

**Situation of the Swiss telecommunications market
in an international comparison**

- Executive Summary -

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I. Mandate and objectives

1. In February 2002, the Federal Office of Communications (OFCOM) commissioned the WIK institute to carry out a study on the "Situation of the Swiss telecommunications market in an international comparison". This study first gives an overview of the nature of competition and of the market structure in Switzerland in the areas of fixed and mobile telephony. It then presents a comparison of the Swiss telecommunications market in relation to other European countries, based on numerous empirical sources. Thirdly, it examines and evaluates the legal basis of Swiss telecommunications policy and regulation, as well as the major developments in regulatory practice which have occurred since liberalisation. On this basis, it finally formulates recommendations for telecommunications policy and regulation in Switzerland.
2. The information provided in this study is based primarily on examination of freely available material, such as laws and decrees, management reports, studies, press articles, etc., then on OFCOM statistics and finally on a series of interviews with businesses and organisations associated with the Swiss telecommunications market.

II. The Swiss telecommunications market

1 Macro-economic considerations

3. The fixed network services sector is still the dominant segment in the market for telecommunications services in Switzerland, but its share of the total volume fell from 63% in 1999 to about 54% in 2001. The downturn in this segment will probably continue in the future. On the other hand, as far as mobile telephony is concerned, high growth rates can be observed. Compared with the total volume of the market, the share of mobile telephony sales is currently more than 30%. Data transmission and leased line services, together with cable services, are significantly less important in relation to the total market. In total, the market volume for telecommunication services in Switzerland for 2001 was 8.4 billion euros. The Swiss telecommunications market is therefore comparable, in terms of size, with those of Belgium and Sweden.
4. At 1,485 euros per inhabitant per year (2001), Switzerland spends more on telecommunications than the EU states, the United States and Japan. It is far above the West European average, which is 820 euros.

In terms of the penetration rate of analogue telephone connections, ISDN channels, cable modems and internet use in Europe, Switzerland is in the upper third, and even at the top in certain cases. It is average in terms of broadband DSL connections and the number of internet hosts.

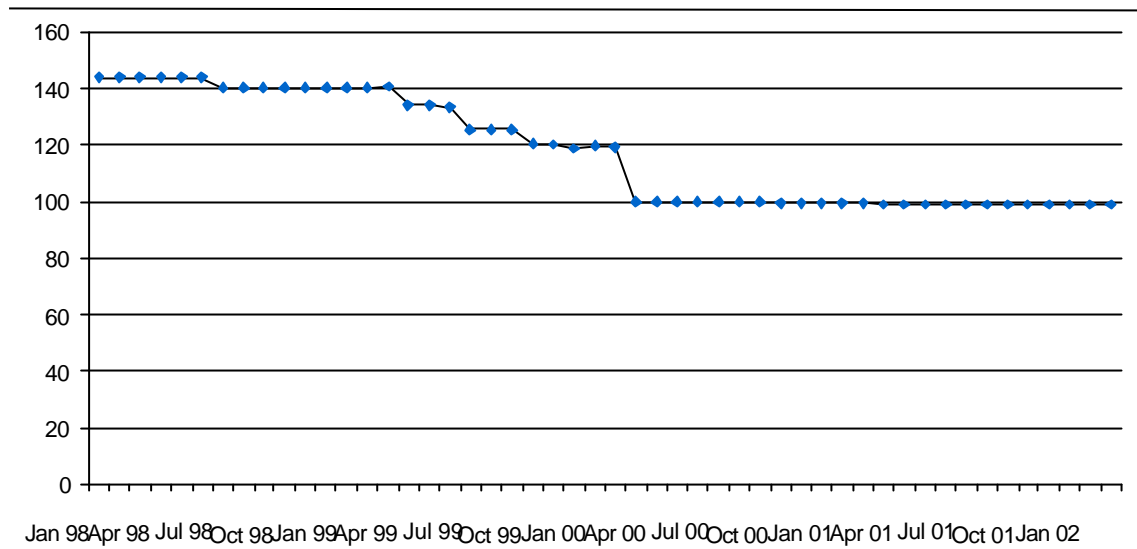
5. Since liberalisation in Switzerland, telecommunication services have become significantly cheaper in relative terms, in comparison with the developments of prices in the national economy as a whole. In an international comparison, on the basis of calculations of purchasing power parities, Switzerland is one of the European countries with the lowest monthly basic charge. In terms of the charges for a local call, Switzerland is ranked in the middle of the European ratings; in terms of prices for national and international calls it is clearly below the EU average.

2 Analysis of the market and of competition in the fixed telephony market

6. The Swiss liberalisation model is based mainly on the introduction of carrier selection for local, national and international calls and for mobile communications, and on number portability. The call-by-call function can be used on the basis of prior registration and there is no third-party billing. The universal service with regard to telecommunications services is guaranteed in Switzerland by the award of a licence of fixed duration. There is no "ex-ante" regulation within this framework, but ceiling prices are fixed for the services forming part of the universal service. In the wholesale market, only interconnection prices are subject to "ex-post" regulation. Liberalisation means that the market-dominant companies are obliged to guarantee interconnection to other companies. Since January 2000, interconnection prices have been based on the calculation model known as "Long Run Incremental Costs" (LRIC). For a competitor to be able to connect an end user directly, it must install its own infrastructure, since unbundled provision of the subscriber line is not yet possible. Moreover, resale of connections is not possible.
7. Liberalisation has led to the appearance of numerous new players on the Swiss telecommunications market. According to OFCOM statistics, almost 340 companies were active on this market at the beginning of March 2002. Even during the first year of liberalisation, more than 100 providers were active. In our opinion, the increase in the number of providers over the subsequent four years is a good indication of the relevance of the appropriateness of liberalisation in Switzerland and the attraction of the Swiss telecommunications market to those active within it. However, it should be noted that the mergers, insolvencies and withdrawals from the market which have occurred in the last few years reflect the fact that the challenges facing providers have changed.

8. The present study does not extend to questions of market delimitation motivated by competition policy and is even less concerned with assessing the existence of market dominance. The delimitation of the market which we use below is defined primarily on a pragmatic basis.
9. The number of users of the telephone service in Switzerland has fallen slightly since 1996, based on the number of PSTN and ISDN connections (main lines). Analogue connections are losing ground, whilst ISDN connections are increasing. The fall in analogue connections, however, is not reflected mathematically by the increase in ISDN channels. Apart from changes of a socio-demographic nature, this phenomenon tends to show that substitution of analogue connections by mobile connections is already taking place in Switzerland. In the narrowband connection market, Swisscom occupies a monopoly position. Swisscom's revenue deriving from connections has markedly increased since liberalisation and today amounts to almost 50% of total revenue attributable to voice telephony services. It is therefore apparent that in a segment which is of increasing economic importance to the incumbent operator, it is not possible for its competitors to enter the market.
10. In terms of the number of customers, Swisscom's major competitors offering telephony services at the end of the year 2001 were TDC, with about 800,000 customers, and Tele 2, with 420,000. The great majority of these users are pre-selection customers.
11. Since liberalisation, Swisscom has lost various market shares in different segments. Measured by turnover, at the end of 2001 its competitors had a 20% market share in local calls, about 35% in national calls and more than 50% in international calls. Now that the area code is an integral part of the number, even for local calls, in accordance with the recent change to the Swiss numbering plan, Swisscom must expect to lose further market share in the local call sector and to see other providers catch up in this sector and in the national calls sector.
12. An *international* comparison of market shares measured by turnover shows that in Switzerland competitors have managed to win a relatively large share of the local calls market. The Swiss model of regulation, which allows carrier selection for local calls, is thus highly advantageous for competition compared to countries which do not apply this instrument. Moreover, in an international comparison, competitors in Switzerland have also won exceptional market shares in the national and international call segments.
13. The fall in prices during the first two years of liberalisation was rather modest in comparison with that observed in Germany, for example. Overall, the price index has fallen by more than 40 percentage points since liberalisation. However, competition on prices has been *de facto* blocked since March 2000, i.e. since Swisscom's massive first reaction.

Figure 1: FOS price index for the telephone service 1998-2002



Source : FOS; the May 2000 level is placed at 100 in this graph.

14. After a relatively long period of calm, there is currently some movement in the market in terms of prices, since Swisscom announced an overhaul of its prices. On 1 May 2002, Swisscom started to charge the same for local and national calls. It is to be expected that this type of pricing policy will also be adopted by its competitors. In our interviews, however, we received the impression that competitors in the Swiss (mass) market for telecommunications services considered that customer sensitivity to prices was very low. In all segments (local, national and international calls), the majority of customers seem to have chosen their provider. No notable change seems to be in the offing as far as competitors' market shares are concerned.

15. In Switzerland, broadband connections are provided mainly by using ADSL and cable modem technology. Since 2000, Swisscom has been offering ADSL connections in various bandwidths. Other companies in Switzerland also offer ADSL, but in order to offer this service they are dependent on a Swisscom wholesale product. At the end of 2001, ADSL could be provided to more than 85% of all connections in Switzerland. Overall, at present (situation as of March 2002), there are more than 70,000 ADSL customers in Switzerland. Switzerland has more than 400 cable operators, with Cablecom by far the largest. The number of households with access to cable was almost 3 million at the end of the year 2000, corresponding to a penetration rate of 94% and placing Switzerland at No. 3 in Europe. Indeed, at that time almost 85% of all households in Switzerland were connected to cable. The number of Cablecom's cable modem connections is currently close to 85,000. At present, only part of Cablecom's network is bi-

directional and voice telephony by cable has not been offered to date. However, further upgrading of parts of the network plus a cable telephony service offering is expected by the third quarter of 2002.

16. Since March 2002, a hard-fought price war has broken out, owing to the duopoly exercised by Swisscom and Cablecom. The reactions of these two companies in terms of pricing, as well as those of some other providers, show that this market is subject to intense competition, at least at regional level. Nonetheless, even though the growth of this market is very dynamic, in our opinion competition is not guaranteed in the long term. Swisscom's consolidation projects hint that in future it might supplant Cablecom in terms of the number of connections, given the latter's financial situation.
17. In the business customer segment in particular, some pan-European infrastructure providers connect companies located close to their city rings directly, via optical fibre (generally FTTB). However, this offering is not comprehensive, even within the urban areas. For business customers who cannot be connected by optical fibre, SDSL connections are being offered on a small scale by competitors. In some regions, the latter may obviously have to resort to Swisscom's "dark copper". However, the dark copper offering in Switzerland is not subject to any regulatory obligation. Furthermore, the wholesale product is very expensive and restrictive in comparison with leasing of unbundled local loops in other European countries. Alternative possibilities of connection using WLL or powerline communications (PLC) do not play (or no longer play) a major role in Switzerland.
18. In the leased line sector, Swisscom is still the only provider to offer national coverage. From this it can be deduced that in major centres like Zurich, Basle and Geneva, as well as between these centres and between other cities, there does exist a genuine competitive offering of leased lines. However, this is not true, or is true only to a very limited extent, for most of the rural regions. In these regions, it is clear that the former monopoly operator continues to occupy a very strong position in the market for leased lines. On this point, the assessment of the Competition Commission's expert report of February 2002 – no dominant position for Swisscom in the fixed network market for leased lines, but a dominant position in the access network – has not undergone any qualitative change.
19. Swisscom offers leased lines at different prices depending on location. Faced with competition Swisscom often demonstrates a high degree of flexibility in the prices billed to end users, i.e. the prices of Swisscom's products which turn out to be offered by one of its competitors at a lower price are subsequently reduced. Moreover, some competitors complain about what they consider to be forms of price squeezing: Swisscom's wholesale prices are higher for them than for Swisscom's end customers. The range of prices for leased lines is very wide: on the one hand, considering the prices charged by Swisscom, according to information provided by

the operator for the international comparison, prices for leased lines in or between cities are in the majority of cases (slightly) below the EU average. On the other hand, Swisscom's competitors occasionally paint quite a different picture in terms of the wholesale prices demanded by Swisscom in relation to other countries' wholesale prices. Here the data differ from a ratio of 1 to 4 to a ratio of 1 to 1.25, but they are not necessarily contradictory. They do not seem to be linked to costs, but rather reflect Swisscom's strategic attitude and negotiating power during bilateral negotiations regarding the level and regional differentiation of prices for leased lines.

20. Four years after liberalisation, Swisscom remains the most powerful player on the market for interconnection services. Moreover, Swisscom has by far the largest number of interconnection agreements with other providers. Few competitors have genuinely national coverage in the fixed network which could be used for interconnection. There is no competition in *national* interconnection.
21. The following points can be made with regard to the importance of competition at the level of Swisscom's wholesale products. The construction of additional infrastructures by competitors has contributed to the fact that a small number of operators are no longer dependent on Swisscom's national switching and termination services. However, dependence on Swisscom's interconnection services remains significant at regional level. Apart from Swisscom, various competitors are able, thanks to the networks which have been established, to offer their own leased lines between the major urban centres. Various players on the market state that for long-distance calls they use not only Swisscom's leased lines but also those of other operators. The situation is quite different in the access network. Several providers have indeed laid optical fibre networks in the large towns, but given that the networks constructed by competitors are few at the local level, the alternative offering of local leased line is sparse. It must be admitted that certain areas of the leased line market are subject to different competitive conditions. The interconnection networks which have been set up now offer other possibilities on the main trunks, i.e. between the cities and urban areas and within these. Nevertheless, Swisscom continues to occupy a dominant position in terms of local leased lines. Consequently, competitors' dependence remains significant in this market segment.
22. An analysis of other connection technologies has shown that the current absence of competition in the connection sector is not sufficiently offset by the potential competition. Today competitors are present on the broadband connection market via cable network operators, but they are few and far between at regional level. It should be noted that the cable network operators do not currently offer voice telephony services. At present, therefore, apart from connecting users to Swisscom, there is no alternative technology in Switzerland which allows the provision of narrowband connections and voice telephony services. Apart from the cable

networks, no other access option seems likely to take become established in Switzerland in the near future. Thus far, and for the foreseeable future, neither WLL nor powerline communications has been competitive. Switzerland, therefore, does not have any operator who is able to offer a range of services independently of Swisscom and who is therefore able to compete with Swisscom.

23. During the first two years following liberalisation in Switzerland, users demonstrated a relatively high willingness to change their communications provider. Until the year 2000, the difference in prices between Swisscom and its competitors was relatively pronounced. It was only after Swisscom reacted to growing competition by lowering its tariffs that customers' willingness to change diminished. Swiss customers prefer to maintain a solid relationship with their provider by opting for number pre-selection rather than selecting a provider on a "call by call" basis. Clearly, most people in Switzerland have changed their provider only once. Customers have the impression that there is no significant competition on prices. What is more, both the incumbent operator and its competitors are more and more concerned with establishing relations with their customers. In Switzerland, another criterion which may cause people to change their provider is the quality of the services offered (fault and repair service, customer service and information, handling of complaints). This factor is reflected in particular in the results of studies relating mainly to Swiss business customers. Finally, customer movements observed in the broadband market show very marked price sensitivity and willingness to change, unlike the telephony sector.
24. Swisscom's pricing policy is very important for competition. For the telephony service, Swisscom has been offering a single rate since May of this year; it therefore does not discriminate on price between local and national calls, so charges for local calls are up and those for national calls are down. Some competitors have already fallen into line with Swisscom. The repercussions of this change on customers' budgets differ greatly according to the individual and users' telephone behaviour. The level of the prices billed by Swisscom to end users for broadband connections is of immense importance for its competitors, who also depend on Swisscom's wholesale product. Product grouping as practised by Swisscom may impede competition policy when commercial power is transferred to competing segments of the market. In addition, even the offer of volume discounts to end users, granted as a function of their expenditure and used to retain customers, may turn out to be problematic if it is financed by cross-subsidies.
25. The state of development of the Swiss telecommunications market on the fixed network side has been compared with that of other countries (Austria, Denmark, France, Germany, Great Britain, Hungary, Italy, Sweden and Switzerland), on the basis of the WIK index for liberalisation, competition and growth. In a European comparison, the degree of liberalisation in Switzerland is rather low (Switzerland is listed second to last). This relatively poor assessment derives essentially from the high interconnection prices and the absence of unbundling in the subscriber

connection sector. According to the WIK competition index, on the other hand, Switzerland enjoys relatively intense competition and is in the upper half of the middle range of European countries. Switzerland gets good marks in particular with regard to prices, mainly of international calls, relatively low concentration of the market, especially at local level, and the relatively high penetration rate of broadband connections. With regard to the dynamics of growth, Switzerland is in the bottom third of the European ranking. Even if the countries analysed are not enjoying dynamic growth, the dynamics of growth are even less marked in Switzerland.

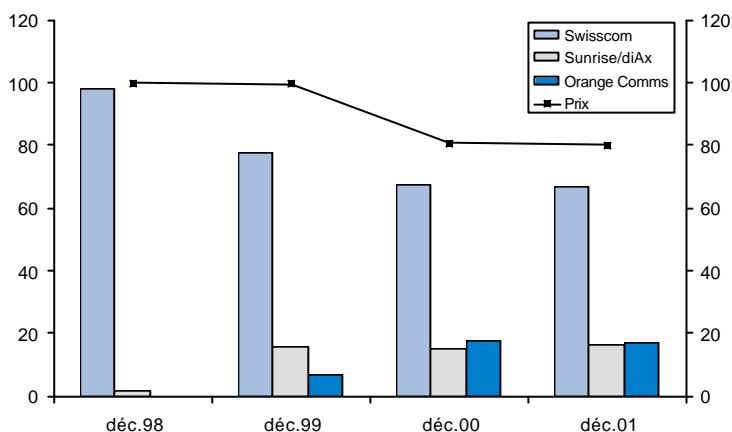
26. The results indicate that the degree of liberalisation is quite low and the intensity of competition relatively high in Switzerland. This situation may support the thesis according to which Switzerland does not need further liberalisation for a competitive situation to emerge. For various reasons, the results of the WIK index cannot, however, justify this proposition. It should be noted here that it is totally restrictive to establish a cause-and-effect relationship between the degree of liberalisation "today" and the state of competition "today", especially as the delayed effects of regulatory measures are not taken into consideration. Causal relationships between the progress of liberalisation and the effects of competition on the basis of our index can be determined only by means of a longer-term comparison. In addition, the positive assessments shown in the competition index are not all the result of liberalisation measures (which are evaluated in the liberalisation index). Finally, although a high competition index value does indicate that competition is intense, it says nothing about the sustainability and operation of competition.

3 Analysis of the market and of competition in the mobile telephony market

27. In 1999 and 2000, the Swiss mobile telephony market enjoyed high growth. The penetration rate more than doubled between 1999 and 2001, reaching 74.8% in December 2001. Switzerland was therefore in the middle of the international ranking. The proportion of customers using prepaid cards was relatively low, at 36.6% (situation in the third quarter of 2001). The growth in the market is also reflected in the growth in turnover – up 21% in 2000 – even though it was not as pronounced, because of the price reductions introduced at the same time. Three operators share the Swiss telephony market. Swisscom Mobile has been offering its GSM services since 1993. It was joined in April 1998 by diAx and Orange, two new operators who had obtained a GSM licence. diAx has been offering its mobile telephony services since the end of 1998, and Orange since July 1999. In December 2000, the Competition Commission approved the merger of diAx and Sunrise under the aegis of Tele Danmark, whose products are marketed under the Sunrise brand name.

28. Shortly after their entry into the market in 1999, each of Swisscom's two competitors succeeded in winning a market share in excess of 15%, thereby contributing to the growth in the mobile telephony market. However, the position of the operators has hardly changed since mid-2000, so at the end of 2001 Swisscom still had a large share of the market (66.7%).
29. Liberalisation of the mobile telephony market has led to price reductions from Swisscom. Nevertheless, prices have remained stable since 2000 and this level is relatively high compared with other countries. However, an international price comparison has not made it possible to draw any conclusions, as it was not possible to include subsidies on terminals.

Figure 1: Evolution of market share (operators) and prices in the Swiss mobile telephony market



Source: Mobile Communications and OFCOM.

30. The low network coverage of Swisscom's competitors, due to the delayed award of licences, constituted a prejudice to competition. This was further reinforced by the fact that at the time these competitors entered the market, the debate was initiated regarding possible health repercussions due to radiation from mobile telephone masts. Orange concluded a commercial agreement on national roaming with Swisscom, in order to be able to provide high network coverage right from the start. In the meantime, both Sunrise and Orange have caught up with their delay, notably in terms of population coverage. Swisscom still has better area coverage but here too the competitors have made up ground by meeting the conditions imposed (55% of the surface area for Sunrise and 53% for Orange).

31. The willingness of Swiss users to change provider depends above all on criteria such as service quality and customer service, whereas price sensitivity is relatively low. The cultural background and the absence of transparency with regard to tariffs also play a role, even if they are difficult to quantify. The introduction of number portability in March 2000 made it possible to reduce the changeover costs borne by mobile telephony users and thereby increase their willingness to change. Formerly, the choice of operator depended essentially on network coverage. Given that all three operators now provide almost full coverage – either at the level of their own infrastructure, or in Orange's case thanks to a national roaming agreement with Swisscom – this aspect has become less important.
32. Swisscom has benefited from competitive advantages in the search for sites for its transmitting and receiving antennas. In fact, it was able to build its network before the debate on the possible repercussions of mobile telephone masts on health complicated the search for sites. Since the possibilities of co-use of sites has since been considerably reduced as a result of the limits on installations set out in the decree on protection from non-ionising radiation, sites have become a scarce resource.
33. Telecommunication services providers have no possibility of substituting the termination of one mobile network operator by termination in a different network. The question is therefore posed in this regard as whether the operators of mobile telephony networks could be subject to competitive pressure for other reasons and if it is appropriate to impose conditions on them when prices are fixed.
34. It is necessary to start from the principle that the behaviour of end users of mobile telephony exerts a degree of control over the margin of manoeuvre of the mobile telephony operators. In particular, it is possible that customers may take call tariffs into account when they choose an operator and that this would encourage them to change their provider. This is particularly applicable to companies or families which are taking a decision on the basis of price levels for calls to the mobile network. Furthermore, termination prices fall when mobile telephony operators who offer fixed telephony services in parallel try to attract major customers by means of advantageous offers for calls established from the fixed network to their own mobile network. According to the stated principle, the fall in termination prices has repercussions on end users, the other operators will also try to remain attractive by offering major customers more advantageous tariffs for calls within their mobile network.
35. Since 2000, there has been an observable downward trend in Swisscom's termination prices. As for the prices charged by the other operators, the price evolution does not follow any clear trend, probably because of the fact that the operators with a significant market share generally have more interest in reducing their termination tariffs than small operators. Indeed, for the large operators, such a

fall results in an increase in demand, which has a greater knock-on effect on the end user market. It is in addition possible that the price reductions introduced by the operators of mobile telephony networks for termination are part of a strategy aimed at defusing the debate on the dominant position in the market in this area (triggered in particular by high termination charges). The high prices charged by Sunrise and Orange (in comparison with Swisscom) indicate that small operators have less incentive to reduce their prices. The trend towards competitive control of termination prices has become stronger only very recently. With regard to the high level of termination prices in an international comparison, the effects of pressure on prices still seem weak in Switzerland; it therefore remains to be seen if the trend towards competitive control of termination prices will be confirmed or if regulatory action will be necessary.

36. The search for sites for mobile telephony antennas mentioned within the framework of dependence on wholesale products is important for the launch of UMTS. Here too there is a danger that competition will be weakened by the advantages enjoyed by Swisscom in the search for antenna sites.
37. In the international comparison, Switzerland, together with a group of other countries, has one of the lowest values for the WIK competition index for mobile telephony. This situation results from the fact that the level of prices is relatively high, market concentration is very high and penetration rates are average. In view of the fact that the number of competition parameters considered is limited and that terminal prices are not taken into consideration in the price index, an international comparison serves merely to provide some complementary indications.
38. The general situation in the Swiss market for mobile telephony indicates that competition may be threatened in this sector. During the first few years after liberalisation, competition was encouraged by the fact that the market grew considerably and that a competitive situation to win new customers arose. With growing penetration rates, the market approaches the point of saturation, so that in order to increase their market share, mobile telephony operators have to lure customers away from the other operators. Given that Swisscom has a very large share of the market, that this has hardly fallen since 2000, and that no fall in prices has occurred since the middle of that year, there is the potential for intensification of competition which might benefit from an additional stimulus resulting from the imposition of adequate regulatory measures. In particular, the lack of sites for mobile telephony antennas is problematic, all the more so as it may put a brake on the intensification of competition which is expected with the envisaged introduction of UMTS networks.

III. Recommendations for action regarding telecommunications policy

1 Regulation of the fixed network

39. General conditions for regulation were defined at the time of liberalisation of the Swiss telecommunications market in 1998. The major elements were as follows: the granting of licences, the universal service, number portability, the fixing of price ceilings for services forming part of the universal service, carrier pre-selection and arrangements for interconnection. In the course of the first two years following liberalisation, the general regulatory conditions encouraged the establishment of competition on the voice telephony market, notably thanks to the choice of provider (for local, national and international calls, as well as within the mobile telephony networks) in the form of pre-selection and the "call-by-call" option with a contract. Not introducing the option without a contract, i.e. call-by-call without first registering with the provider, or third-party billing generated a very strong relationship with customers over the following years, though without having any negative effects on the way competition developed.
40. Since liberalisation, the telecommunications market has developed dynamically. This evolution is characterised by the fact that in recent years new services other than those linked to voice telephony have become more important, e.g. internet services and broadband data services. Whereas competition in the voice telephony market has stagnated for some months, the players in the market are in fact trying to win market share in the broadband services sector. Swisscom has a decisive competitive advantage in the mass market, and this will continue to be the case as long as the absence of unbundling and the lack of regulation in the market for leased lines prevent the other operators from offering end users a full range of services. Despite the perceptible evolution of the telecommunications market, no adaptation of the general regulatory conditions has taken place. If these are not made more stringent, Swisscom might still further strengthen its position. Furthermore, such a situation would erode the positive effects of competition in the voice telephony market observed in the first years after liberalisation, while impeding the growth of competition in the broadband services market. The regulatory authorities had indeed envisaged more severe measures, but were finally unable to impose them because of the vagueness of the legislation.
41. The regulatory framework of the Swiss fixed network as a whole requires much interpretation and it is less precise than in other European countries. The result is a degree of vagueness in the legislation. In the very recent past, the fact that the legislature has deliberately refused to regulate each detail at the level of the law has

led the courts to reject the regulatory measures proposed, for example, in the leased lines and unbundling sectors. It also became apparent on that occasion that the regulatory authority can intervene only in a limited manner. Either it is appropriate to give the regulatory authority more powers when the formulation of the law demands interpretation – so that it can take decisions with mandatory effect – or, if it is not granted these powers, the law or decrees should be fine-tuned.

42. The relatively vague legal framework results in very long procedures. In numerous cases, experience has shown that several years may pass between the time the application is lodged and the time when a decision is taken; this hinders the process of competition. This is why the time scale of the procedures should be laid down and limited in law.
43. To encourage competition, it is indispensable, given the evolution of the telecommunications market, for the regulatory authority to intervene more strongly. The WIK institute recommends the introduction of "ex-ante" regulation of the prices of wholesale products (leased lines, unbundled access to the local loop, interconnection) where market dominance exists. Experience acquired in these areas in other countries has proved how much competition in the end user market is dependent on such regulation. The principle of "ex-ante" regulation has to date not taken root in Switzerland, nor is "ex-post" regulation particularly pronounced. The latter is not an instrument which produces such an immediate effect as "ex-ante" regulation, as has become apparent in the sphere of interconnection in particular, where after more than two years of procedure it has still not been possible to verify if the prices fixed by Swisscom comply with the relevant costing standards. The example of the leased lines market indicates that the total absence of price regulation may result in behaviour which restricts competition, in the form of price squeezing. In view of this cost/price problematic, wholesale prices in the markets dominated by Swisscom should relate more appropriately to costs, so that the other operators can compete against the prices which Swisscom bills to end users. From the end user's point of view, prices are subject to little regulation. The upper price limits for services forming part of the universal service are fixed according to policy considerations. These prices are therefore not subject to a system of regulation, since there is no yardstick for costs and prices have not been checked to see if they are set at the right level.
44. In Switzerland, unbundled access to the local loop is not laid down in law and has been refused at the end of a prolonged regulatory procedure. The absence of any obligation relating to unbundling has negative consequences, firstly in that competitors are not able to offer their own products and a full range of services. At present, in order to offer a package of products to their end users, competitors are forced to resort to Swisscom's wholesale products such as ADSL (Broadband Connectivity Service) and leased lines. Secondly, the infrastructure over the last mile is a major link in the added-value chain in telecommunications. Without it, the

possibility of extracting extra added value from other sectors of the market is therefore limited. Thirdly, because of the lack of customer relations, competitors do not have the information on customer behaviour available to Swisscom and cannot therefore react as quickly to customers' specific needs. Fourthly, the impossibility of accessing subscriber connections prevents both Swisscom and the other operators from innovating and investing. The German example shows that the current and future competitive pressure resulting from the unbundling obligation introduced in 1998 has caused the incumbent operator to invest both in its own networks and technologies and in innovative services. Thus in 2001 DT AG invested almost a billion euros just in constructing broadband DSL. With regard to connection, therefore, providers are highly dependent on Swisscom's wholesale products. The negative repercussions of the absence of unbundling necessitate regulation which is more extensive than it is today. As far as the forms of unbundling are concerned, it has to be said that only fully unbundled access to the local loop will allow competitors to provide a full range of products, including voice and data services. Bitstream access makes it possible to access the data services market relatively quickly. As for line sharing, experiments in the United States and Germany show that establishing a business model based on this form of unbundling is extremely difficult. Generally speaking, the practical experience gained in Germany with regard to unbundling show that fixing one-time or monthly prices for wholesale products plus contractual agreements concluded with the established operator and its competitors are an indispensable condition for the development of competition in the access network.

45. The resale of telecommunication services as a solution for accessing the market has so far been little used in Switzerland. This is an independent regulatory instrument. However, resellers may be considered as positive elements for competition, since they offer advantages to consumers by way of new marketing strategies, customer-specific product combinations and innovative forms of pricing. In relation to unbundled access, resale of telecommunications services, notably telephone connection services, makes it possible to enter the market quickly, and with good coverage. Resale as a possibility of accessing the market is interesting above all in Switzerland since some time might elapse before the application of unbundling, if it were to be introduced by way of legislation. The often-mentioned dichotomy between competition in service and competition in the infrastructure does not exist. Competition based on reselling impedes neither investment in networks nor competition in infrastructure. Rather, the two forms of competition are complementary.
46. In Switzerland, the universal service license is in the process of being granted anew, the sole candidate being Swisscom. According to the latter, the provision of services forming part of the universal service involves uncovered costs originating from a deficit in analogue telephone connections. However, it must be taken into account

that the existence of a deficit in one or more service sectors may be offset by revenue obtained in other areas, and a net total cost may not therefore arise. It is also appropriate to stress that regardless of whether the licensee incurs uncovered costs, the universal service is not an excuse for not taking other regulatory measures, in view of the fact that the financing mechanism is such that it has no effect on competition.

2 Regulation of mobile telephony

47. The context of the award of the GSM licences in Switzerland turned out to be problematic from the viewpoint of competition policy. In an international comparison, the mobile telephony market was liberalised very late in the day and Swisscom's competitors entered the market with the disadvantage of a long delay. The disadvantages of the situation were made worse by the fact that network coverage is a very important competitive factor and at the time the licences were granted to the other operators, network construction was hindered by the debate on the possible effects of radiation from mobile telephony antennas. It would have been judicious at that time to legally oblige the first operator benefiting from a licence to guarantee national roaming to other network operators, and thereby partially to offset this competitive disadvantage. Even though Orange has concluded a commercial roaming agreement with Swisscom, the fact that the latter was not obliged to guarantee national roaming constitutes a disadvantage for competitors. Indeed, although the said commercial agreement meant that Orange was indeed able to offer the same network coverage as Swisscom right from the start, this was at a very high price. The mobile telephony operators who were the last to arrive on the scene are additionally faced with the fact that those who arrived before them have the majority of business customers. What is more, these long-established customers are rather unwilling to change their provider because of the costs they would have to incur, as explained in the analysis of the market and competition.
48. In the international comparison, the value of the regulation index for Switzerland falls within the lower half of the league table, at about the same level as Greece and Portugal, and above, Spain, France, Finland, Ireland and Belgium. The positive factors in the regulation index are: the obligation to guarantee carrier selection for international mobile telephone calls, the relatively early introduction of number portability in March 2000, the granting of a UMTS licence to a new operator and the right of this operator to benefit from national roaming from a GSM operator. The disadvantages: the fact that in Switzerland, termination prices remain high in an international comparison and that, in view of the high concentration of the market and due to Swisscom's pronounced lead in market share compared with operators who acquired a licence later, service providers and MVNOs have no right of access to the Swisscom Mobile network.

49. In December 2000, four UMTS licences were granted by auction. The three existing network operators all obtained a licence, and the fourth went to 3G Mobile. The holders of a UMTS licence are obliged to cover 20% of the population by the end of 2002. By the end of 2004, the UMTS networks must attain 50% coverage of the population. In the context of the construction of UMTS networks, the problems originate essentially in the shortage of sites for transmitter and receiver antennas. For the mobile telephony operators, and in particular for the newcomer 3G Mobile, this shortage of sites is a problem. Moreover, the rigorous limits laid down in the decree on protection from non-ionising radiation for base station radiation (values ten times more stringent – in the international comparison – than those recommended by the World Health Organisation and applied in most European countries) very often prevent operators from jointly using sites, even though they are obliged to do so when no technical, economic or legal reasons stands in the way.
50. In view of the shortage of sites for mobile telephony antennas and the importance of network coverage for competition in the mobile telephony market, sites may be considered as a scarce resource. Since this scarcity is due mainly to the provisions of the decree on non-ionising radiation, measures should be taken in terms of regulation of radiation limits to offset the disadvantages suffered by the competitors (these disadvantages arise because the radiation limits laid down in the decree have been reached by those operators who obtained a licence earlier on, with the result that those following have only limited room for manoeuvre to plan their network). One solution would be to allocate operators a "radiation budget", so that, at least in terms of the radiation limits, operators are subject to the same initial conditions for the construction and subsequent operation of their network.
51. Number portability in mobile telephony was introduced in Switzerland in March 2000, at the same time as number portability for fixed network numbers. The cumulative rate of porting has remained low to date – it was 1.5% in December 2000 and 2% in August 2001 – but it must be assumed that a rising penetration rate will certainly increase number portability and therefore the rate of porting. The solution adopted in Switzerland for portability of mobile telephone numbers causes the following problem: the operator whom the customer wishes to leave has more than a week to dissuade the customer from switching operators (e.g. by matching or bettering the offer of its competitor). In order to avoid such a strategy, it would be wise to shorten this period.
52. With regard to termination of calls in the mobile telephony networks, the market and competition analysis showed that to a degree the end user market imposes pressure on termination prices which may partially offset the limits on competition. These limits originate from the fact that those requesting termination have no possibility in the short term of substituting termination by one mobile telephony operator for termination by a different operator. In Switzerland, the measures to control prices seem to be having little effect. As long as no single mobile telephony

operator occupies a dominant position in terms of call termination in their networks, termination prices will remain subject to "ex-post" regulation, which, however, is applicable only when interconnection negotiations fail and a complaint is lodged. The termination prices fixed within the framework of "ex-post" regulation should be based on normal market prices in the industry. In the case of a dominant position in termination in the mobile telephony networks, it would be adequate, as in the fixed network, to provide for "ex-ante" regulation to guarantee that termination prices are fixed on the basis of the costs of an efficient operator.

IV Conclusion

53. The liberalisation of the telecommunications market in Switzerland may be considered as having been successful in view of the evolution of the market in the last four years. First of all, the reduction in prices and the appearance of innovations in technology and services have had positive consequences for both residential and business customers, and therefore for the Swiss economy. Nonetheless, the evolution observed over recent months seems to indicate that unless new regulatory measures are taken, competition is threatened.
54. In the first two years following liberalisation of the Swiss telecommunications market, it became apparent that the legal conditions defined 1998 have enabled strong competition to develop in the fixed network for voice telephony. However, for some time now there has been a trend away from the traditional telephone service and towards innovative broadband services. This change, however, has not been accompanied by a simultaneous adaptation of the legal framework. Without intervention at this level, the positive effects which competition has had on the mobile telephony market would be eroded and competition on the broadband markets would be impeded. It is therefore necessary for the regulatory authority to intervene more strongly. In concrete terms, the WIK institute recommends regulation of wholesale products for dominant operators, i.e. the introduction of unbundling for subscriber connections plus regulation of leased lines and interconnection. In all cases it would be necessary to apply the principle of "ex-ante" regulation.
55. As for the Swiss mobile telephony market, competition has been promoted in the first two years of liberalisation by very strong growth in the market. Since mid-2000, however, the dynamics of competition have weakened. New stimuli may nonetheless appear thanks to the entry into the market of the new UMTS network operator. For this to happen, it is essential first of all to regulate the problem posed by the scarcity of transmitter and receiver antenna sites, which is hindering the development of the UMTS networks. On the regulation front, it is perhaps necessary

to act on termination prices, on which there is only very little competitive pressure in Switzerland.