerned with the potential exclusion of European (and other) companies from participation in the insurgent strategy due to the structure of the United States market, which provides large-scale and rapid reinforcement of successful insurgent initiatives. This concern prompts us to devote particular attention to virtual community interests and strategies throughout this book. Such strategies may provide the best, although not the last, hope for European leadership in implementing important information society resources reflecting uniquely European aspirations and interests.

1.2.2 Technological Trajectories, Institutional Evolution, and Interests Co-ordination

The future dominance of any one of the three strategies, and therefore of the groups of players and the network and service architectures they champion at any given time, matters because the health of information society developments hinges on an active contest between them. The absence of virtual community interests would pit two ‘winner take all’ strategies against one another with the probable outcome that accommodations and mergers would be arranged to produce an oligopoly composed

of allied insurgent–incumbent interests. The deployment of the information and communication infrastructure would create another medium that would call for a substantial regulatory structure that would face an uphill battle to preserve public interests and inveigh against exclusionary forces. The absence of an incumbent strategy would lead those developing insurgent strategies to mobilize blocks of user communities around their infrastructures and services creating potentially severe interoperability problems and the marginalization of virtual communities. The absence of an insurgent strategy would encourage accommodations and mergers between the incumbent firms that are proceeding with incumbent strategies, producing an information society dominated by multimedia broadcasting in which virtual community members would be marginalized. This, in turn, would produce potentially severe problems in generating localized content and innovative technological approaches. In the case that only the virtual community strategy prevailed, no player would have the scale of resources to construct cohesive information and communication infrastructures or general-purpose tools.

The tripartite division of interests and strategies, therefore, is desirable relative to the alternatives. The contest between firms with incumbent and insurgent strategies can draw upon the experimentation and variety of virtual community participants and it is in the interest of both to promote the development of virtual community initiatives to enlarge the potential market for their products and services. This is so as long as virtual community activities do not interfere with incumbent or insurgent interests or threaten to favour either one of these players' interests. All these developments are strongly apparent in the development of the Internet, largely because the rate of Internet technological and market developments highlights the actions and the short-term advances and retreats of actors with identifiable interests. The Internet is not the only place where these processes are occurring, however. The development of other elements of the information and communication infrastructure, such as broadcasting, telephony, or intelligent transportation and logistical systems, is occurring more slowly and often involves the attenuation of the influence of the adherents of one or more of these three interests and strategies.

The reason to argue that these changes are occurring throughout the industries involved with the information and communication infrastructure is that they are all influenced by a common technological trajectory, the improvement of microelectronics technology generally, and microprocessor hardware and software systems in particular. Improvements in microelectronics technology are the principal engine driving the insurgent strategy and frustrating the extension of incumbent strategies. The effects of this technological trajectory are most apparent in the use of the personal computer as an information appliance. A decade ago, personal computers were only able to display crude graphic diagrams and their capabilities were strained by the requirements of graphic user interfaces. Today, a suitably networked personal computer is able to display, for instance, an intimate and high quality photographic view of the monastery cloister garden at Mont-Saint-Michel accompanied by an

appropriate musical score, as well as millions of other images and sounds.²¹ Although many technological changes are responsible for this advance, the increase in the complexity and speed of microelectronics plays a central role.

With the rapid pace of advancement along the technological trajectory of increasing speed and complexity, the creation of an effective information and communication infrastructure also requires institutional evolution. In our example of the cloister of Mont-Saint-Michel, it has been necessary to agree the standards by which visual and audio information can be decoded by the networked personal computer. These standards involve the operation of standards-making institutions and the rapid response of hardware and software companies to the new opportunities provided by standards. Access to this information, which resides on a server in France, from Great Britain requires institutional arrangements for international communication of data outside the traditional arrangements for international telecommunication traffic. The provision of this information by the Office de Tourisme de Dol-de-Bretagne, a department of the regional government of West France, indicates that it is not only international institutions that are evolving in response to new technological opportunities, but also local institutions.

Analysing the contest between those developing the three strategies for their place in the European information society involves an assessment of the relative position of the organizations employing these strategies. It also calls for the alignment of technological and institutional issues with the interests of the actors. Any snap-shot of technological or institutional position is but a fleeting impression of a rapidly evolving process. It is necessary to take into account the rate and direction of technological and institutional changes as well as the current position. The theoretical framework of diffusion analysis (the study of the pattern and determinants of the adoption process in the deployment of new technologies and services) provides a *partial* solution to the problem of organizing observations and analyses of the processes of technological change. For the analysis of institutional evolution, the available theoretical apparatus is less satisfactory and we employ case studies and comparative approaches as the principal tools in our analysis of institutional evolution. Our analyses of both technological and institutional changes are, of necessity, impressionistic given the scope of the developments that we examine. We believe that the broad perspective we adopt is necessary to convey the importance of the interactions between the different social and economic, as well as technological, developments.

Many of the assessments of trends in the development of the emerging information society focus predominantly either on the choices of users or on the components of the advanced information and communication infrastructure that key players appear to be selecting.²² This leads to projections of the demand for individual pieces

²¹ See <http://www.asteria.fr/mont.htm>, accessed 6 April 2000.

²² The methodology of market forecasting varies, but it generally employs the development of consensus estimates of the CAGR that is expected by major participants. Examples of such market forecasts include Aderton and Delaney (1995) and Barling and Stark (1995). A guide to many other such studies is Oxbrow, Kibby, and While (1997).

of technology or speculations about the future use of specific services. Such projections can be helpful in examining the diffusion of specific technologies and services, but the pathways for their diffusion are influenced by the choices of a wide range of actors and institutionalized actions in addition to those of the individual user. For example, the decisions taken by those active in the standards and regulatory arenas, as well as those who develop and implement legislation with respect to intellectual property, security, and privacy are equally important in setting the context in which the diffusion process occurs. Changes in the social practices, cultural values, and the organizational routines of the people who use the information society infrastructure and services are also vitally important for the outcomes that we analyse in this book.

1.3 Conclusion

One of our aims is to provide a social and economic account of movement towards the European information society since this vision was articulated in the European Commission's 1993 White Paper on *Growth, Competitiveness, Employment*. Another is to define, by example, an analytical approach to the issues presented by this movement that has important policy implications and provides an agenda for the socio-economic research that is needed to support this movement in a way that supports both diversity and especially the interests of the members of virtual communities who generally have a smaller voice in the decisions that are shaping the information society and that are affecting their lives. Our claim is that policy relevance requires an intimate involvement in the examination of the interactions between actor interests, technological change, and institutional evolution. Defining the socio-economic research agenda in terms of idealizations such as 'competition' or through a political process in which 'wise men' define the social needs to which technologists should respond appears to us to fall short of the mark. The European information society is in the process of being born through the contests of interests as they are shaped by technological opportunities and constraints and by the evolution of institutions supporting or discouraging particular lines of development. There are numerous studies that have taken up this agenda and many are cited throughout this book. Much more work is needed particularly on the interaction between technological and institutional developments and on the social and economic processes governing market development and strategy. What follows is not a beginning. It is an account of a journey that is underway and on which we are accompanied by many fellow-travellers.

In Ch. 2 we develop the basis for an account of information society developments by identifying and elaborating several sources of social exclusion. We emphasize the way the emerging information society is being experienced by people as citizens and consumers, and highlight some of the applications of the information and communication infrastructure that are being devised in a bid to ensure that the European information society is responsive to social and cultural aspirations and to efforts to use the

tools of the information society to devise innovative forms of governance and access to relevant information. We also consider the value of proactive policies designed to combat exclusion and the role of virtual communities in bridging the powerful forces supporting exclusion.