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EDITORIAL

The Information Society

Report by Nicolas Curien and Pierre-Alain Muet

An industrial revolution is above all defined by the multiplicity of changes brought about by the new technologies. This principle can be applied yet again to the informational and digital revolution.

It is necessary, first of all, to take the measure of this revolution. It is also necessary to provide the tools needed for its interpretation. The report highlights a second paradox, following the one already formulated by Solow: whereas the new information and communication technologies should in principle lead to a more efficient functioning of the market economy, they in fact harbour the ingredients of a public economy because they are accompanied by economies of scale, network effects, etc., that call for public regulation.

Those primarily concerned by the informational revolution include industry, users and government. But this tripartite dimension forms only a part of the broadest possible space, since information has some of the aspects of a global public good. For this reason the authors of the report place their hopes in the World Summits convened to deal with the question, as well as in governance of the Internet conceived as 'multi-player co-regulation'.

Christian de Boissieu
Executive Chairman of the CAE

Does the digital revolution constitute a third industrial revolution? Is it leading us into the information society? Is the digital economy liberal or public in nature? What policies are needed to combat the 'digital divide'? What kind of global governance for the Internet? These are among the questions to which the authors of the report, Nicolas Curien and Pierre-Alain Muet, provide their own answers.

The report, discussed by the Council in plenary session on 21 October 2003, was drawn up as part of the preparation for the World Summit on the Information Society, organised by the United Nations and the ITU, the first phase of which is to be held in Geneva in December 2003 and the second in Tunis in the spring of 2005. It will be preceded by the World Summit of Cities and Local Authorities on the Information Society on 4-5 December 2003 in Lyon. This newsletter, published under the responsibility of the permanent staff of the CAE, summarises the main conclusions reached by the authors.

The digital revolution: a new industrial revolution

The report maintains that the digital revolution is not just a revolution in the field of information and communication, but indeed a third industrial revolution. The functioning of the Internet system and the use currently made of it constitute a sort of 'test-bed', prefiguring phenomena that will at some stage govern a substantial proportion of socio-economic activity. Among the phenomena that are driving the 'digital revolution' are the emergence of the networked firm, the growing autonomisation of labour, the increased role of financial markets in innovation and the

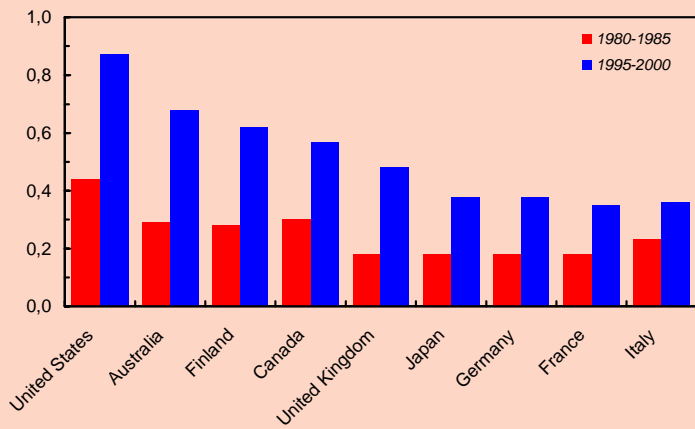
restructuring of the management of skills and knowledge.

These changes are perfectly real and the Solow paradox is now obsolete: the consequences of the penetration of computers and computer networks are now clearly to be seen in the macroeconomic data, having in the past five years contributed 0.35% to annual growth in France, Italy and Germany, and 0.9% to that of the United States (graph 1).

The digital economy: the apotheosis of the market economy or a public-goods economy?

The report highlights a new paradox of the digital economy: whereas in principle information and communication technologies (ICT) were expected to lead to more efficient functioning of the market economy, by making transactions smoother and eliminating informational friction, it has turned out in fact to harbour the elements of a public economy. Informational goods show characteristics that are those of public goods: 'information merchandise' takes on the nature of an idea, not being relinquished when communicated to someone else. This is evident in the case of information accessible via the Internet, within the limits set by network congestion. In the case of information that is still attached to particular media, copying without appreciable loss of quality is now possible, not only at negligible marginal cost but even at very modest average cost. It is now possible even for private individuals to photocopy a text, scan an image, reproduce an audio cassette, a CD or a DVD, using equipment that is constantly falling in price.

1. Contribution of ICT to growth, now and twenty years ago



Source: Coleccia and Schreyer (2001).

Moreover, the production and supply of informational goods give rise to substantial economies of scale. This is because both the upstream phase of compilation of information and the downstream phase of design of software permitting its assimilation and utilisation by economic agents involve substantial fixed costs. By contrast, the intermediate phase of replication and transmission of content is essentially one of variable costs, these being substantially reduced through the use of the Internet. Looked at as a whole, therefore, the production of information carries a large fixed cost element and a low marginal cost, hence the economies of scale.

Informational goods are also at the origin of 'club' or network effects, which can be regarded as economies of scale on the demand side: individual acts of consumption, far from being mutually exclusive, are mutually enhancing in that the utility for each consumer is increased by the presence of others in the same network. For example, the greater the number of internet users brought together on a peer-to-peer MP3 file-sharing site, the larger the catalogue of songs to which each of them has access.

Lastly, under the impact of the build-up in the volume of information, many economic goods take on greater complexity ('packages' incorporating customised services) or become 'experience goods' (whose utility is difficult to assess in advance) or 'customisable goods' (adjustable to the profile of the consumer). As a result, the price signals sent out by a traditional market are no longer sufficient to guide consumers' choices, especially at a time when it is becoming increasingly common for certain purely informational goods to be available free of charge. In this type of economy, the decentralised functioning of the market does not lead to the collective optimum but may, on the contrary, encourage excessive concentration and monopoly rents (*cf.* Microsoft).

The development of 'infomediation'

Faced with this far-reaching modification of the economy, how can public and private players react? Should they adopt a defensive strategy, as proposed by certain content publishers and large media groups, demanding strict application of copyright law and curbs on the development of

'freeware' through the patentability of software? Quite to the contrary, the authors advocate a more evolutionary scenario, in which public and private agents invent new methods for the financing of fixed costs of production and distribution of informational goods and services. In this scenario, co-operation is intermingled with competition; freeware communities exist alongside proprietary software and new forms of intermediation emerge, made all the more necessary by the fact that numerous informational goods are available free of charge.

The appropriate market for grasping the complexity of the digital economy is in fact not the Walrasian market, but rather the 'free market' in the sense used by Hayek, i.e., one on which producers and consumers interact, exchanging information that can help to optimise their choices as regards production or consumption. In this connection, there can be seen on the Internet the emergence of an original form of intermediation, namely 'infomediation'. This may be institutionalised, in cases where it is organised by commercial sites, portals, or media sites trying to derive value from their audiences and transform them into customers. It can also be informal, in cases where individuals enter into direct contact without any explicit intermediary, to exchange information on products. The so-called chat rooms, or even simply the links between private sites, are locations where the demand of internet users-consumers is constituted and segmented in a self-organised manner.

What public policies to adopt?

The authors note that France, along with southern Europe, is lagging behind the United States and Northern Europe as regards

the penetration of ICT and access to the Internet, although considerable progress has been made in recent years. From 16% in 1997, the PC equipment rate for French households has since risen sharply to 42% in March 2003, i.e. the level recorded for the United States five years ago (graph 2).

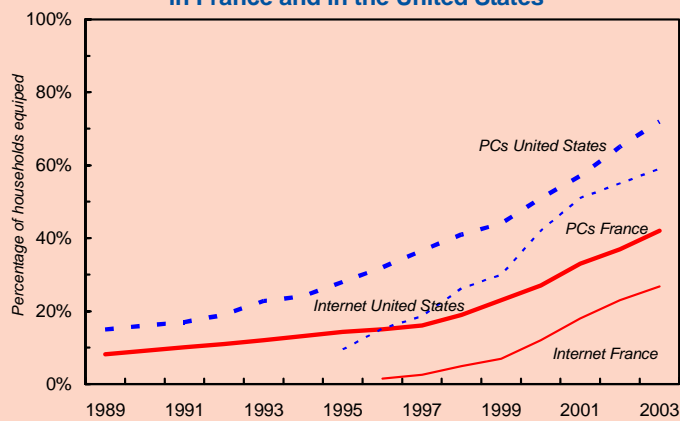
In the corporate domain, practically all SMEs in France have become connected to the Internet in the space of four years. On the other hand, progress in the opening of web sites has been much slower: at the end of 2002, only 56% of firms of all sizes in France possessed a web site (58% in Italy), compared with over 80% in the United States, Japan, Germany, the United Kingdom and the Scandinavian countries.

Having become aware of the implications of the information society, most governments launched action programmes for the development of e-government and for combating the 'digital divide', the main instruments being training and education.

The efforts made by France as regards e-government have placed the country in a position that compares favourably with those of its European partners. Just as in its partners, however, there is a wide disparity between the development of centralised services under the control of a single player (taxes and social security contributions), which are in all cases at the stage of a two-way interaction, and that of services delivered by multiple or decentralised players, which remain in most cases informational in nature and interactive on a one-way basis only. One of the handicaps to the development of public on-line services remains, in all countries, a lack of co-ordination between the initiatives taken at national, regional and local level.

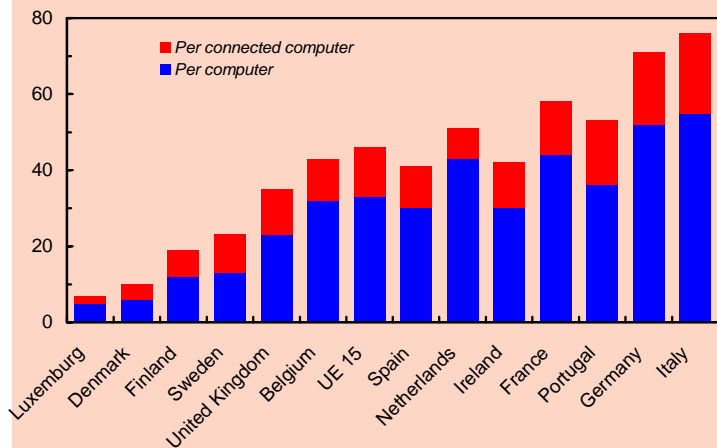
With a view to reducing the digital divide, the report's authors put

2. Evolution in the household equipment rate for PCs and the proportion of households connected to the Internet in France and in the United States



Sources: INSEE, see contribution by Karine Revcolevshi (2003) to this report.

3. Number of pupils per computer in primary education in Europe in 2001



Sources: Eurobarometer Flash 101 and contribution by Roussel et al. (2003).

forward a number of proposals of different kinds:

- first of all, they consider that the policy currently being pursued in France to introduce ICT into the educational system, notably at primary level, is still insufficient (graph 3) and they call for amplification of, and support for, efforts made by local authorities as regards the equipment of schools, in order to reduce the existing disparities and bring France more into line with the best European practices:
- as regards the training of adults, the authors recommend, in addition to the opening up to parents of computer classes in primary and secondary schools, the ex-

pansion of the policy based on 'public digital spaces' that has already been launched, by accrediting and subsidising local initiatives emanating from various associations and institutions (libraries, youth centres, social centres, etc.);

- in the case of the development of the equipment of households, they recommend that the State call on the large retailers to offer an integrated entry-level package consisting of PC, Internet access and maintenance, and that this be accompanied by a public subsidy targeted on low-income households with children in school.

Global governance of the Internet: the need for multi-player regulation

The World Summit on the Information Society must be used as the occasion to make progress towards multilateral governance of the Internet, which is a global public good, and in a way to lay the constitutional foundations for the information society. In order to circumvent the present blockages, the authors recommend the introduction of a genuine 'multi-player co-regulation', in the form of tripartite working groups bringing together government, industry and users, given the task of making proposals with a view to the Tunis Summit on closely circumscribed subjects such as:

- the organisation of the governance of the Internet and in particular the reform of ICANN^(*), since regulation of the Internet cannot depend indefinitely either on a single State or on a private firm;
- the search for the proper balance between protection of intellectual property and encouragement of innovation, with in the background the balance between proprietary software and freeware.

The World Summit will also be the occasion to examine the proposal by the President of Senegal, Abdoulaye Wade, for the creation of a 'digital solidarity fund', with additional discretionary finance supplied by the various players (firms, governments, local authorities or associations, etc.) in order to reduce the digital divide between North and South. This proposal has the support of Africa, Latin

(*) ICANN, *Internet Corporation for Assigned Names and Numbers*, a non-profit corporation set up under United States law, to which the US Department of Commerce has delegated responsibility for assigning IP numbers and domain names.

America and a substantial portion of Asia (notably China and India) but has encountered strong opposition from the European Union.

Comments

Elie Cohen says he is impressed by the report's originality and theoretical creativity, and attracted by the questions and initial responses regarding the future of infomediation, copyrights, freeware, etc. He compares the theoretical framework put forward for this new economy to one of the fundamental laws of Marxism under which the new productive forces (the digital technologies) enter into conflict with the former elements governing production (property rights and the market). He nevertheless considers that today's economy has been profoundly remodelled not only by the irruption of the new technologies but also by, among other things, globalisation, financial deregulation and the deregulation of public utilities, and that the authors have not provided a sufficient demonstration that today's economy has actually become the information society they describe.

Michel Didier, for his part, considers that the report should not be of a kind to trigger off strong and passionate debate. He is in agreement with the authors regarding the historical importance of the digital revolution and the French backlog in this field. He wonders about the causes for this. Can it not be attributed to the long tradition of absolute State monopoly over communications that persisted until recently? He remains doubtful regarding the thesis according to which the development of information technology harbours the ingredients of a public economy and calls for new types of regulation. In his view, this is not true of a number of economic sectors such as food, cars and building, while in the field of pu-

1. La réduction du temps de travail
Reduction in Working Time
2. Partage de la valeur ajoutée
The Sharing of Value-Added
3. Service public/Secteur public
Public Service and Public Sector
4. Croissance et chômage
Growth and Unemployment
5. Coordination européenne des politiques économiques
Coordination of Economic Policies in Europe
6. Pauvreté et exclusion
Poverty and Social Exclusion
7. Retraites et épargne
Pensions and Savings
8. Fiscalité de l'environnement
Environmental Taxation
9. Les cotisations sociales à la charge des employeurs
Social Security Contributions Paid by Employers
10. Innovation et croissance
Innovation and Growth
11. Fiscalité et redistribution
Taxation and Redistribution
12. Emplois de proximité
Local Employment Initiatives
13. Régulation du système de santé
Regulation of the Health-Care System
14. Instabilité du système financier international
Instability of the International Financial System
15. Égalité entre femmes et hommes
Equality between Women and Men
16. Agriculture et négociations commerciales
Agriculture and Trade Negotiations
17. L'architecture des prélèvements en France
Architecture of Levies in France
18. Architecture financière internationale
Architecture of the International Financial System
19. Le temps partiel en France
Part-Time Work in France
20. Le cycle du millénaire
The Millennium Round
21. Retraites choisies et progressives
A Voluntary Gradual Retirement Scheme
22. Formation tout au long de la vie
Life-Long Training
23. Réduction du chômage
National Achievements in Overcoming Unemployment
24. État et gestion publique
State and Public Sector Management
25. Développement
Development
26. Politiques industrielles pour l'Europe
Industrial Policy
27. Questions européennes
European Issues
28. Nouvelle économie
Economics of the New Economy
29. Régulation des relations entre fournisseurs et distributeurs
Which Regulation for Trade?
30. Plein emploi
Full Employment
31. Aménagement du territoire
Regional and Urban Planning
32. Prix du pétrole
The Oil Price
33. Inégalités économiques
Economic Inequalities
34. Enchères et gestion publique
Auctions and Public Affairs Management
35. Démographie et économie
Demography and Economy
36. Enjeux économiques de l'UMTS
Economic Analysis of the UMTS Project
37. Gouvernance mondiale
Global Governance
38. La Banque centrale européenne
The European Central Bank
39. Kyoto et l'économie de l'effet de serre
Kyoto and the Economics of Global Warming
40. Compétitivité
Competitiveness
41. Propriété intellectuelle
Intellectual Property
42. Les normes comptables et le monde post-Enron
Accounting Standards and the Regulation of the Financial Information Industry
43. Crises de la dette : prévention et résolution
Sovereign Debt Crises: Working In and Working Out
44. Protection de l'emploi et procédures de licenciement
The Institutional Design of Employment Protection
45. Ségrégation urbaine et intégration sociale
Social Integration and Urban Segregation

blic utilities the direction taken by the movement is probably rather to introduce competition where there was previously monopoly.

A number of complements are attached to the report

Isabelle Falque-Pierrotin reports on the legal implications of the Internet on the eve of the Geneva Summit and proposes that the European Union present itself at the Summit as the world leading advocate of a multi-player co-regulation of the information society. She also recommends that the Summit should be the occasion for launching a reflection on the criteria that determine the competent tribunal applicable in a cross-border dispute originating on-line.

Didier Zmiro emphasises the high stakes involved for industry in the information society and shows that, while Europe has taken a lead in mobile telephony and achieved certain successes in strategic fields such as semiconductors, its future situation will depend on its capacity to remain a strong technological pole.

The **Direction des relations économiques extérieures** (External Economic Relations Directorate) reviews the principal incentives for ICT penetration and Internet access in the main OECD countries: highly-targeted direct aid for a limited period in some countries or regions (Korea, Italy, Quebec); tax measures, aimed principally at employees through firms in Europe and school pupils through primary and secondary schools in the United States, Canada and some European countries; finally, measures permitting a reduction in the price of Internet connection in the United States and the United Kingdom.

Karine Revcolevschi proposes the implementation of training programmes and supplementary measures targeted on certain categories of the population – low-income households or those with a child entering secondary education – in order to encourage the penetration of the PC and the Internet among French households.

With France getting ready to transpose the 22 May 2001 European Directive on the

harmonisation of certain aspects of copyright and related rights in the information society (known as the European Union Copyright Directive), **Gilles Bordes** and **Alain Crawford** show, through an analysis of the record market, that digitalisation of content does not seem at present to pose a threat to the remuneration of authors and artists.

Dominique Foray presents the architecture of the knowledge-based economy in the main OECD countries.

Jean-Michel Salaün describes the three approaches that redefine documents in the digital age: the sign (or the form), the text (or the content) and the medium (or the relation).

Raymond Heitzmann, **Fabrice Lenseigne** and **Patrice Roussel** stress the very short period covered by the statistics on ICT compiled by national statistical institutes under the impetus of the OECD and the European Commission.

Gilles Brégant sets out the main implications of e-government.

Mireille Campana analyses the current state of regulation of network security and initiatives taken to enhance it.

Highlighting the prominent role of local authorities, in between central government and the citizens, **Emmanuel Eveno** and **Daniel Latouche** stress their great capacity for innovation.

For **Michel Villac**, e-health constitutes a formidable lever for advancing the healthcare sector in the direction of greater efficiency and higher quality: following the success of the French SESAME-Vitale programme, it is now essential to go beyond the experimentation stage as regards on-line healthcare records.