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Working Party on the Information Economy

ICT DIFFUSION TO BUSINESS: Peer review

Country report: Switzerland

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FOREWORD

In December 2003, this report was presented to the Working Party on the Information Economy (IE) as part of the peer review of ICT diffusion to business in Switzerland. It was recommended to be made public by the Committee for Information, Computer and Communications Policy in April 2004.

The report was prepared by Andreas Dubs (consultant) in conjunction with Graham Vickery of the OECD Secretariat. The series of peer reviews of ICT diffusion to business have been coordinated by Graham Vickery. It is published under the responsibility of the Secretary-General of the OECD.

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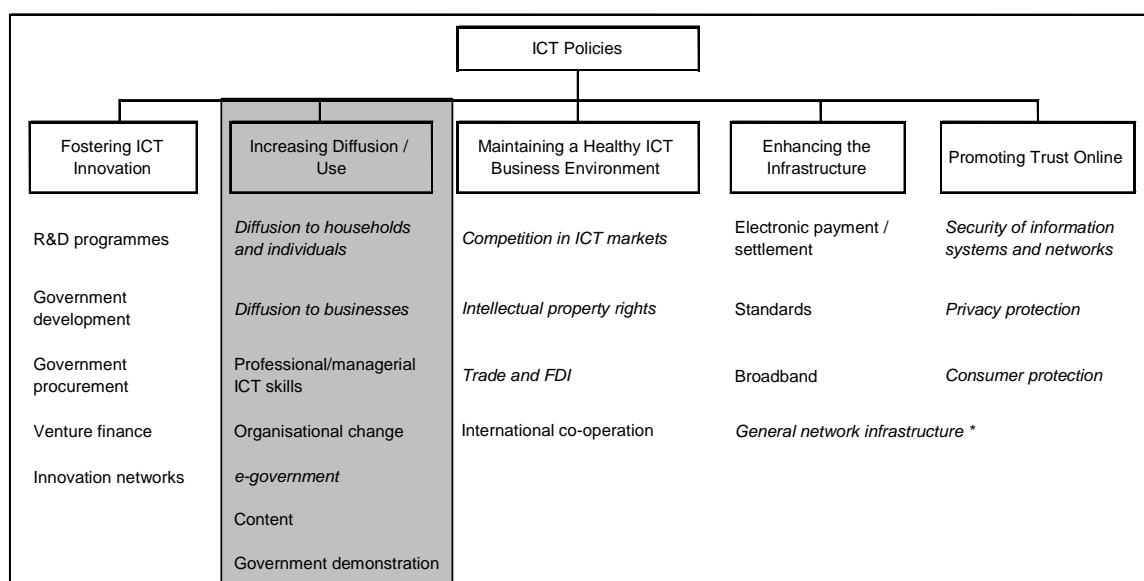
BACKGROUND

The OECD Growth Study concluded that information and communications technology (ICT) is a key input to productivity and growth performance (OECD, 2001*a*; 2001*b*; 2003*a*). In 2001 the OECD Council Ministerial urged the OECD to strengthen its peer review of structural reforms. The 2002 Council Ministerial requested “the OECD to increase its monitoring of member countries' implementation of the recommendations of the OECD Growth Study”.

This report is part of the peer review process of policies promoting ICT diffusion to business, which has been designed to respond to the two Ministerial requests as part of the Growth Follow-up; Micro-policies for Growth project. OECD peer reviews are used as a method to bring together peers from member countries to discuss the policy experience and its main challenges in one country at a time. Once a critical mass of countries has been reviewed, a cross-country comparative synthesis report will be prepared with a view to identifying common good policy practices. The review has been conducted in the Working Party on the Information Economy (WPIE) on 4 December 2003. The discussion and comments made at the meeting are reflected in this report.

The report reviews the status of *diffusion of ICT to business* in Switzerland by examining the available indicators and describes the current and previous policies aimed at ICT uptake in firms. That area was designated as the focus policy domain for these peer reviews. It is one of the five pillars of the ICT policy framework that is used in the *Information Technology Outlook 2004* Policy Questionnaire, shown in Table 1. Given the complexity of the ICT diffusion process and the central role of a number of the other factors, attention is also given to the other parts of the framework (R&D, e-procurement, payment systems, standards, broadband trust and security) as they are important elements in the diffusion of ICT to business.

Table 1. ICT Policy Framework



The report presents recommendations for possible policy actions based on the strengths and weaknesses observed in the Swiss policy approach. Policies to encourage ICT diffusion to business cover traditional areas such as awareness-raising and publicly financed business services to develop ICT readiness in small and medium sized firms, and also more general business environment policies such as infrastructure competition policies. The review does not focus directly on broader aspects of Information Society policies aimed at citizens' and household's uptake of ICTs and participation in the Information Society. Furthermore, the review should not be seen as a comprehensive evaluation of the effectiveness of the most recent initiatives, but as a guiding tool for facing the challenges and setting priorities for new initiatives.

SUMMARY

Switzerland is well-advanced along the diffusion curve of ICT use in business. Levels of basic “readiness” (see *IT Outlook* 2002, 2004) are high, and it is well equipped with the necessary hardware, both information technology and communications technology. However diffusion is uneven and ICT impacts on business may be lower than expected based on the average levels of equipment and diffusion. Switzerland tends to be a follower in embracing fully new technologies and their application to business rather than an early adopter despite the strong technology base. This raises the question of whether business in Switzerland makes the best use of the technologies not only in terms of introducing the hardware but re-engineering processes and business models to take full advantage of the technologies. Given the relatively lower penetration of PCs in schools and homes, there may be bottlenecks in terms of skills and familiarity with ICT that could become impediments to the effective adoption of ICT in business. The federal government’s industry policies generally tend to focus on setting the right framework through improved information flow, streamlined procedures and demonstration programmes. In this context, the next steps in policy could be to develop a better picture of shared goals, obstacles and measures needed to improve performance. The following Table summarises the analysis and recommendations developed in more detail in the report.

Policy domain	Current policy priority	This priority should be	Recommendations
Coordination of initiatives	Medium	Increased	Maintain current coordination mechanisms. Review and update overall strategy. Establish quantitative goal setting and evaluation. Obtain high level government commitment.
Infrastructure	Low to medium	Continued	Investment in ICT is high and does not require intervention.
R&D	Low	Continued Increased	Continue support of ICT R&D through general R&D support mechanisms. Improve effective low-cost adoption of ICT in SMEs; requires adaptation rather than R&D.
Equipment	Low	Continued	Investment in equipment not a limiting factor and no further intervention is needed.
Public/private partnership	Medium	Increased	Design and implement follow-up project to CH21
Skills: ICT in schools	Medium	Increased	Address barriers and investigate incentives for teaching staff to get involved; review reduction in funding.
Business organisation	Low	Increased	Consider mechanisms to assist micro-enterprises to adapt their business processes to make optimal use of ICT.
Content creation	Medium	Continued	Focus primarily on content provision relating to public services and issues. Await outcome of study and implement recommendations without delay.
Trust/security	Medium	Increased	Consider establishing certifying agency in a public/private partnership. Develop and adopt overall IT security strategy.
Demonstration/awareness	High	Continued	Complete and build on existing platforms and e-Government initiatives, with particular focus on SMEs
Small firms	High	Continued	Improve reach by involving local industry associations

PROMOTING ICT DIFFUSION TO BUSINESS IN SWITZERLAND

Introduction

Information and communications technology (ICT) is now generally recognised as a key factor contributing to productivity and growth. This was reaffirmed in *The New Economy, Beyond the Hype* (OECD, 2001b) and more recently in *Seizing the Benefits of ICT in a Digital Economy* (OECD, 2003) where the point was made that successful adoption of ICT is closely linked to firms' innovative abilities and good management practices. Another example can be found in a recent study in the manufacturing sector which showed a strong correlation between the introduction of ICT, innovation and expanding market share (OECD, 2002a).

This review summarises the development in Switzerland of the adoption of ICT by the business sector. While the ICT industry itself contributes directly to economic performance and growth, this aspect is less significant than the pervasive effect of the application of ICT across all sectors.

Switzerland has a federated structure with a strong autonomy of the cantons as well as the local governments. Thus the federal government limits its interventions to those areas where action is not or cannot be taken by the 26 cantons (subsidiarity principle). Switzerland has also a history of a fairly "hands-off" approach to industry policy compared with some of its geographical neighbours. The federal government's industry policies tend to focus on setting the right framework through improved information flow, streamlined procedures and demonstration programmes. These facts are strongly reflected in the ICT policy domain where the main action is towards awareness raising (strategy for an information society in Switzerland), leading by example (e-Government) and adapting the legal and regulatory framework to suit the new technologies.

Industry structure

Switzerland is a highly industrialised country with a substantial proportion of high technology, export oriented, small to medium sized enterprises (SMEs). Of a total of some 300 000 enterprises, only about 1 000 are large (more than 250 employees), about 30 000 are small to medium size (10 to 250 employees) and the great majority of around 270 000 are micro-enterprises with fewer than 10 employees. This structure is by no means unique in the context of the OECD. In terms of employment, it is of interest to note that Switzerland is dominated by the small to medium sized enterprises, similar to Austria, Luxemburg, Portugal, Iceland, and Norway, while micro-enterprises dominate the employment market in Spain, France and Italy. Germany, Sweden, the United Kingdom, and Belgium are examples of countries where large enterprises employ the majority of people (State Secretariat for Economic Affairs, 2000).

Business use of ICTs

Since 1999, specific statistical information covering many aspects of ICT and its implementation in homes, enterprises, and education is being collected by the Swiss Federal Statistical Office (*e.g.* 2002a-c). These indicators are essentially measures of the proportion of the relevant population that has adopted a particular new technology. While few of the indicators allow an insight into the extent of its use and the economic cost and benefit of its introduction, measuring the detailed level of integration and the actual impact of ICT in industry is almost impossible beyond specific case studies of individual projects and thus the input measures are often the only reliable quantitative indicators. However, some progress is being made in this area. For example, a recently published benchmarking study breaks new ground by introducing a "sophistication index" based on a range of 54 separate indicators; this study could provide a

useful framework to consider the development of more insightful measures of the ICT impact on the Swiss business sector (Department of Trade and Industry UK, 2003).

In 2000, 94 % of all enterprises had at least one computer (Federal Office of Communications, 2003a). 90 % of firms make use of the Internet and about every second firm has an Internet presence. Adoption of ICT hardware is more prominent for the large firms (Table 1). There is also an earlier adoption in services and industry, while the construction sector lags somewhat behind in many statistical indicators measuring ICT diffusion (Swiss Federal Statistical Office, 2002a). Overall, the conclusions of a number of studies suggest that the adoption of Internet technology by the Swiss business sector has reached a saturation point and most developments in coming years will be towards improved access, *i.e.* increased bandwidth, to cater for the demands of future applications beyond e-mail and simple information search and distribution applications (Federal Office of Communications, 2002c).

The number of Internet hosts per 1 000 people is, at 74, below the OECD average (101). On the other hand, the number of secure Web servers (used for e-commerce applications) at 192 per million people is substantially above the OECD average of 119.

SMEs show a somewhat below average adoption rate with 84% using PCs, 65% being connected to the Internet but showing some reluctance to deal with the public administration by electronic means (State Secretariat for Economic Affairs, 2002). It is argued that this is mainly due to some doubts about the safety and security of the technology. Nevertheless, it is claimed that around 200 000 SMEs make use of such facilities.

Some two thirds of enterprises with Internet access use access via modem, mostly via ISDN. Of these firms, 9% are considering access via cable television and a further 10% are studying the possibility of alternative broadband connections. Those businesses with no Internet connection justify their position mainly by a lack of perceived benefit and reluctance by management to adopt these new technologies.

Table 2. Diffusion of ICT to business by size of firm (surveys 2000 and 2002)
Figures represent proportion in % of all firms

	2000				2001	2002	2003 (projected)
	By number of employees			All sizes			
	5-49	50-249	> 250				
Personal digital assistants, organisers, etc.	30.1	45.8	64.0	32.6	33.5	36.5	37.7
Laptop computers	42.8	64.8	79.6	46.2	49.9	53.1	54.2
PCs/Workstations/Terminals	93.3	97.3	99.7	93.9	94.0	96.2	96.3
E-mail	84.7	94.5	99.4	86.1	84.7	92.7	93.3
Internet	76.4	86.6	97.0	78.0	82.8	92.1	93.0
Electronic data exchange with other enterprises	38.3	48.2	71.8	40.1	40.7	43.1	44.7
Computer networks within firm (LAN/WAN)	49.2	76.3	95.1	53.4	53.3	56.0	58.2
Intranet (Internet technology within enterprise)	23.0	47.4	78.9	27.0	25.1	27.2	28.6
Extranet (protected external access to Intranet)	11.2	24.3	40.3	13.3	10.7	11.9	13.1

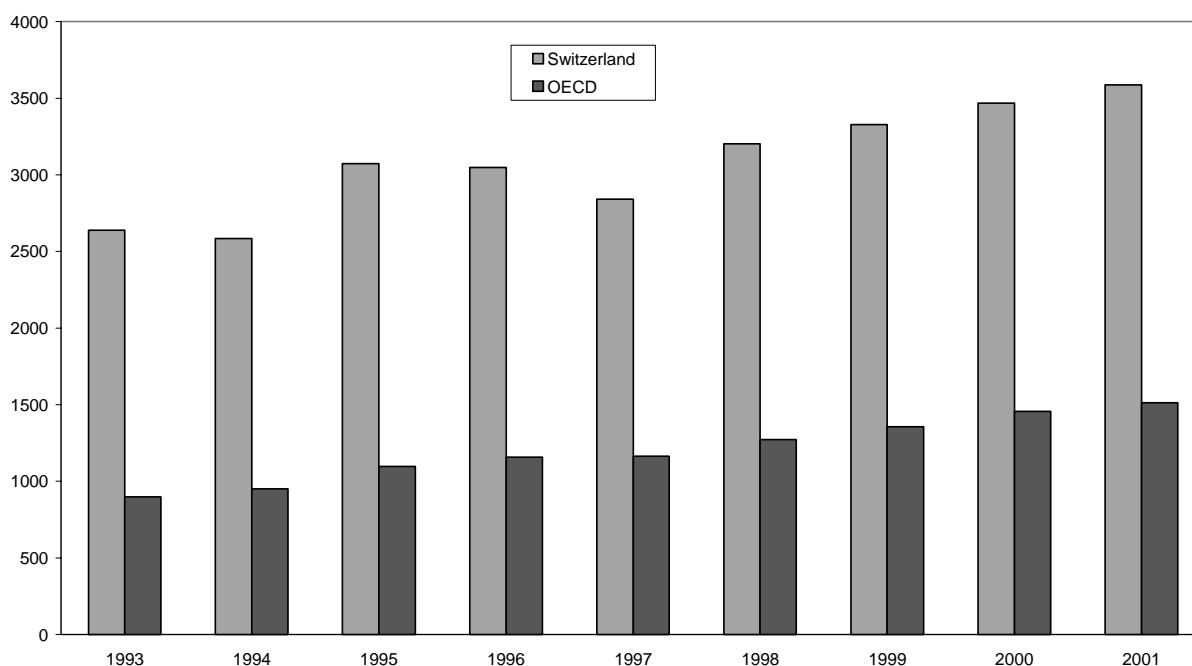
Source: Swiss Federal Statistical Office (2002a); Swiss Federal Statistical Office (2003); Die Volkswirtschaft (2003).

Trends in ICT usage in business

In line with the other OECD countries, one observes a significant overall increase in the ICT infrastructure installed in Switzerland over the past decade.

ICT spending

Figure 1a illustrates that Switzerland, in line with other OECD countries, invests in ICT at a rate which was constantly growing over the period 1993 to 2001. What is more significant however is that Switzerland spends consistently about twice as much as the OECD average. Switzerland has, in fact, the highest ICT spending per inhabitant of all OECD countries (Figure 1b). This significantly higher spending is clearly reflected in the increased availability of ICT infrastructure such as telecommunication networks, servers and PCs (see below).

Figure 1a. Total ICT spending per inhabitant (USD)

Source: OECD, based on World Information Technology and Services Alliance (WITSA) / International Data Corporation, *Digital Planet 2002*.

Infrastructure: Telecommunications

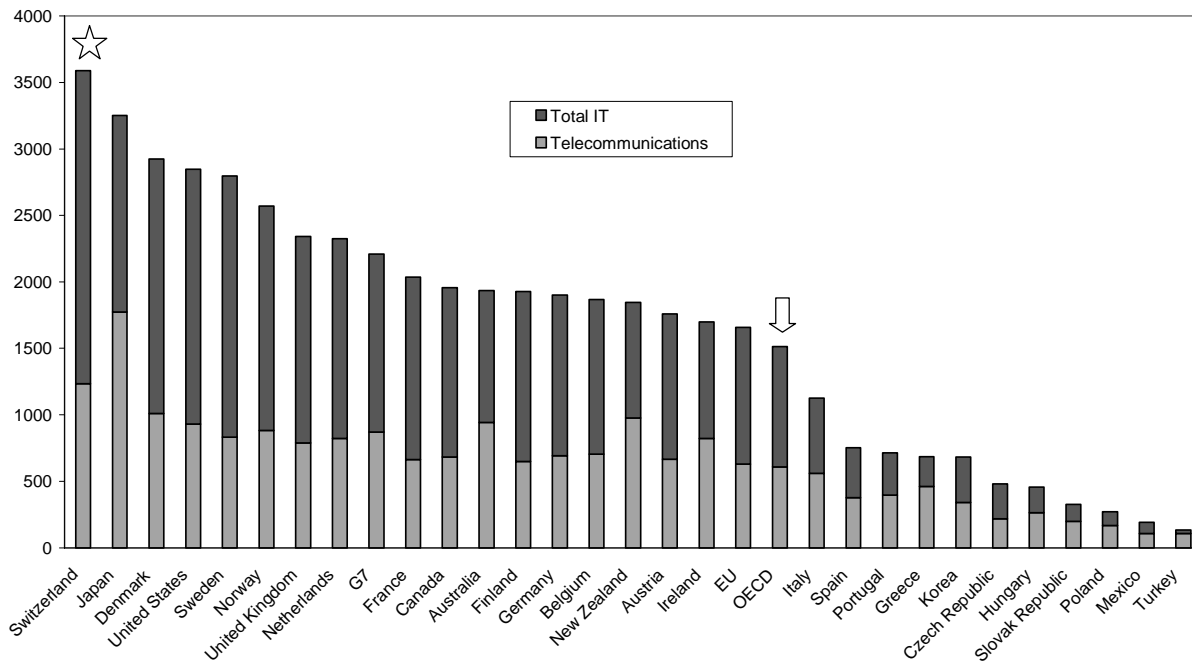
The communication network is also expanding continually with a number of communication channels per 100 inhabitants about 50% above the OECD average and growing at similar rates to the OECD average. On the other hand, Switzerland was not a leader in the adoption of mobile communication as measured by the cellular mobile phone penetration, but exhibited a rapid growth between 1998 (when penetration was at the OECD average) and 2001 (when penetration was above the OECD average). Similarly broadband coverage is good, with June 2003 broadband subscribers per 100 inhabitants considerably above the OECD average (see Annex).

Infrastructure: PCs

To get some measure of the ICT diffusion in education, business and private use respectively, one of the most reliable indicators may be the number of PCs installed in these areas. While this does not reflect the use or even the benefit derived from the technology it is likely to reflect fairly reliably the diffusion rate in different countries.

Figure 2a shows that Switzerland, in unison with the OECD average, experienced a strong growth in this indicator. By 2002, Switzerland reached a level of 43 PCs for 100 inhabitants, which is about 10% above the OECD average. Growth in this indicator appears to diminish at higher levels, reaching saturation at about 40 PCs per 100 inhabitants.

Figure 1b. Total ICT spending per inhabitant (USD) : OECD countries 2001



Source: OECD, based on World Information Technology and Services Alliance (WITSA) / International Data Corporation, *Digital Planet 2002*.

Switzerland in comparison with the OECD average and most other countries has a high number of PCs installed in businesses, while the number of PCs in schools and in homes is at about the level of the OECD average (Figure 2b). In the context of this study of diffusion to business, this difference may be of some significance. It suggests that business is well equipped to adopt the new technologies but there may be a relative weakness in terms of education and training to ensure that workers are ready to make full use of these opportunities. The rather low adoption of PCs at home compared with some other countries, such as the Netherlands, is a further suggestion that people in Switzerland embrace ICT less enthusiastically than in other countries.

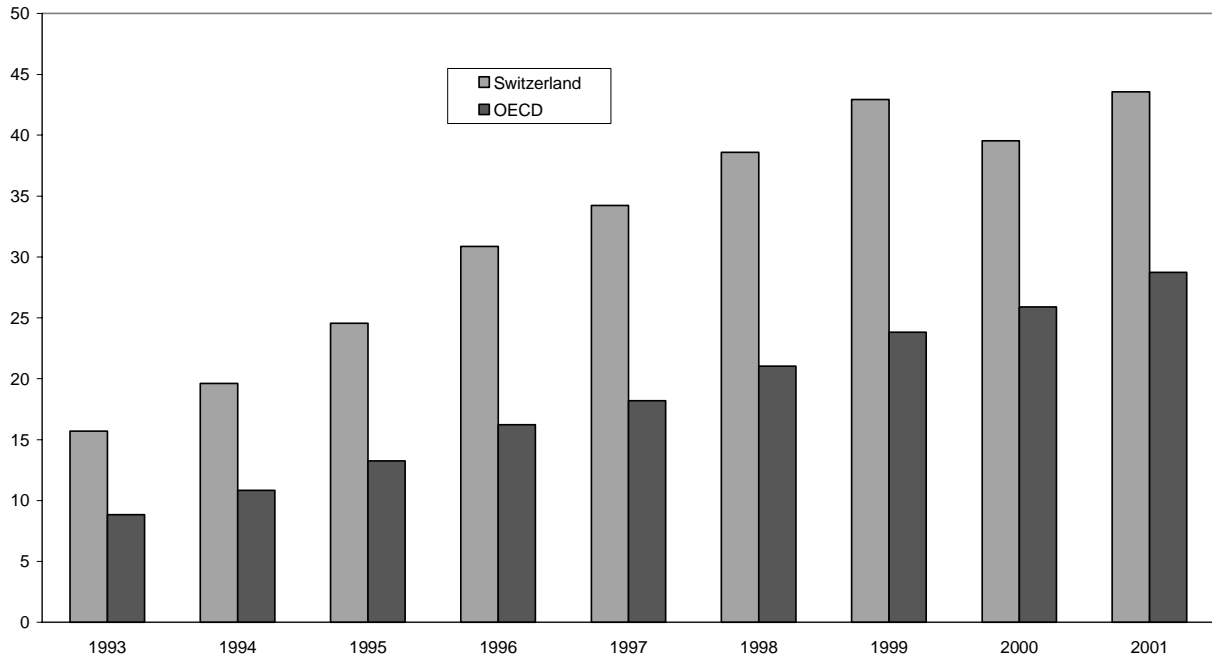
On the other hand, one could argue that Switzerland's substantial investment in ICT is also more predominantly aimed at the business sector and thus one could potentially expect a better economic return than in countries where more of the investment is in mobile phone infrastructure and home computing.

E-commerce

An indicator for the level of e-commerce that is taking place is the number of secure servers. The growth in the number of secure servers has been substantial over recent years, with a ten-fold increase over a four year period from 1998 to 2002, a period when the number of PCs had already commenced to stagnate, presumably due to saturation.

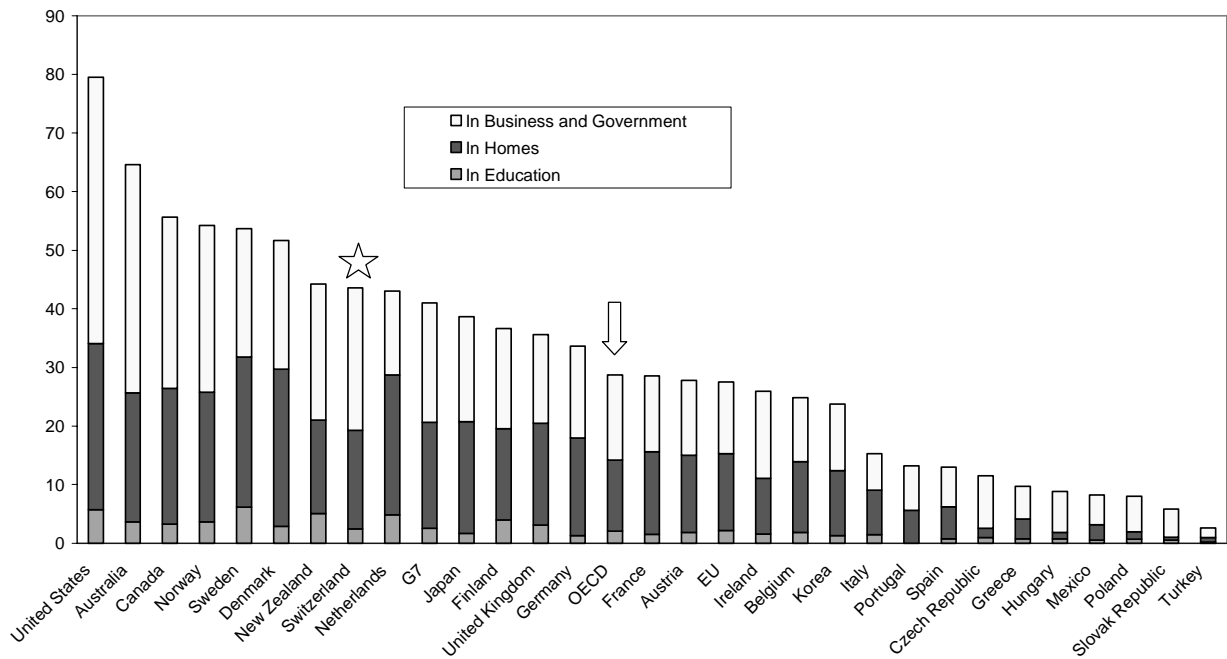
The level of secure servers in Switzerland is about 50% greater than the OECD average (see Annex). At least partially, this difference may simply be an indication of the greater concern regarding security issues in Switzerland rather than an increased level of e-commerce, a view that is supported by a number of reports and also the government's policy priorities to encourage secure transactions in 1998.

Figure 2a. Total number of PCs installed per 100 inhabitants



Source: OECD, based on World Information Technology and Services Alliance (WITSA) / International Data Corporation, *Digital Planet 2002*.

Figure 2b. Total number of PCs installed per 100 inhabitants: OECD countries 2001



Source: OECD, based on World Information Technology and Services Alliance (WITSA) / International Data Corporation, *Digital Planet 2002*.

A more direct measure of the importance of e-commerce is the annual volume of B-to-B and B-to-C e-commerce. A strong annual growth of around 100% over the 1999-2001 period in both types of e-commerce is in line with the OECD average. However, this must be tempered by the fact that even in 2001 e-commerce represented only about 2% of GDP when considering B-to-B e-commerce and about a third of 1% of GDP in the case of B-to-C e-commerce. So while growth is substantial, it is from a very low base and thus remains of relatively limited overall importance at this stage compared with total transactions. Nevertheless, because of a substantial concentration of e-commerce in certain industries, this application of ICT has a much greater importance in certain sectors than the overall figures would suggest. Sectors where e-purchasing is well above average include data-processing/research, watches, textiles and construction, while hotels and the plastics industry generate a substantially above average proportion of their turn-over through e-sales (Swiss Federal Statistical Office, 2003).

More recent figures show that 44% of firms use e-commerce for purchasing while only 16% sell through electronic channels. These participation rates remained fairly stable over the period 2000 to 2002 (Swiss Federal Statistical Office, 2003), which makes Switzerland one of the leading countries in e-commerce purchasing and “about one year behind the leading countries” in e-commerce selling (Die Volkswirtschaft, 2003).

Summary

Based on the comparative analysis of this limited number of indicators Switzerland appears to be well equipped with the necessary hardware, both in terms of information technology and communications technology. There would appear however to be a certain reticence in embracing fully the new technologies and to lead their application to business.

Switzerland has a rather conservative attitude to ICT, making it a follower rather than an early adopter despite the ready availability of the technology base. This raises the question of whether business in Switzerland makes the best use of the technologies in terms of not only introducing the hardware but re-engineering the processes and the business models to take full advantage of the technologies. Given the relatively lower penetration of PCs in homes and schools, there may be a bottleneck in terms of skills and familiarity with ICT that could become a bottleneck to the widespread and effective adoption of ICT in business in Switzerland.

General approach

Strategy for an information society

In terms of the national ICT policy framework, the obvious starting point is the policy statement by the Swiss Federal Council in February 1998 (Swiss Federal Council, 1998). This statement was formulated following a review by an expert group of opportunities and threats presented by the Information Society in Switzerland (*Groupe de Réflexion*, 1997), supported by a commissioned study (Prognos AG, 1997). In essence, the group recommended the setting up of a coordinated approach towards facilitating the effective adoption of ICT which was adopted in the Federal Council strategy. This strategy, intended to be implemented in a decentralised manner by the responsible areas of the administration, remains five years after its publication the fundamental document setting out the direction to be taken by Switzerland in order to become an information society.

The 1998 strategic statement is aimed at capturing the opportunities and benefits of ICT while at the same time ensuring that the negative effects are minimised. The four principles are:

- “Access for all” to enable everybody access according to their needs.
- “Empowerment of all” noting that on-going education and training are important elements.
- “Freedom of development” emphasises the important role private industry has to play while the government must provide the appropriate framework, and
- “Acceptance” by developing trust and confidence through appropriate legal and regulatory actions, noting the importance of self-regulation.

The strategy goes on to list the high priority measures to implement the four principles. These cover:

- Training at all levels, including adult education.
- Increasing the attractiveness of Switzerland as an economic location by establishing and maintaining an attractive ICT infrastructure.
- Provision of the organisational and regulatory framework to allow electronic commerce, including the introduction of the digital signature.
- Use of ICT in public administration to generate trust in and acceptance of ICT as well as using ICT to strengthen the democratic process.
- Promoting and facilitating the application of ICT in the arts, through new artistic forms of expression as well as by using ICT to make culture more generally accessible.
- Ensuring security and availability of information, focussing on the need for reliable data transfer, storage and archiving.
- Statistical information and research on the social aspects of the application of ICT and
- Assessing the appropriateness of the legal framework to the new demands of the information society.

In a general sense, it can be noted that Switzerland’s position in 1997 was seen as relatively well developed, particularly in terms of the proportion of work places equipped with computers and the capacity of telecommunication links. This view is also supported by the data presented in the previous section. However, the importance of ICT for future growth was recognised as well as such ongoing challenges as education and training, electronic commerce, security, trust and availability.

Since the enunciation of the overall policy and the setting up of a coordination mechanism, the initiative has been reviewed formally every year, with the 5th and latest review dating from June 2003 (Federal Office of Communications, 2003a). In broad terms, progress in all priority areas is reported to be in line with the strategy implementation plan.

Telecommunication market

The telecommunication market in Switzerland was opened up to competition in 1998 and, in April 2003, the monopoly over the last mile was also lifted. As a consequence, telecommunication costs have been reduced by about 30%, with international and long distance calls being low to average in an international comparison (Federal Office of Communications, 2002d & 2003b).

To stimulate the Swiss mobile telephony market by means of innovative projects, three additional GSM frequencies have been put for tender in July 2003, with the Federal Communications Commission deciding on the successful tenders by the end of 2003.

A technology of particular importance to the introduction and adoption of many of the new technologies is broadband transmission networks. Broadband access is mainly available through ADSL and cable modems. Other technologies such as wireless access have currently only a very limited use. Cable modems are particularly important to personal connections of households in Switzerland since over 90% of all households have access to this infrastructure and some 85% have an actual connection. However only a small proportion of households were making use of broadband technology, driven by a combination of a limited need for such high speed connections (games, video and music downloads) and the relatively high cost (Federal Office of Communications, 2002c). By June 2003, the equivalent of 8.7% of the population were subscribers to broadband with 317 000 ADSL access lines and 320 000 cable access lines, above the OECD average of a little over 6% (Federal Office of Communications, 2003c).

Business utilises ISDN and ADSL access, with large businesses making use of optical fibre networks, available in some of the agglomerations, and leased lines. Leased lines with more than 2Mbit/s transmission capacity increased by approximately 70% between 1998 and 2000 (Federal Office of Communications, 2002b). Given the subsequent almost ubiquitous availability of broadband access and yearly growth rates in subscriptions of about 250% over the period from January 2000 to June 2003, the Swiss Government does not see a need to intervene actively in the broadband telecommunication market.

Focus of government policies and programmes

It would appear from the Sieber study (State Secretariat for Economic Affairs, 2002) that the main need is in the area of demonstrating the usefulness and economic return to businesses. The report goes on to suggest that this is best achieved through case studies. The same study points out that investment in ICT is quite high and that over the period 2000 to 2002 the sectoral and size differences in the adoption of the new technologies has substantially disappeared.

The focus of the federal government is on the changes to legal and regulatory aspects required to allow e-commerce to prosper, the security and safety issues associated with the Internet, and the effective use of ICT within the public administration and in its interaction with the public. Equally important are the awareness raising initiatives such as the case study data base *eXperience* with currently over 150 detailed case studies showcasing SMEs taking advantage of ICT.

The general approach of Switzerland in seeking to facilitate the diffusion of ICT to business shows great similarity with the most common mix of strategies found in OECD countries (OECD, 2002b). They include provision of information and promotion of e-commerce, as well as demonstrating the benefits through the government as a model user. It was found that direct financial assistance through subsidies or fiscal means is much less common.

Co-ordination

The coordination group Information Society is overseen by an Interdepartmental Committee for the Information Society (ICIS) with representatives from all relevant federal departments. The ICIS is supported in its work by an Information Society Coordination service. Individual working parties and project implementation teams report to their supervisors within the departmental structure, and the ICIS oversees the overall progress through reporting by the relevant departmental representatives.

To give an impulse to the various projects and programmes aimed at facilitating the introduction of the information society, a two year project called CH21 was launched in 2001 with the support of a broad range of individuals and organisations mostly from the private sector. CH21 had as its goal to bundle and link the many different initiatives being undertaken, to improve coordination and visibility and to provide an impulse to the effective implementation of ICT at all levels of society. Only very few new projects were funded through CH21, which came to an end early in 2003. Its final report concludes that while substantial progress was made, several target areas, in particular education and training, e-Government, and the introduction of the digital signature, remained behind the targets set in early 2001 (Impulsprogramm CH21, 2003). It should be noted that these areas concern the public domain mostly and were thus beyond the sphere of effective influence of this mostly private initiative.

Specific initiatives

Many of the projects described below are essentially applications which demonstrate to business the potential of the new ICT, particularly the Internet, or which provide indirect assistance to firms in their efforts to adopt ICT by way of provision of information, education and training.

There are no specific initiatives to facilitate or subsidise the introduction of ICT infrastructure, hardware or software or to undertake R&D in this area beyond those more generally available to businesses, with the exception of SoftNET which provided some specific assistance to the software industry, but comes to a close at the end of 2003 (see below).

Skills: Public Private Partnership – School on the Net (PPP – SiN)

This initiative is aimed at improving the use of and training in Internet technologies in schools. This is seen as an important aim which will in turn increase the attractiveness of Switzerland as a location for businesses. The partnership is between hardware and software suppliers, who make their goods available at discounted rates, and the education sector, which ensures the further education of its teaching staff in support of this joint initiative. Education and training are fields where the federal government has only limited direct responsibility and control, since they are largely the responsibility of the cantons. This programme thus relies heavily on the collaboration of the cantons. The programme is implemented by the Federal Office for Vocational Training and Technology (BBT). As at January 2003, some CHF 74m had been earmarked by the federal government for the period 2002 to 2006. This allocation was reduced to CHF 40m during 2003 as part of an overall expenditure reduction initiative. In January 2003, some 1 800 schools, representing a total of 480 000 students were provided with access to the Internet (Federal Office of Communications, 2003a), which increased further to 2 200 schools and 540 000 students during 2003.

This initiative is a good example of a public private partnership with industry representation from the communication and the hardware/software sector. Free Internet access and hardware at reduced prices are being offered. The government is committed to provide the necessary education and training to ensure that teachers are able to use the technology effectively. It would appear that the major barrier is this latter activity, mainly due to the reluctance of teachers to participate. Furthermore, the government funding was

recently reduced substantially as part of a general savings initiative. An external evaluation of the Programme is scheduled for 2004.

Skills: Apprenticeship and vocational training in ICT: i-CH Cooperative venture

This initiative involves a great number of organisations which have an interest in the education and training of information technology professionals. A major aspect is the structured and modular definition of competencies required by the many different specialists (www.i-ch.ch). Through modularisation of IT competencies, training is expected to become more flexible and better to meet the market needs. A further goal of the programme is to increase the number of IT-workers, and particularly the percentage of female IT professionals. Part of the initiative was a public awareness raising campaign. In terms of ICT diffusion to business, an increased supply of IT professionals combined with improved professional qualifications of those required to put in place and maintain these new technologies clearly provide substantial benefits to industry and facilitate the rapid and effective introduction of these technologies.

Skills and business organisation: SoftNET

SoftNET is a programme aimed at assisting the local software industry. It concludes at the end of 2003, after three years of operation, and in future support for software projects will be provided through a general technology assistance programme. The programme encourages in particular collaborative projects involving public and private organisations. It supported the establishment of competency networks, educational activities and seminars aimed at the software sector and the development of standards.

An attractively presented publication for people of all ages and particularly parents and their children on what one needs to know about the Internet, its uses, safety aspects etc is an example of an educational activity. This publication was supported by the standards association, a major industry association, a consumer organisation, the ICT industry association and SoftNet. It tries to overcome the initial barriers for newcomers to the Internet as well as raising important issues of safe behaviour while surfing on the net.

Another project was the establishment of an e-learning module on project management in the software industry. A further initiative offered a structured self-analysis of strengths and weaknesses for firms with an aim of developing an information base that would ultimately allow benchmarking of firms.

Content creation

Content creation and the role the federal government may play has become an issue over the past 12 months, following the 4th review of the strategy implementation. From initial indications it would appear that there is very limited support for content creation by the public service outside of information directly relating to public matters. Rather, content creation is seen as a private matter with the public sector limiting its action to ensure free access to and flow of information.

A report suggesting an overall policy and concrete measures is in the process of being elaborated, with specific measures to be decided by the federal government in 2004.

Trust and security

Security of information systems has been a particular concern to Switzerland for some time now. In 1999 the Foundation InfoSurance (www.infosurance.org) was founded as a means to bring together business partners, NGOs and administrations in order to exchange information and raise awareness relative to security aspects. Since 2001 annual high level IT-security conferences have been held to serve the same purpose. The federal administration is at present devising an early warning system using the Computer Emergency Resource Team (CERT) of the Swiss Education and Research Network SWITCH, which

should be operative in 2004. However, an overall IT-security strategy has yet to be adopted. An issue to be addressed in this context is whether there is a need for a federal ICT security agency.

The Swiss Federal Data Protection Commissioner regularly publishes information concerning *privacy protection* in a digital world (see <http://www.edsb.ch/e/aktuell/index.htm>). The Swiss data protection law was amended to cover digitized data and guarantees protection of privacy for data processing carried out by persons in Switzerland.

Trust marks/labels have not proved very successful in Switzerland so far. E-comtrust has established its first worldwide pilot project in Switzerland. E-comtrust offers a seal of quality based on an analysis of the procedures and policies of the e-commerce organisation which is aimed at engendering trust in the clients and potential clients. E-comtrust is a private initiative sponsored by SwissICT (the ICT industry association), *economiesuisse* (the main industry association), the consumer forum, and the Swiss Standards Association. Based on the E-comtrust initiative, the CEN/ISSS CWA eTrust (14842) standard has meanwhile been worked out by an international group of experts and is soon to be published.

The federal strategy identifies transaction security as an important aspect particularly to develop e-commerce. This issue was initially given highest priority but by the time the legislation was introduced into parliament in 2001, the agency SwissKey had discontinued its operation and the Internet boom had collapsed. The legislative base for *electronic signatures* was set in place in its final form with the approval of the new legislation by parliament on 19 December 2003.

Switzerland has adopted an approach that will allow the electronic signature to be used in essentially all circumstances where currently a signature is required, rather than excluding some areas as is the case in some other countries. The view was taken that there is no reason for differentiating between different applications and that excluded areas would be likely to develop *ad hoc* approaches which would likely be less satisfactory.

The remaining issue is by whom and how a *certifying agency* should be established. There is general agreement that a certifying agency on its own is not a viable business proposition, at least until there is substantial demand for certification of digital signatures. Banks and other private users currently use their own proprietary systems to ensure security. The main area of need seems to be in the implementation of e-Government to allow tax, voting and other transactions to be implemented electronically.

However, the government is reluctant to set up a certifying agency and is looking towards the private sector to do so, while industry argues that the government is best placed to set up an organisation that has the trust and can ensure the longevity that is needed for this type of organisation to be effective. It is also argued by some that the government is best placed to “force the issue” by introducing the use of electronic signatures in areas where it has a unique position such as in the health care system, income tax, utilities or the research and education arena. By issuing digital identities and introducing the use of electronic signatures in such fields, one could expect business applications making use of the same infrastructure to follow.

Demonstration and awareness: Portal to government services - www.ch.ch

This portal integrates all three levels of public administration and government (commune, canton and country). While it is currently limited to the provision of information, it is planned to incorporate interactive features in the near future. It is expected that the provision of these services will allow SMEs not only to access information 24 hours a day but also to save time in their interaction with the various levels of public administration. This site is mainly aimed at the individual citizen to assist in his/her dealings with the public administrations at the federal, cantonal and communal level. At the current pilot

stage, its usefulness particularly to businesses is limited by the restricted coverage of services included. However it could form the basis for a broader government portal for citizens, with perhaps a special business portal linked to it.

Demonstration and awareness: Some further initiatives

Other government services aimed at business and providing the dual benefit of improved access to services and demonstration of the capabilities of these new technologies include:

- The Swiss Official Gazette of Commerce (www.shab.ch), edited by the State Secretariat for Economic Affairs, and which is produced and distributed electronically; the electronic form of the Gazette of Commerce substantially facilitates the search for specific information, reduces the distribution costs and paper usage.
- The Central Business Names Index (www.zefix.ch) which gives electronic access to all 26 cantonal commercial registers and allows direct access to register extracts.
- The Swiss Federal Tax Administration offers companies the possibility to digitally exchange documents required to calculate VAT. The authenticity of the data must be digitally certified. Currently, a German body is providing this service in the absence of a Swiss certification agency. The services offered by the Tax Administration replace paper-based processes reducing both transmittal costs and archiving costs.
- A pilot database of public procurement (*i.e.* call for tenders) information (www.simap.ch) is currently being tested at the cantonal level, with the federal procurement being under preparation and several major cities already included. It is a good example of an application that reaches out to many businesses, facilitates their operation, demonstrates the capabilities of the technology and is able to be built up from an information source into a two way fully-fledged electronic exchange system.
- A fully electronic system for the administration of the export controls (restricted goods such as arms and dual use items) is in the process of implementation (pilot Project eXcos). It is expected that it will provide greater transparency, efficiency and quality of service than the current paper based system.

To raise awareness about the business opportunities offered by the new ICT, a *Guide for SMEs about the introduction of the Internet* into their businesses was sponsored by the State Secretariat for Economic Affairs and published in 1999. It offers SMEs a realistic assessment of the opportunities available and provides practical guidance.

The same office also sponsored work in the area of *e-contracting* at the University of St. Gallen. Since 1998 the University of St. Gallen has been carrying out research in the area of electronic contracting. The project “secure electronic contracts” implemented an XML-based contracting application. Current projects are working on the standardization of e-contracts in specific industries, investigating the potential of e-contracts and taking the first steps towards their implementation.

Small Firms: Portal for SMEs – www.kmuinfo.ch

The portal for SMEs represents important initiative at the federal level in terms of businesses both as a useful tool as well as a demonstration of the technical opportunities and, particularly for those establishing a new business, the *Guichet Créateur* (www.pmeinfo.ch for the French version and www.kmuinfo.ch for

the German version) being developed and maintained by the federal SME Task Force of the State Secretariat of Economic Affairs. This site has a wealth of basic information regarding regulatory, legal and administrative requirements, as well as other information of importance to new businesses, such as intellectual property issues, case studies of start-ups, and information on regional and local promotional bodies.

A database of case studies on e-commerce (<http://experience.fhbb.ch/>) is also available from this portal. *eXperience* currently consists of a total of 156 case studies, searchable by industry sector and application specific search criteria. Each case study provides detailed information on the type of e-Commerce application, the advantages and challenges and paints a picture of the environment within which the implementation has been undertaken. The initial set of case studies was developed by an academic institution. The case studies are written up in a consistent format by a range of academic and consultancy organisations.

One of the greatest difficulties is to demonstrate to the very small firms how they could benefit from these new technologies. These firms often do not have the specialist knowledge and the human and financial resources to undertake ICT projects which go much beyond the purchase of a PC, standard business software and a simple static information Web page. However, it is often only through the integration and adaptation of procedures and business processes that real benefits become available. It would be useful to include some very simple, low cost examples of ICT application, cooperation, integration and networking in small businesses in the case study database *eXperience* to give these firms affordable practical assistance.

Furthermore, the State Secretariat for Economic Affairs, in cooperation with other Federal Offices, is elaborating a transaction portal to be available under www.pmeadmin.ch. This portal will go online early in 2004, and as a first step it will enable individual enterprises to register with the commercial register, VAT and old age insurance via the Internet, considerably alleviating the administrative burdens on SMEs.

Evaluation

The annual review of action taken to implement the strategy is to be commended. The commissioning of external review activities and the involvement of an international expert group in 2002 is also seen as very positive. Unfortunately, the reviews are limited to qualitative statements regarding the input into the strategic activities and lack almost completely any quantitative measures and in particular any quantitative measures of the economic benefits achieved through the action undertaken over the past five years.

The more quantitative evaluations are undertaken at the level of individual projects and are not readily available. The initiative CH21 mentioned above made an attempt to set specific goals at the overall level and to measure progress on a “barometer” specifically developed for this purpose. As with all performance indicators, one can argue about the optimal set. Nevertheless, the process tends to focus the effort and make progress more measurable and thus more tangible. A similar approach should be considered in the context of the Strategy for an Information Society.

It would also be desirable to have some estimate of the overall resources invested the various strategic elements as well as a clear definition of the expected outcome and appropriate indicators. In this way, it would become possible to evaluate the effectiveness of the various approaches both over time and between programmes. In the international context, it would facilitate comparisons but would also allow other countries to learn from the experiences and would assist the planning of their strategies and the allocation of appropriate resources.

The most recent review of progress against the strategy for an information society provides an account of the many initiatives in education, legal and intellectual property areas, access by all, eGovernment, electronic signature and other legal revisions (Federal Office of Communications, 2003a). This and previous reviews limited themselves to stock taking and a more critical assessment of progress and achievements, as well as a review of the overall strategy should be considered for the next review. The latest review also points out that information society issues do not rank highly on the Swiss political agenda. The strategy established in 1998 provided a valid general framework. Now a review and refinement of this strategy and a new commitment at the highest level of government would appear essential to ensure that the goal of the Swiss Information Society will be achieved in the most effective manner.

Conclusions

Strengths

- Availability of ICT hardware in Switzerland is above the OECD average and does not appear to be a limiting factor in the application of ICT to business.
- The telecommunication infrastructure, including access to broadband services, is of high quality, readily available, and open to competition.
- An early high-level government strategy, endorsed at the highest political level and complemented by coordination and review mechanisms, provided a solid framework for the development of the information society.

- Adoption of e-commerce is progressing well, and Switzerland is one of the leading countries in e-commerce purchasing.

Weaknesses

- The initiatives undertaken as part of the Information Society Strategy are no longer given the same high level of priority and have suffered cut-backs in the current climate of economic stringency.
- A strong political commitment is no longer clearly evident.
- Due to the lack of relevant data, surveys and studies, it was not possible to establish whether the full benefits of ICT are being gained by business. Furthermore, there have been no attempts to gather information at the national level on the effectiveness of business use of these new technologies.
- At the overall strategic level, there seems to be a lack of direct involvement of businesses which may explain the emphasis on aspects which are internal to the public service. However, business representatives appear satisfied with their involvement, which is more at the project level in initiatives such as CH21.
- Active use of ICT in schools remains sub-optimal.

Recommendations

The fundamental strengths of ICT in Switzerland in terms of early strategic commitment, excellent infrastructure and a high level of investment should be built on by addressing the areas of weakness identified above. The recommendations that follow identify the priority actions that should assist Switzerland to obtain maximum benefits from its substantial past and current investment in ICT.

Renew public commitment at the highest level: The federal strategy for an information society, enunciated by the Swiss Federal Council in early 1998, should be updated, and there are plans to update the strategy by 2005. The current federal strategy statement is very general, which was appropriate at the time. While the general statements are still valid, they should now, six years on, reflect the substantial progress that has been made in this field. Most importantly, the initiative needs to be given a renewed public commitment at the highest level.

Introduce a more quantitative goal setting and evaluation approach: The coordination, yearly public reporting on activities and priority setting of the various government initiatives aimed at the introduction of the information society through a high level interdepartmental committee, would benefit greatly from more quantitative objectives and goals, coupled with regular quantitative reporting and evaluation. It is currently not possible to evaluate the progress made, the investments made and the benefits obtained beyond broad qualitative statements.

Design and implement a follow-up project to CH21: The CH21 project had many positive aspects, including measurable indicators and quantitative evaluations. Progress was slower than expected and the goals had not been reached by the end of the two-year initiative. Education and training is but one important aspect that falls into this category. It would be worthwhile to devise a follow-up project, again bringing together the public and the private sectors, to ensure that the impetus is not lost and that leading projects in the different sectors (e-government, health management, utilities, private sector) are synchronised in order to build optimal momentum in the information society.

Improve outreach to SMEs: One of the challenges is how to organise awareness-raising activities when trying to reach the many small firms. A concerted effort should be put in place to develop material, demonstration programmes and delivery mechanisms to promote the benefits of appropriate, low-cost ICT applications and their integration in the operation of SMEs. In Switzerland, the industry associations play an important role in getting the message to the client at the regional and local levels. Their federated structures, with organisational units firmly implanted at local level, lend themselves to getting the message to small and micro firms. These channels should be used to implement the broad dissemination of information.

Increase the use of ICT in schools: A major barrier to the increased use of ICT in education and training is the reluctance of teachers to be trained in the use of these technologies. In addition, government funding for these activities has been drastically reduced. Given the fundamental and crucial role of early exposure to these technologies to its optimal application in businesses, initiatives should be developed to address these barriers and potential incentives for teaching staff should be investigated.

Build on current e-government initiatives: The e-government initiatives are excellent as demonstration of the benefits of ICT as well as providing better and lower-cost access to information and services. To fully capitalise on these initiatives, it is important to expand the scope of the pilot projects both in terms of coverage and by introducing more interactive applications which deliver complete services on line.

Establish a certifying agency: The introduction of fully electronic services in the areas of taxation, voting, and health care will require that a certifying agency be established in Switzerland. At the same time, it is these government services that are likely to reach a critical mass and to make a certifying agency a viable business proposition. The government should therefore consider the possibility of a public/private partnership to establish a certifying agency and to develop the more sophisticated applications, thus leading the way and establishing the infrastructure which will then benefit private sector applications.

Develop an IT-security strategy: As noted in the report, an overall IT-security strategy is not yet in place. It would benefit the further expansion of ICT use by business, if such an IT-security strategy could be devised and adopted without delay.

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APPENDIX: LIST OF PERSONS INTERVIEWED DURING THE OECD MISSION

State Secretariat for Economic Affairs

- Dr. Oscar Zosso, Ambassador and Member of the Executive
- Ms. Sandra Läubli, Deputy Head, Policy and Trade in Services Division
- Mr. Christian Weber, Head Task Force SME

Federal Office of Professional Training and Technology

- Dr. Beat Hotz-Hart, Commission of Technology and Innovation

Federal Office of Justice

- Dr. Felix Schöbi, Division Principale du Droit Privé

SwissICT, Swiss Information- and Communications Technology Association

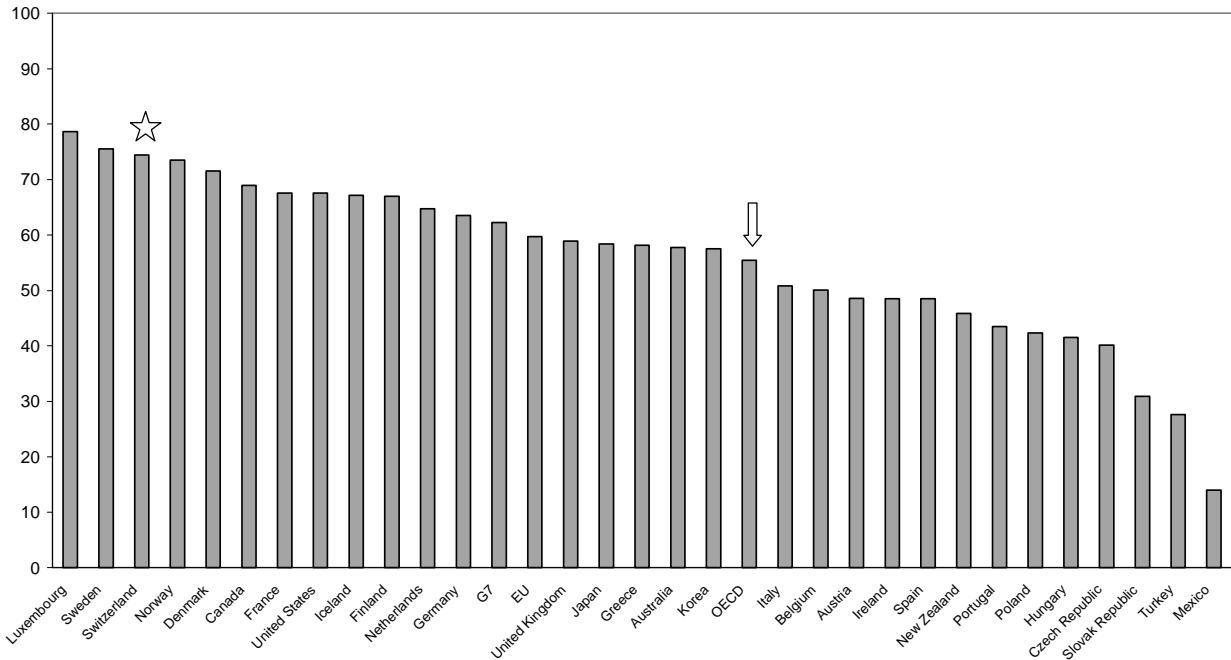
- Mr. Markus Fischer, Member of the Executive and leader of the *Commission d'Experts*

Economiesuisse, Swiss Business Federation

- Dr. René Buholzer, Member of the Executive

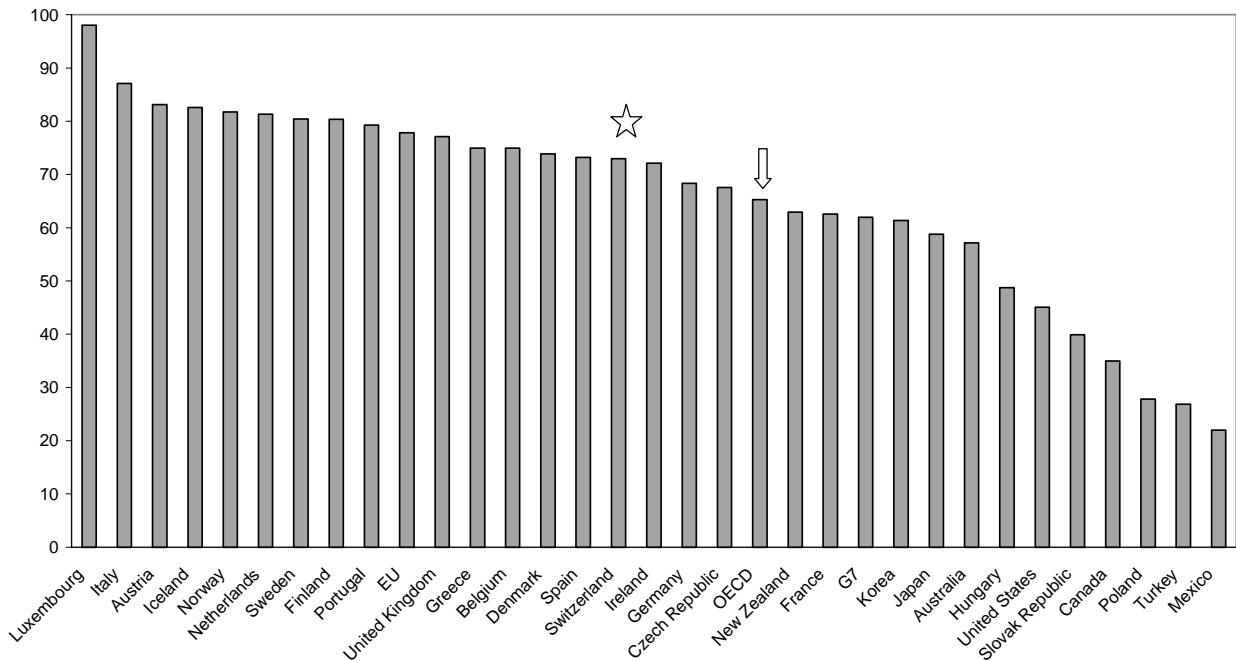
ANNEX

Telecommunication channels per 100 inhabitants 2001



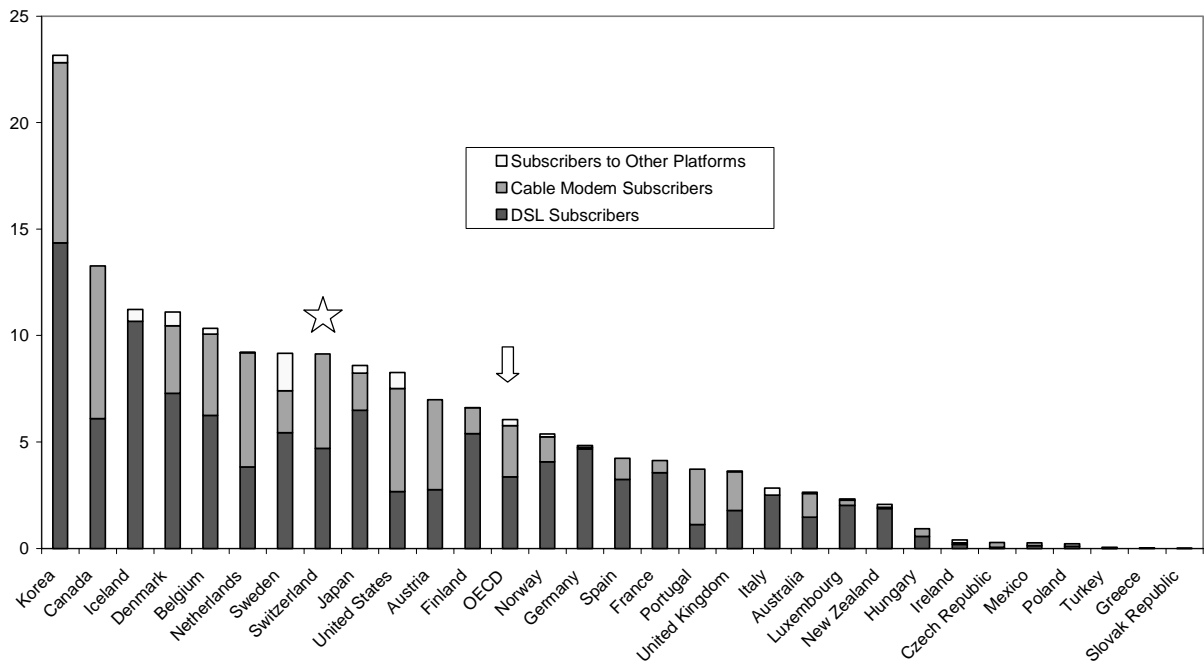
Source: OECD, *Communications Outlook*, 2003.

Cellular mobile penetration per 100 inhabitants 2001



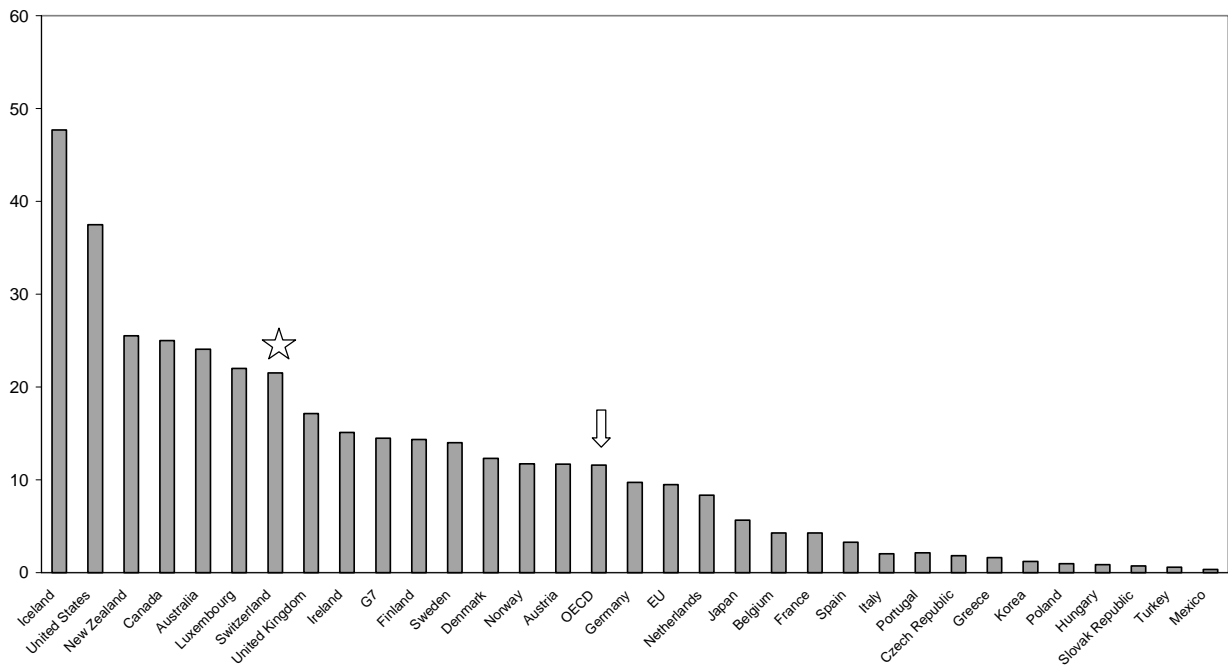
Source: OECD, *Communications Outlook*, 2003.

Broadband subscribers per 100 inhabitants June 2003

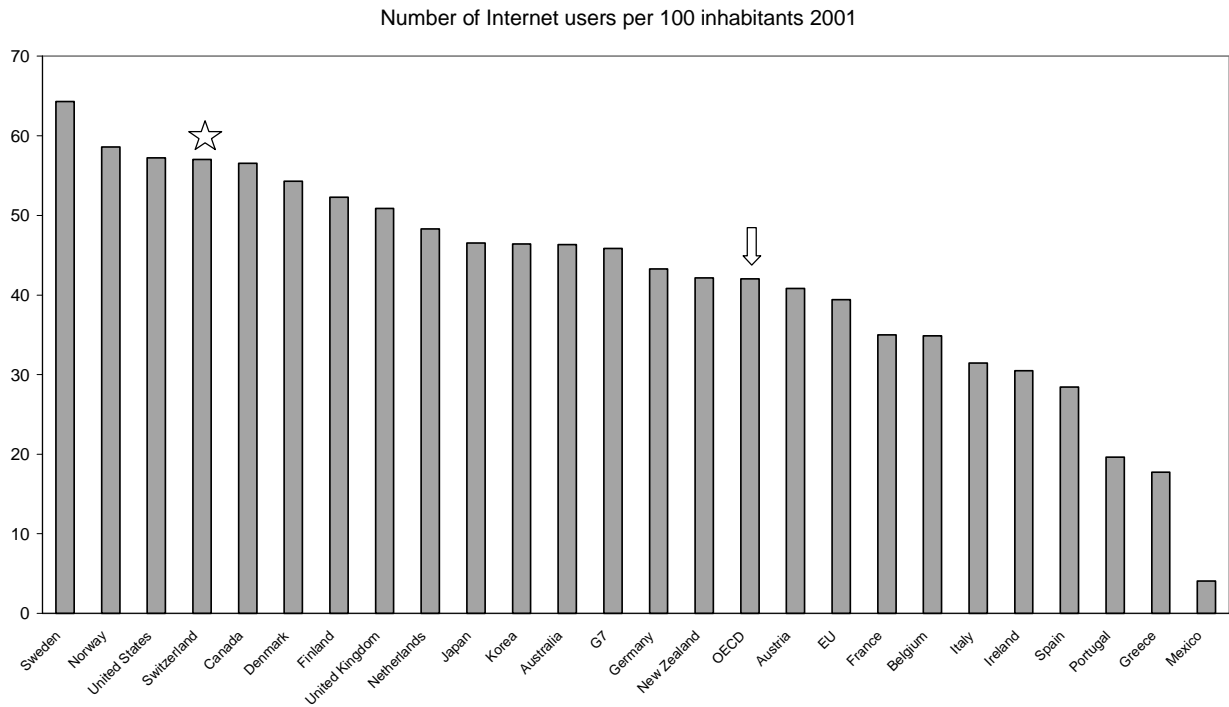


Source: OECD, 2004.

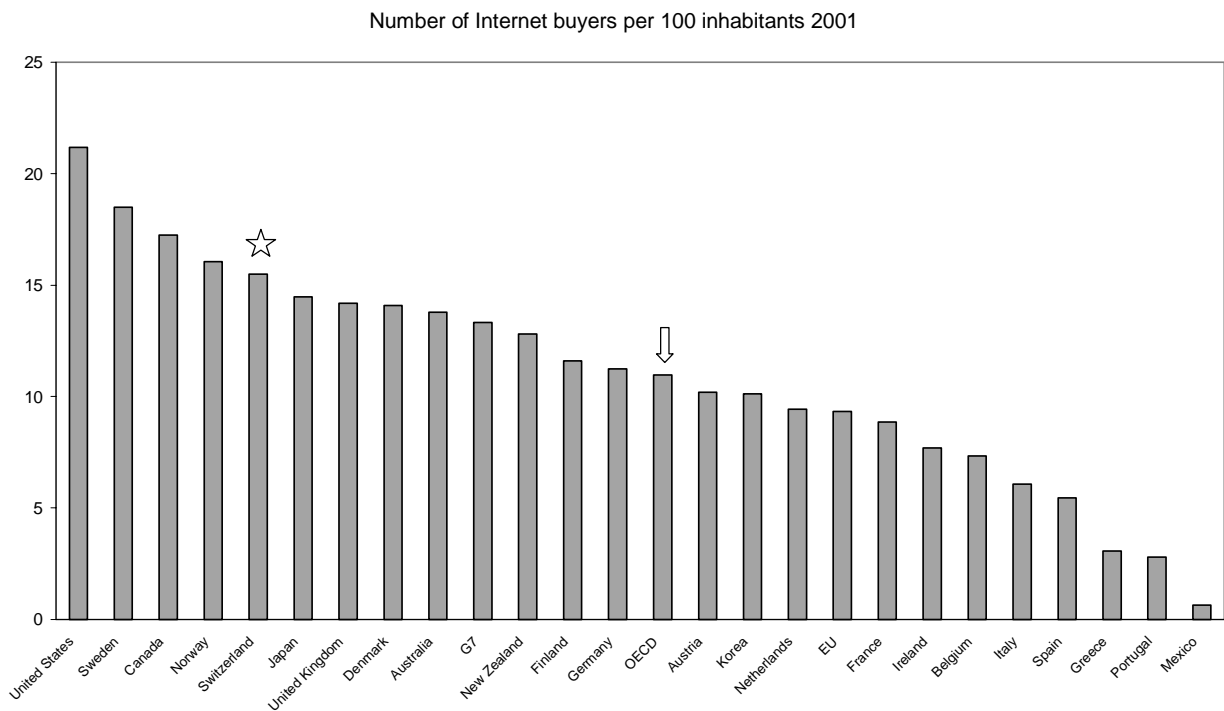
Secure servers per 100 000 inhabitants 2002



Source: OECD, *Communications Outlook*, 2003.

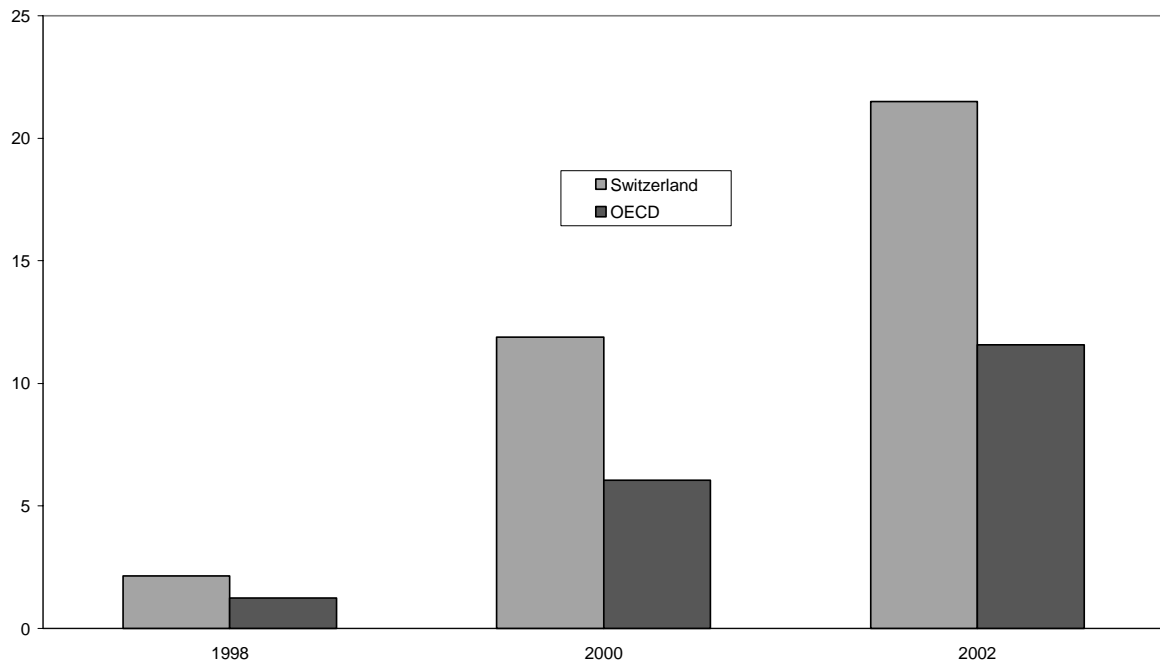


Source: OECD, based on World Information Technology and Services Alliance (WITSA) / International Data Corporation, *Digital Planet 2002*.



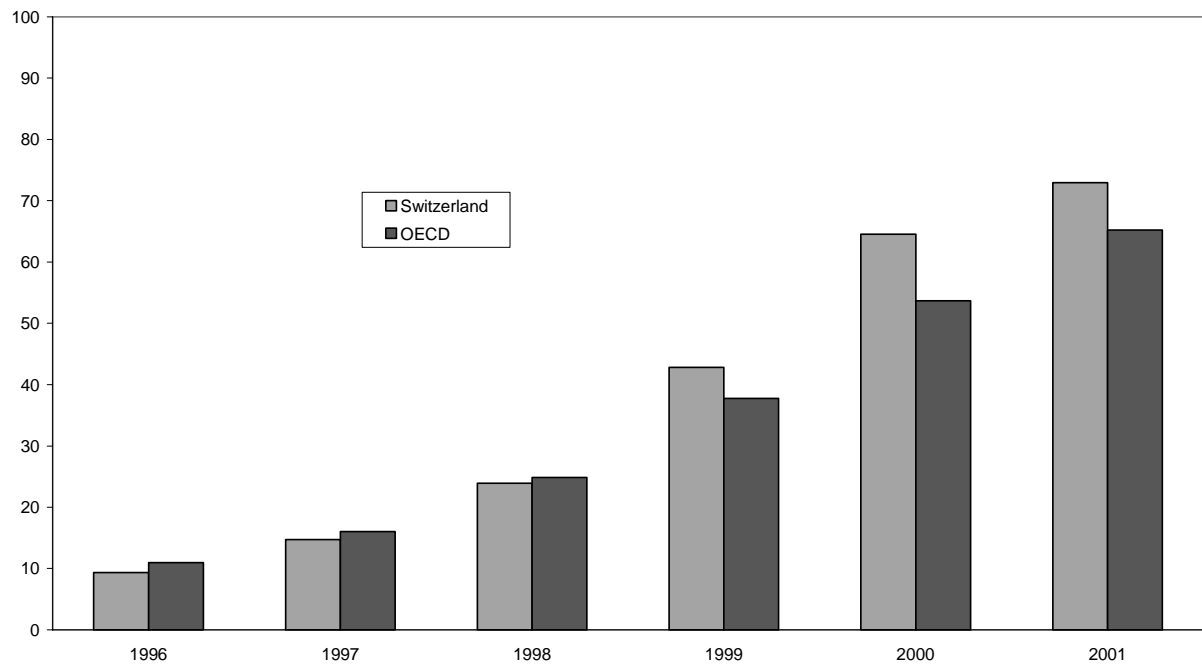
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Secure servers per 100 000 inhabitants



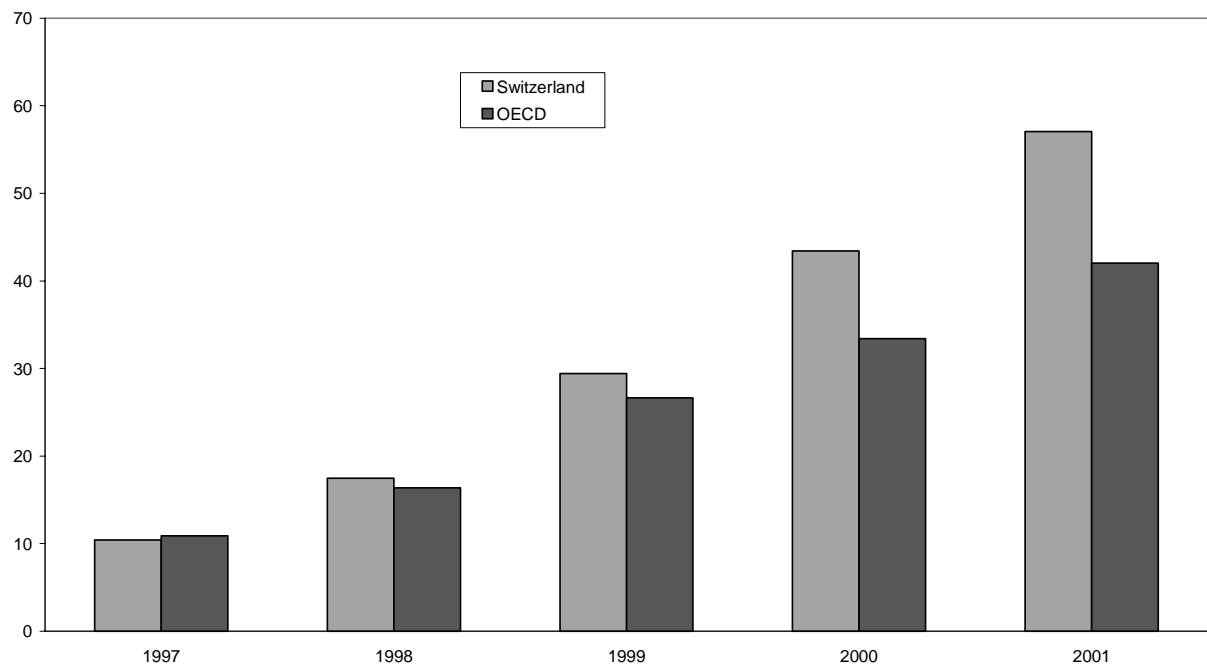
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Cellular mobile penetration per 100 inhabitants



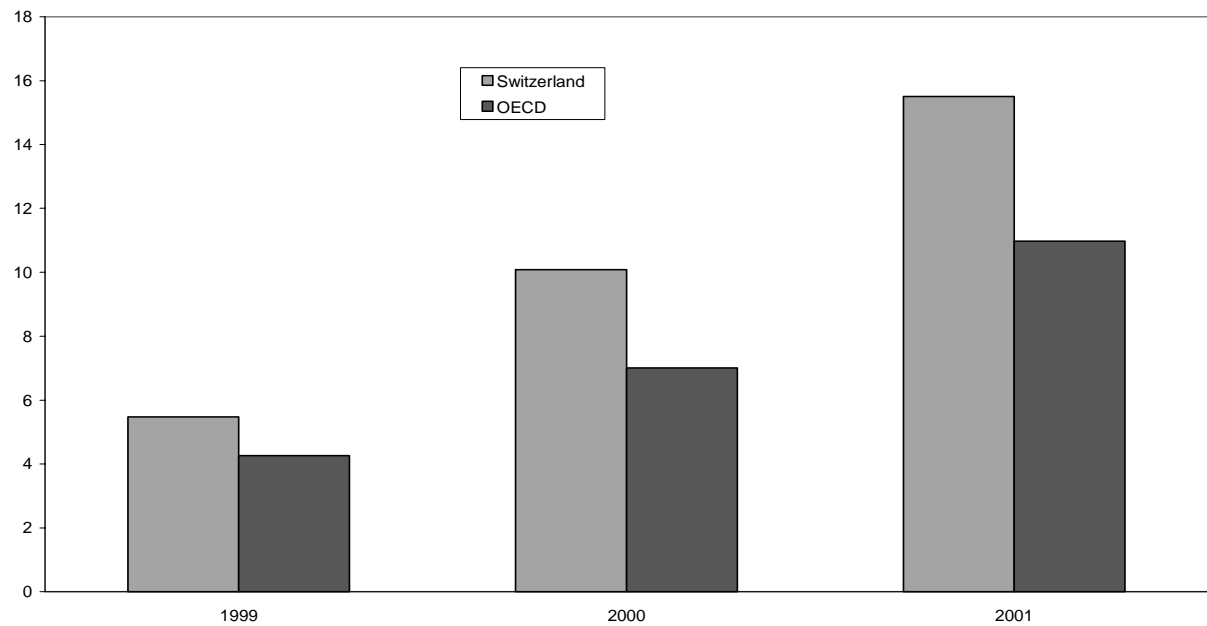
Source: OECD, *Communications Outlook*, 2003.

Internet users per 100 inhabitants



Source: OECD, based on World Information Technology and Services Alliance (WITSA) / International Data Corporation, *Digital Planet 2002*.

Internet buyers per 100 inhabitants



Source: OECD, based on World Information Technology and Services Alliance (WITSA) / International Data Corporation, *Digital Planet 2002*.