

DIGITAL DEUTSCHLAND:
The Effects of Telecommunications Reform on
the Internet in Germany

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ABSTRACT

This paper focuses on aspects of the German telecommunications landscape which affect the use of the Internet, and through this, Germany's ability to reach its goal of leadership in the Information Society in Europe. Telecommunications are key to the transformation to an Internet Economy, affecting both the availability and quality of services. The first section deals with the German government's ongoing reforms to open the communications market. We start with the process of liberalization, including changes in the telecommunications law, and the privatization of the national PTT monopoly, Deutsche Telekom, and its ISP subsidiary T-Online. We continue with a look at new competitive carriers for a variety of services, and include explorations of ISDN, DSL, and cable technologies as ways to bring broadband Internet access to more Germans. We will see how the introduction of competition into the German telecom market has affected telecommunications costs, including Internet access costs. Flat-rate Internet access pricing is of particular interest, and we will see if this pricing can encourage Internet use. Also discussed is the ability for the Internet economy to help alleviate unemployment, expectations for which are a major push behind German policy toward the Internet.

Diese Arbeit beschäftigt sich mit denjenigen Ausprägungen der deutschen Telekommunikationslandschaft, welche die Nutzung des Internets beeinflussen; hieraus wird abgeleitet, ob Deutschland sein erklärtes Ziel, die führende Informationsgesellschaft in Europa zu werden, erreichen kann. Telekommunikation wird als Schlüssel für die Transformation in eine Internet-Wirtschaft behandelt, die entsprechende Nutzbarkeit und Qualität von Dienstleistungen werden hierdurch beeinflusst. Das erste Kapitel betrachtet die bundespolitische Reform des deutschen Telekommunikationssektors. Zunächst wird der Liberalisierungsprozess, einschließlich der Änderungen im Telekommunikationsgesetz und der Privatisierung des nationalen Postverwaltungsmonopoles, von einer Fokussierung der Deutsche Telekom und ihrer Tochter T-Online ausgehend, betrachtet. Anschließend erfolgt ein Vergleich der Wettbewerber und deren Angebot an neuen Technologien, wie z.B. ISDN, DSL oder Kabel. Es wird gezeigt, wie der neue Wettbewerb die Telekommunikationskosten und damit auch den Zugang zum Internet bestimmt; Pauschaltarife und deren Einfluss auf Internet-Nutzungsintensitäten bilden hierbei einen Schwerpunkt. Als weiterer Aspekt wird untersucht, inwieweit die Internet-Wirtschaft zum wirtschaftspolitischen Ziel eines hohen Beschäftigungsgrades beitragen kann.

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1. INTRODUCTION

Germany, land of Oktoberfest, oompah bands, and cuckoo clocks – not quite the vision one has of the new digital Europe. Travel to the nation’s high-tech centers, however, and you will see a country bent on using that German know-how to become the most technically sophisticated nation in Europe. When Germans put their minds to something, well, remember the Economic Miracle? Now they have put their minds to the Internet and are busy building a bright and rosy future for the new Germany, the new digital Deutschland.

The many changes brought about due to the Internet go under the heading of the Information Society. Observers are concerned that if Germany does not take an active roll in promoting its vision, the country will fall behind in the race to create an Information Society in Europe. This is a real concern, as the Internet has shown that it is making a notable impact on economies across the globe, even after the bursting of the dot.com bubble. In order to smooth the way, the German government has begun implementing a series of reforms. Political and business leaders see many challenges to overcome before the dream of the Information Society is to become reality, and although these reforms stretch to many aspects of the German economy, this paper will focus on changes taking place in the telecommunications sector. Telecommunication technologies are key to the transition to the

Information Society, and we will look at how aspects of the telecommunications landscape in Germany affect the use of the Internet and the ability to reach the goal of leader in the Information Society.

In the first section, we look at the process of liberalization in the German telecommunications sector. Germany, like many other countries, has a history of state-run monopoly for telecommunications. The German government has attempted reform the telecommunications sector through privatizing the national monopoly carrier, Deutsche Telekom, introducing regulatory reforms through re-writing the telecommunications laws (the TKG), and generally opening up the market to competition.

We will examine this process and see that it has resulted in many new competitors opening up shop in Germany. The introduction of competition has caused a marked decrease in the cost for most telecommunication services, especially long-distance voice communications, and is pushing the development and availability of advanced telecommunications services. We will look at how some of these service, ISDN, DSL, and cable, are being used for Internet access in this country. We will look for advantages these technologies bring, and how competition is influencing the deployment of new infrastructure.

Also important to realizing Germany's dream of an Information Society are the costs to businesses and residential consumers for Internet use, and we will look at price schemes that could affect usage patterns of both providers and end-users, alike. Compared to other countries, these costs are too high in Germany, and are arguably deterring a wider-spread utilization of this medium. One proposed solution is the introduction of flat-rate Internet access, through both a wholesale flat rate for ISPs leasing capacity, and flat-rate monthly

Internet access plans for consumers. Implementation of flat-rate plans has proven difficult, however, due to Deutsche Telekom's continued control of the last mile connection to customers, and its per-minute charges for this access, even for local phone access.

One of the key goals in promoting an Information Society in Germany is to decrease unemployment and ensure economic stability. The hopes are that the Internet economy will do this for Germany. It is unclear, however, whether demand for technology workers will actually solve the country's long-term employment problems. Businesses in Germany face many other challenges to profitability, and these, too, must be addressed if the German economy is to perform as hoped in the future.

1.1. Lagging Behind on the Road to an Information Society?

The fear that Germany is being left behind in the next wave of modernization – the transformation to the information age – can be seen as early as 1994, with titles in the media such as "When Will Germany Come Back?" from *Fortune* magazine.¹ Talk of technology gaps and falling behind in the world economy is something we are more used to hearing in connection with developing countries, not the highly developed economy of Germany. After all, it was here that Leibnitz developed the binary system in 1673, and built the first useable calculator.² Germany is the land of mobile phones, super-fast trains, Smart Cards, and digital TV. Yet, German industry sees itself as behind the United States on the Internet, and is concerned about its position among the countries of Europe, as well.

¹ Justin Fox. "Surprise! Europe Has Web Fever." *Fortune*, Vol.141, No.12, 12 June 2000, e-Europe. [www.fortune.com/fortune/2000/06/12/eur.html].

² *European WebSoup*, 1 March 2000, Vol. 4, No. 01. Citing [www.theregister.co.uk/000226-000006.html].

In a survey of German executives, 94% said that German Internet use was between two and three years behind the United States.³ As of May 2000, 29% of the population of Germany were online, compared to 55% in the United States as of February 2000. There has been an increase in the use and spread of modern information and communications technologies in Germany, and the number of users is growing all the time. Despite all this, the Information and Communications industry still makes up just 5% of GDP in Germany, compared to more than 7% in the United States or Sweden.⁴ Internet users in Germany are also less experienced. Results of a joint Stanford study by the Freie Universität Berlin and the market research institute Forsa show that although more than 22% of American Internet users have been online more than 5 years, in Germany the number is only 8%.⁵

Numbers such as these do show a gap between Germany and the United States. In a European context, however, Germany appears about average. In Sweden, the chance of meeting an Internet user is twice as high as in Germany, whereas in Germany it is twice as likely you will meet a web user than in France.⁶ The EU Commission reported that at the end of 1998, the percentage of private households which had a computer was 31% in Germany, the same as the EU average, while 7% of households had Internet access, just under the 8% EU average.⁷ European Internet penetration is lowest in Greece at 2.6%, and highest in Finland at 31%.⁸ In all, Germany appears to come out in about the middle of the pack. However, because it is such a relatively large country, when we look at sheer numbers as opposed to percentages, Germany comes out ahead simply due to the size of its population.

³ *European WebSoup*. "Germany Sees Itself 3 Years Behind U.S. on Net." 22 May 2000, citing [www.handelsblatt.de].

⁴ Norbert Walters. "Deutschland auf Online-Kurs." *Net-Business*, 6 März 2000, 16.

⁵ *Net-Business*. "Eine Flatrate von 20 Mark wird gewünscht." 26 Juni 2000, 6.

⁶ *Warburg Dillon Read (France) SA*. "The Internet in Europe." 6 January 2000, 25.

⁷ *Institut der deutschen Wirtschaft Köln (iwd)*. "Schleichende Revolution." 2 Dezember 1999, Nr. 48, IuK-Techniken, 2.

⁸ *Warburg Dillon Read (France) SA*, 24.

The figures below show that Germany has the most web users, at 10.3 million in 1998, expected to grow to 32.9 million by the end of 2002.⁹ According to Gfk Monitor, in 2000, Germany was already about halfway to the 2002 estimates, showing 15.9 million Germans with access to the Internet, some 21% of all households, numbers which are up 50% from the previous six months.¹⁰

Figure 1-1: Internet Users by Country¹¹

Internet Users by Country, 1998 - 2002

| Internet Users (millions) | Year-end 1998 | Year-end 2002 (estimate) | CAGR 1998 2002est. |
|---------------------------|---------------|--------------------------|--------------------|
| Germany | 10.3 | 32.9 | 34% |
| UK | 8.9 | 23.0 | 27% |
| France | 4.0 | 23.0 | 54% |
| Italy | 3.1 | 13.3 | 44% |
| Sweden | 2.5 | 5.7 | 23% |
| Netherlands | 2.5 | 7.6 | 32% |
| Spain | 2.0 | 8.4 | 43% |
| Finland | 1.6 | 2.8 | 15% |
| Denmark | 1.1 | 2.5 | 22% |
| Switzerland | 1.1 | 3.2 | 33% |
| Norway | 1.0 | 2.2 | 21% |
| Austria | 0.9 | 3.1 | 36% |
| Belgium | 0.8 | 3.4 | 43% |
| Portugal | 0.5 | 2.1 | 46% |
| Ireland | 0.3 | 1.1 | 37% |
| Greece | 0.3 | 1.4 | 51% |
| TOTAL | 41 | 136 | 35% |

(source: WDR estimates, IDC)

⁹ Warburg Dillon Read (France) SA, 26.

¹⁰ European WebSoup, 13 March 2000, Vol. 4, No. 023, Citing [http://194.175.173.244/gfk/pressemeldung/presse.php3?zeige=details&id=109].

¹¹ Warburg Dillon Read (France) SA, 26.

1.2. The Internet's Importance to Germany's Economy

Germany's ranking in the international Internet Economy is important because the Internet Economy is seen as the development which will bring the next wave of economic growth to countries. In 1998, 8% of world trade was carried out over the Internet.¹² To indicate the potential for this sector, we look at North America, where the Internet has been a key component of the economy and of economic growth. In 1999, the Internet was responsible for 15% of regional GDP growth and 26% of market capitalization growth.¹³ In just three years, the Internet had become an economic sector in its own right, and one that the rest of the economy cannot afford to ignore. We find that the Internet is over-taking traditional sectors of the United States economy. In 1999, the Internet produced an estimated US \$507 billion in revenues and 2.5 million jobs, overtaking Airlines (US \$355 billion), catching up to Publishing (US \$750 billion), and even starting to compete with Healthcare's revenues (US \$1 trillion).¹⁴ According to Warburg Dillon Read, if during the next three years the Internet economy were to grow at just half its estimated current rate of 68%, annual revenues would reach US \$1.2 trillion by 2002.¹⁵

Even after the dot.com bubble burst, the Internet Economy retains its importance for economies, and from all reports, will continue to grow. Those that fail to adequately utilize this will miss out on the benefits it will bring in this sector expected to fuel the economic growth of countries well into the foreseeable future. Germany is the biggest single market in Europe. Counting German-speaking Austria and parts of Switzerland, there are almost 100

¹² Verrue, Robert, Director General, Directorate General XIII - European Commission. "Electronic Commerce in Europe: the Present Situation," speech for the Seminar on Electronic Commerce, Kangaroo Group - European Parliament, Brussels, 20 January 1999, [<http://europa.eu/int/comm/dg13/ecie.htm>].

¹³ Warburg Dillon Read (France) SA. "The Internet in Europe." 6 January 2000, 7.

¹⁴ Warburg Dillon Read (France) SA. "The Internet in Europe." 6 January 2000, 4.

¹⁵ Ibid.

million German-speaking people in Europe.¹⁶ Germany understandably wants to be a leader in this sector, and with its large number of Internet users, will continue to be of major importance to the Internet Economy in Europe.

Internet use in and of itself will not change economies. It can, however, have a significant effect through moving business processes online. The most obvious impact, though, can be seen with buying and selling online. In this respect, Germany will be of major importance to the European Internet economy.

Germany has a rapidly rising Internet penetration, and a high level of per capita spending in traditional shopping channels.¹⁷ Internet transactions have the advantage of not being subject to shop closing times, mandated by law in Germany, and which many times see consumers pushed out of the front doors. In 1998, Germans bought more online than any other nationality, accounting for 1.3 out of 4.6 million web buyers in the European Union.¹⁸ The year 1999 saw 3.4 million Germans spending online,¹⁹ and Germans are expected to continue to make up the majority of online buyers in the future. (See Figure 1-2).

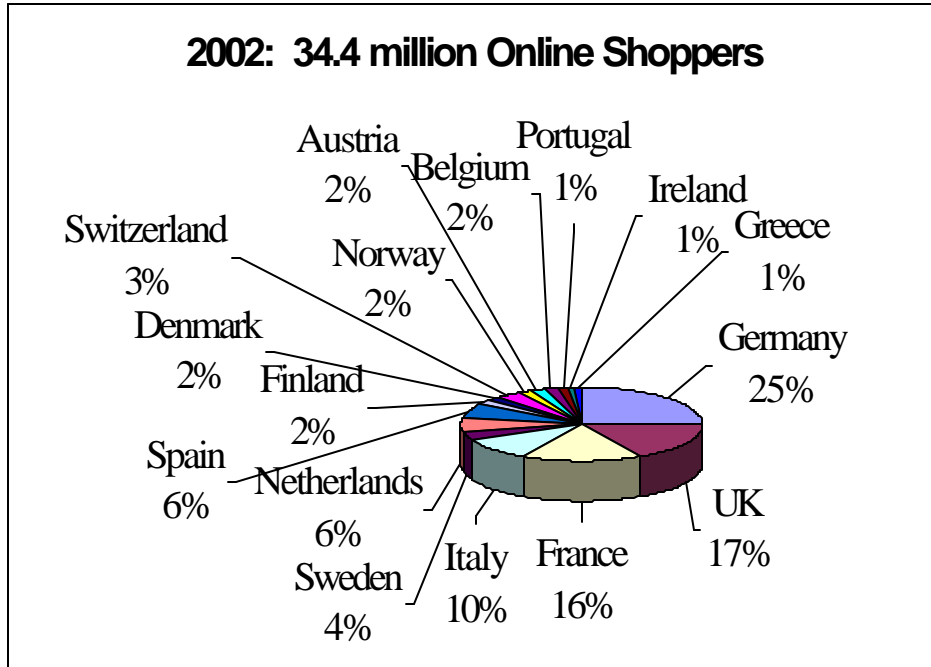
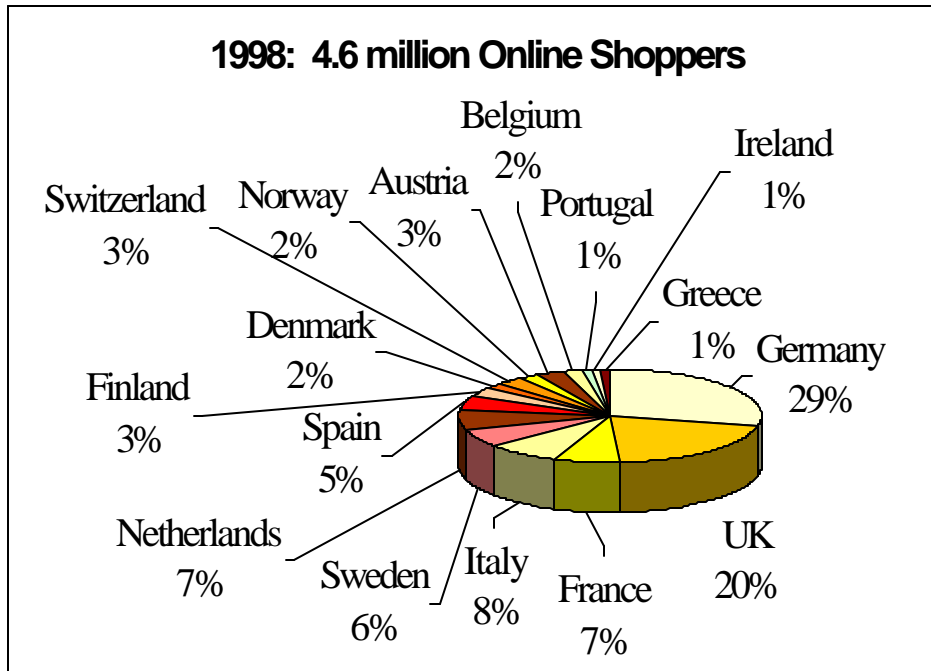
¹⁶ *e-Business Advisor*. "Make the E-Commerce Voyage." February 2000, Strategies p. 18. [<http://web.lexis-nexis.com>].

¹⁷ *Warburg Dillon Read (France) SA*, 49.

¹⁸ *Warburg Dillon Read (France) SA*, 41.

¹⁹ *European WebSoup*, 13 March 2000, Vol. 4, No. 023, Citing [<http://194.175.173.244/gfk/pressemeldung/presse.php3?zeige=details&id=109>].

Figure I-2: Share of Online Shoppers by Country²⁰



²⁰ Warburg Dillon Read (France) SA, 41, also citing IDC.

Almost one in three European online transactions occur in Germany, and no less than 35% of B2C sales.²¹ E-commerce revenues were \$1.7 billion in 1998,²² amounting to 0.08% of the total domestic expenditure for this year.²³ On average, Germans spent \$20 per capita on E-commerce in 1998, placing Germany seventh among EU nations for online spending per capita.²⁴ Although estimates for 2002 do not show much change in Germany's ranking, we can see from estimates of total amount spent that Germans as a whole will spend more than any other nationality (Figure 1-3). So, not only is the Internet important to Germany, but Germany is important to the future of online sales in Europe.

Figure 1-3: Internet Commerce by Country²⁵

Internet Commerce by Country, 1998 to 2002

| | 1998 | | 2002 | |
|--------------|------------------|---------------------|------------------|---------------------|
| | Share of TDE (%) | USD per capita (\$) | Share of TDE (%) | USD per capita (\$) |
| Germany | 0.08% | 20.00 | 3.04% | 750.00 |
| UK | 0.11% | 24.00 | 3.69% | 794.00 |
| France | 0.03% | 6.00 | 2.12% | 475.00 |
| Italy | 0.03% | 7.00 | 1.63% | 317.00 |
| Sweden | 0.12% | 29.00 | 4.09% | 958.00 |
| Netherlands | 0.11% | 23.00 | 3.73% | 780.00 |
| Spain | 0.03% | 5.00 | 1.53% | 204.00 |
| Finland | 0.13% | 27.00 | 3.45% | 723.00 |
| Denmark | 0.08% | 26.00 | 3.16% | 975.00 |
| Switzerland | 0.08% | 27.00 | 3.19% | 1047.00 |
| Norway | 0.10% | 31.00 | 3.33% | 1051.00 |
| Austria | 0.07% | 17.00 | 2.80% | 713.00 |
| Belgium | 0.04% | 9.00 | 1.91% | 411.00 |
| Portugal | 0.03% | 4.00 | 11.57% | 178.00 |
| Ireland | 0.06% | 11.00 | 2.65% | 465.00 |
| Greece | 0.03% | 3.00 | 1.26% | 156.00 |
| TOTAL | 0.07% | 15.00 | 2.69% | 571.00 |

Total Domestic Expenditure (TDE)

(Source: WDR estimates, IDC)

²¹ Warburg Dillon Read (France) SA, 49.

²² Warburg Dillon Read (France) SA, 50.

²³ Warburg Dillon Read (France) SA, 49.

²⁴ Ibid.

²⁵ Warburg Dillon Read (France) SA, 49, also citing IDC.

Figure 1-4: Internet Commerce Revenues in the European Union²⁶

**Internet Commerce Revenues in the EU
1998-2002**

| (\$ bn) | 1998 | 2002 (estimate) | CAGR (estimate) |
|--------------|------------|--------------------|--------------------|
| Germany | 1.7 | 62.8 | 147% |
| UK | 1.4 | 47.6 | 141% |
| France | 0.4 | 28.5 | 194% |
| Italy | 0.4 | 18.1 | 163% |
| Sweden | 0.3 | 8.7 | 140% |
| Netherlands | 0.4 | 12.6 | 143% |
| Spain | 0.2 | 8.0 | 159% |
| Finland | 0.1 | 3.7 | 127% |
| Denmark | 0.1 | 5.2 | 149% |
| Switzerland | 0.2 | 7.8 | 152% |
| Norway | 0.1 | 4.7 | 142% |
| Austria | 0.1 | 5.8 | 153% |
| Belgium | 0.1 | 4.4 | 163% |
| Portugal | 0.0 | 1.8 | 167% |
| Ireland | 0.0 | 1.7 | 157% |
| Greece | 0.0 | 1.7 | 164% |
| TOTAL | 5.6 | 223.0 | 151% |

(Source: WDR - IDC)

Germany's position is not an accident. Government officials recognized the importance of the "Information Economy" early on. Federal Chancellor Schröder indicated the importance of the new media and the information and communications industry to the Federal Government's policy in his first statement as head of the government on November 10, 1998. He said that a responsible media policy would be of "central importance," and that the Federal government intended to "accelerate the use and spread of modern

information and communications technology in our society.’²⁷ He made clear that the most important reason for this policy was reducing unemployment, which could only be achieved if the transition from the industrial society to an information society was mastered.²⁸ Nearly two-thirds of executives said they expected the Internet to alleviate unemployment in Germany, where the rate hovers at just under 10%, with 65% saying that they expected job creation from e-commerce.²⁹ Therefore, developing a modern information economy in Germany which could be competitive worldwide, creating optimal legal conditions, and developing the appropriate infrastructure, were priorities for the Federal government in economic, research, technology, and education policy.

The main aims of the action plan included increasing the spread and use of modern information and communications technologies in every sector of the economy and society with the aim of achieving a leading position internationally by 2005, and expanding the IT infrastructure to maintain Germany’s present international lead in telecommunications.³⁰ Concrete targets for 2005 include: Increasing the number of Internet subscribers from 9% in 1999, to more than 40% by 2005; doubling the number of multi-media companies from the current 1,500 by 2001; developing pure optical networks by 2005, with fiber glass cable connections for every household by 2010; and developing new broadband mobile communications systems with access to these multi-media services at all times and in every location, including wireless Internet access from 2003 onward.³¹

²⁶ *Warburg Dillon Read (France) SA*, 50, also citing IDC.

²⁷ *Federal Ministry of Education and Research, and the Federal Ministry of Economics and Technology*. “Innovation and Jobs in the Information Society of the 21st Century: Action Programme by the German Government.” (Bonn: Köllen GmbH Druck und Verlag, November 1999). [www.iid.de/contents.html], 13.

²⁸ *Federal Ministry of Education and Research, and the Federal Ministry of Economics and Technology*, 13 –14.

²⁹ European WebSoup. “Germany Sees Itself 3 Years Behind U.S. on Net.” 22 May 2000, citing [www.handelsblatt.de].

³⁰ *Federal Ministry of Education and Research, and the Federal Ministry of Economics and Technology*, 8, 21-22.

³¹ *Federal Ministry of Education and Research, and the Federal Ministry of Economics and Technology*, 9, 22-23.

We have discussed the importance of the Internet economy to Germany, and Germany's leading position in E-commerce, now and in the future. The remainder of this paper will focus on one aspect necessary to make the Internet in Germany a success – the telecommunication infrastructure the Internet runs on, and the telecommunications market which shapes this sector.

2. REFORMING THE GERMAN TELECOMMUNICATIONS SECTOR

2.1. Why Reform?

Telecommunications are an important building block in the quest to develop an Information Society founded on the Internet. The Internet is a network of networks, and these connect to each other using telecommunications networks, either the traditional voice telephony network, or increasingly advanced networks of digital services.

Telecommunications have always been important for economies and vital to the functioning of individual businesses. The World Bank suggests that a country's gross domestic product increases an average of \$3 for every \$1 spent on a nation's telecommunications infrastructure.³² One way to increase the potential of the Internet is to improve a country's telecommunications sector – both the availability and quality of infrastructure, and the functioning of the market for these services.

In Germany, as in many countries around the world, the telecommunications sector has a history of being run by a state-owned monopoly. While monopolies have proven well suited to accomplishing the goal of universal service in voice telephony, the next level of services can best be provided by a competitive market, as monopolists tend to be unresponsive to demands for quality, diversified service, and innovation. The hope is that by opening the market to competition, more services will be offered, the development of these will take place sooner, and that these services will be available at more attractive rates – all of which will spur economic growth in general, and the growth of the Internet economy in particular.

³² John Blau. "Please Sir, Service – Universal Service is Taking on New Meaning, While It Wrestles with Old Problems." *Tele.com: CMP Media Inc.*, 10 January 2000.

Much of the impetus for reforms in many European countries came from the EU, and this is the case in Germany also. The Post, Telegraph, and Telephone (PTT) ministers of the European Union decided in November 1994, to get rid of all PTT monopolies by January 1, 1998. Many Member States were reluctant to introduce reforms, as the national PTTs were instruments of local industrial and employment policies, as well as sources of revenue. Removing the German government's responsibility for telecommunications would decrease the state bureaucracy, enable the national carrier to enter foreign markets (vital in an increasingly global marketplace, and hindered by government ownership of the company), and increase selection for customers. In the end, liberalization should increase the development of new services, provided by means of the financial markets and not the German taxpayers, and improve infrastructure, helping the Internet economy, which will then hopefully help to alleviate unemployment. Germany has set about this task by privatizing the national telecommunications monopoly, liberalizing its telecommunications regulations, and encouraging competitors to enter the market.

2.2. Privatizing the PTT Monopoly

We cannot fully understand current developments in the telecommunications sector if we do not understand the forces which shaped this market. Like most countries, Germany had a state-run monopoly for telecommunications services. This meant that all services were provided by the national PTT, there were no competitors allowed in the market, and that the country's infrastructure and telecommunications services needs were decided on a centralized basis by a government ministry.

For a country not always known for its light-on-its-feet bureaucracy, it has been amazing how fast changes have come to the telecommunications industry. One large reason for this is that Germany has gotten rid of the bureaucrats. By 1994, almost 50% of Deutsche Telekom workers were no longer federal employees.³³

The legacy of monopoly is still present, however, and areas remain in which competitors are struggling to make inroads. As we have mentioned, Germany feels that the success of the Internet is important for the country's economic health. The Internet runs largely over telephone lines, and up until recently, those lines were completely controlled by the German national monopoly, now called Deutsche Telekom. Therefore, no look at the telecommunications sector's past would be complete without talking about the former monopolist, which in general still controls the last-mile connection to customers. It is perhaps easiest to understand the developments by using a chronological approach. Therefore, we will begin with the days of monopoly, continue with privatization, and finish with the days of competition and continuing reform.

2.2.1. To an Information Society through Infrastructure

In the Seventies and Eighties the German Federal Government wanted to initiate and accelerate a transformation into an information society by an infrastructural approach, using the state-owned telecommunication monopoly, Deutsche Bundespost, to build up an infrastructure far beyond demand in order to create new markets for services and terminal equipment. In 1974, the social democratic government set up a Commission for the Development of Technical Communication to decide which services made economic sense,

³³ Andreas Barth. "Privatization and Deregulation in Germany," in *Information Technology in Germany*, 6 March 1996. [<http://gurukul.ucc.american.edu/mogit/ab5369a/telepage.html>].

and were also socially desirable. The main focus was on data communication and two-way cable television, which both had just been introduced in the United States. The Technical Commission was skeptical about demand for commercial television, a new thing in Germany, but ultimately this is the technology which won the push, leaving data communication behind.

In 1984, Deutsche Bundespost planned to invest about DM 500 billion within 20 years to upgrade the analog telephone network to a switched broadband network with fiber optic lines reaching all households in Germany.³⁴ Deutsche Bundespost started to build up the TV network also, this time a one-way cable TV network on coaxial cable. Fiber vs. Copper became a big dispute, the core of which was the dispute between data communications and television. Both computer networks and cable television were on the agenda, but despite high expectations for data, the result was only a push for cable television, again leaving data communication behind.

2.2.2. Splitting up Deutsche Bundespost

Until 1989, the Deutsche Bundespost had exclusive rights, as the state owned national monopoly, to install and operate telecommunication facilities and all services in West Germany. Article 73 of the Basic Law (the German Constitution) lists the PTT ministry as one of the public services over which the state had exclusive rights, and went on to list the monopoly's rights over network infrastructure. Telephones and modems were part of the network. Deutsche Bundespost never produced terminals but held the authority to license these. Telephones for private extensions and modems could only be rented from

³⁴ Herbert Kubicek. "Multimedia. Germany's Third Attempt to Move to an Information Society." (Paper) 3 May 1997, 2. [<http://ksgwww.harvard.edu/iip/GIIconf/kubpap1.html>].

Deutsche Bundespost, and the monopolist exercised its operating and network rights rather strictly.

In 1985, the study of reform options began with the Witte Commission. The 1987 Witte Report recommendations fell short of full deregulation or privatization, but even these reforms were diluted by parliamentary process. Under the previous system, the Federal Minister for Post and Telecommunications also acted as CEO of the telephone company. Since the state monopoly player might not be the proper actor to direct change in the telecommunications industry, the first step was to take the Deutsche Bundespost (DBP) out of state telecommunications regulatory administration.

Germany introduced reform legislation on July 1, 1989, to separate regulatory functions from the operating functions of the DBP. Minister Christian Schwarz-Schilling broke up the Deutsche Bundespost into the following ministry and firms:

- The *Regulierungsbehörde*, or RegTP – regulatory ministry
- Deutsche Bundespost Telekom – telecommunications
- Deutsche Bundespost Postbank – financial services
- Deutsche Bundespost Postdienst – postal services

Each division had separate boards of directors, supervisory boards, and maintained separate balance sheets. The entire Deutsche Bundespost “family” was represented by a directorate formed as a conglomeration of members from each division. However this organization did not exclude the possibility of cross subsidization, with the approval of the Ministry. The telecommunications sector has historically subsidized the postal sector by charging rates

above actual costs. At this time, competition was introduced for any kind of terminal and any kind of service except basic phone service. So-called alternative networks, which were at the beginning only run for internal usage by public utilities and the German railway, were to be allowed to open for third party usage, before the official date for full competition.

2.2.3. Privatization: Deutsche Telekom is Born

On January 1, 1995, as a result of the second Post reform of the German government, DB Telekom, DB Postbank, and DB Postdienst were given *Aktiengesellschaft* (AG) status, i.e. incorporated companies. The Deutsche Bundespost Telekom got a new name, and officially transformed into the "private" company, Deutsche Telekom, although the federal government still retained 100% stake in it and the other companies. In May, Ron Summer, previous president of Sony in the United States and Europe, became chairman of the new Deutsche Telekom AG (Inc.), and remains so today.

This separation had several implications. Of Telekom's 225,400 employees, only 51% still counted as official government employees, and no additional personnel would be given government employee status. In fact, Deutsche Telekom wanted to trim its labor force by 55,400 to 170,000 by 2000.³⁵

In November 1996, Deutsche Telekom underwent a DM 20 billion partial privatization, with around 27% of its capital listed on the stock exchange. Around 2 million people bought Deutsche Telekom stock (DTAG) at the initial offering of DM 28.50. This had another interesting consequence: when Deutsche Telekom stock was sold, it was the first time many small private investors had ever bought stock. They invested in Deutsche Telekom because as a former part of the government it seemed to be a secure investment,

much like AT&T stock was seen as in the past. The German government, however, initially maintained 74% control of the company,³⁶ and is still Deutsche Telekom's major shareholder with a 58% stake, as of February 2001.³⁷ During privatization, liberalization was slow, as competition hurts a company which previously had 100% market share, and the revenues from the company helped the state budget. The proceeds from going public were meant to stay with Deutsche Telekom to strengthen capital structure and to provide a financial foundation for future growth, but Deutsche Telekom's relationships with other members of the former Deutsche Bundespost family, and its ties to the government, made its financial situation complicated.

From 1996 forward, it has been treated like a private company for tax purposes, and has been subject to profit distribution regulations like a private company. However, with privatization, it is free to decide business policy on issues such as recruitment, performance pay, and cost management. Deutsche Telekom faces competition in all areas except networks and voice switching for third parties.

The major challenges Deutsche Telekom faced were strengthening its competitive position nationally and internationally, to internationalize services, and to modernize the infrastructure in the five new Länder (states) of the former East Germany. Deutsche Telekom was also asked to make a special surrender of profits in order to help finance reunification. The state was reluctant to relinquish the revenue provided by telecommunications, in spite of reforms. Until 1996, Deutsche Telekom had to balance the deficits of the post office and postal bank, and to surrender 10% of its profits to the minister of finance.

³⁵ Andreas Barth. "Privatization and Deregulation in Germany" in *Information Technology in Germany*.

³⁶ *The Economist*. "European telecoms in a tangle." 25 April 1999.

³⁷ *Reuters*. "Ron Sommer says he has Deutsche Telekom backing." 23 February 2001.

By this time, Telekom had completely digitized its long distance network down to the regional network's local exchanges. The plan was to have the local loop completely digitized by 2019. Germany had 625,000 miles of fiber optic cables in the public telephone trunk network, 75% of which was used for long distance traffic, and 25% for local traffic. The local networks combined 30 million cables as twisted copper pair wires, and 2.4 million coaxial cables with a total length of 450,000 miles. Numbering 232,000, cable distributor units connected 131,000 miles of main cable to the subscriber lines in the local loop.³⁸ The long distance trunk network consisted of a hierarchy of toll switching centers, with connections running through 480 regional center group selectors and 64 with primary centers in major metropolitan areas.

In 1997, when the television network still only reached 47% of German households,³⁹ plans for fiber as the normal subscriber line to home customers was given up quickly, and it was only taken up again for renewing the telephone network in the former East Germany. In 1997, the post ministry had licensed 35 new public telephone network providers, of which 13 planned to operate nationwide services.⁴⁰

At the beginning of 1998, Deutsche Telekom lost its protected monopoly status, and competition was opened up outside of mobile communications. There are now more than 50 fixed-line operators for German consumers to choose from.⁴¹ The former monopoly was exposed to ferocious competition due to an enthusiastically pro-competition regulator, and with this and a continuing price war, Telekom has lost almost a third of its long distance business and some of its international traffic.⁴²

[<http://www.totaltele.com/view.asp?ArticleID=37288&pub=tt&categoryid=627>].

³⁸ Andreas Barth. "Telecommunication Infrastructure in Germany," in *Information Technology in Germany*.

³⁹ Herbert Kubicek, 1.

⁴⁰ Ralph Atkins. "Defensive giant limbers up." *Financial Times (London)*, 19 December 1997, 3.

⁴¹ *The Economist*. "European telecoms in a tangle."

⁴² *Ibid*.

By the year 2000, liberalization had largely been accomplished, Deutsche Telekom had been, for the most part, privatized, and the market was open for competition. Deutsche Telekom is apparently now fairly independent of the government, according to a questionnaire from the U.S. Federal Communications Commission, regarding the proposed acquisition of VoiceStream Wireless Corp. and Powertel Inc. Companies asked said that, "There are no formal or informal mechanisms for the German government to exercise influence over Deutsche Telekom's business strategy apart from the government's votes at shareholder meetings."⁴³ The German government has pledged to eventually eliminate its stake in Deutsche Telekom, which it will dilute to 44% once the VoiceStream deal closes.⁴⁴

In the recent past, Deutsche Telekom brought 10% of T-Online on the stock market in April of 2000. Now, Deutsche Telekom is dividing itself into 4-pillars: T-Com (fixed-line network), T-Mobile (wireless), T-Online (ISP), and T-Systems (technology services), and is positioning itself to be a global player. (See appendix for Deutsche Telekom's international involvement). Some question, however, if Telekom is not being too aggressive, at least at home, where some companies claim it is still trying to use legacy monopoly powers to fuel its international expansion.

2.3. East Merges West: Telecommunications in the former East Germany

No discussion of the history of Germany could be complete without mentioning the 1990 reunification. This is especially important considering the state of telecommunications infrastructure in East Germany at the time. One might think that the decaying infrastructure

⁴³ Jeremy Pelofsky. "Deutsche Telekom's Govt Links Come Under Investigation." *Reuters*, 14 February 2001. [<http://www.totaltele.com/view.asp?ArticleID=36897&pub=tt&categoryid=0>].

⁴⁴ *Total Telecom*. "VoiceStream shareholders approve merger." 14 March 2001. [www.totaltele.com/view.asp?ArticleID=37909&pub=tt&categoryid=0].

in the East would only be a burden on Germany, however, we argue that this situation actually presented an opportunity.

While trying to open the first McDonald's in the former East Germany, Manfred Voigt realized the importance of universal service. Life without local phone service was not just a nuisance, it was a threat to his economic survival. He was forced to make regular trips to the highest hill in Plauen, the small industrial town near the former border, in order to make calls from a Western mobile phone to order more hamburger patties and french fries. Today, times are easier for Voigt and for the 8.2 million households in the region.⁴⁵ After having one of the lowest tele-densities in Eastern Europe, the area now has one of the world's most advanced digital networks. Given its scope, sophistication, and brief build-out time, it is an accomplishment of staggering proportions. One of the forces to thank for this is the push for liberalization in the telecommunications industry coming from the EU and the German government, alike. Competition was, after all, one of the main reasons why Deutsche Telekom was so keen on getting into East Germany.

After the fall of the Berlin Wall, and German Unification in 1990, it became apparent that there was an urgent need to modernize the antiquated telecommunication infrastructure of the five eastern Länder. The telecommunication infrastructure in the eastern Länder was incredibly out of date, and the services provided left much to be desired. As one example, phone penetration here was 10%, compared to 70% in western Länder.⁴⁶ By 1996, Länder in the West had 1.08 telephones per household, while in eastern Länder there were only 0.35 telephones per household.⁴⁷ In all, 96% of German households had one phone, while every tenth had two or more, while in offices, there were 125 phones per 100

⁴⁵ Blau.

⁴⁶ Annette Metraux, *European Telecommunications Policy and the Regional Bell Operating Companies*. Dossiers de l'institut universitaire d'études européennes – Geneve, September 1991, 57.

employees.⁴⁸ Germany, with 81.6 million inhabitants, had 40 million telephone connections, compared to the United States with 141 million telephone lines, and coverage of 93.9 % of households.⁴⁹

The Deutsche Bundespost developed its Telekom 2000 program in an extensive effort to modernize the eastern system to the standards of the west. The eastern Länder's telephone network, built from scratch by Deutsche Telekom, has become more advanced than that of the United States. However, wiring the former East Germany was not accomplished by regulatory mandate, as one might expect, although the German government was eager to build up the region's infrastructure to encourage business investment. Instead, it was the result of fear of competition. Deutsche Telekom responded by lobbying hard to win the right to build and operate the eastern Länder's local and long-distance telephone networks, largely to keep competitors from gaining a foothold in the "home" market. Now, East Germans have a first-class network, and Deutsche Telekom is generating additional cash from leasing last mile connections to new operators in addition to its direct subscriber revenue.⁵⁰

The Telekom 2000 Program planned to build and modernize antiquated telecommunications infrastructure in the eastern Länder by 1997, which would require an investment of DM 50 trillion,⁵¹ and creating an estimated 100,000 jobs.⁵² The plan was to install 7 million new telephone lines, 400,000 fax lines, and provide 50,000 Datex-P lines.⁵³ An overlay network of more than 30,000 lines between East and West was to be constructed.

⁴⁷ Andreas Barth. "Telecommunication Infrastructure in Germany," in *Information Technology in Germany*.

⁴⁸ Ibid.

⁴⁹ Ibid.

⁵⁰ Blau.

⁵¹ Atkins, 3.

⁵² Heather E. Hudson. *Global Connections: International Telecommunication Infrastructure and Policy*. (New York: Van Nostrand Reinhold, 1997), 127.

⁵³ Ibid.

The plan also included linking 2.2 million households to cable lines and establishing cellular mobile networks. Telekom looked at this as a learning experience that would be useful later in the upgrading of infrastructures in Eastern Europe. (See appendix for Deutsche Telekom's international holdings).

One might think that the enormous amount of investment required in the East to bring the telecommunications infrastructure there up to date would be a drain on the economy of Germany as a whole, especially since a large portion of investment funds pouring into the East came from taxpayers money. However, the investment in the telecommunications sector has caused an impetus for growth, and has given Germany one of the most advanced telecommunication systems in the world. As the country's capital, Berlin, is located in the former East Germany, and in the past few years has become a center for high technology companies, this will be a definite boon to the economy, not a drag on it.

2.4. Legal Reform: Issues with the Telecommunications Law

After the EU decision to open market for alternative infrastructure for already liberalized services by July 1, 1996 and market for voice telephony service, by January 1, 1998, the Germans began reforming their laws to comply. The process writing a (new) telecommunications act, the *Telekommunikationsgesetz* (TKG), began. In March 1995, the Federal Ministry of Post and Telecommunications published its 'key points' for future legislation. The purpose of this advanced warning, was to reduce uncertainty for new competitors trying to write their business plans.

Passing the new law was not easy. It took several rounds of parliamentary negotiations, before the law was finally passed in July 1996, taking effect on August 1, 1996. The TKG immediately liberalized the infrastructure sector, meaning that companies

could apply for licenses for the operation of transmission lines, as long as they offered services that were already in the competitive arena (i.e. not voice communications). The Deutsche Telekom voice monopoly was not scheduled to end until December 31, 1997, the latest possibly date under EU framework.

The regulation of major market entry conditions was characterized by a significant number of disputes between new operators and Deutsche Telekom. The Federal Ministry for Post and Telecommunications (*Bundesministerium für Post und Telekommunikation*) oversaw these disputes. It was replaced on January 1, 1998 by the *Regulierungsbehörde für Telekommunikation und Post* (RegTP), which makes decisions independently of, but is controlled by, the Ministry of Economics, and sometimes in consultation with the Cartel Office (*Bundeskartellamt*). The main issues in regard to the telecommunications sector in Germany are licensing, interconnection, and universal service. In the following section, we will examine these issues using the TKG.

2.4.1. Licensing

In general, Germany decided not to limit the number of companies which can receive licenses, except in cases of scarcity, as with frequency allocation. The legal philosophy is different for the supply of voice telephony and for infrastructure, which is divided into:

- Mobile services (class 1)
- Satellite services (class 2)
- Other services (class 3)
- Self-operated voice networks (class 4)

The RegTP has issued more than 500 telecommunications licenses since liberalization started.⁵⁴ License fees are not directly regulated by the TKG, but by an ordinance based on the TKG. Originally, the amount set for class 3 and 4 licenses was a one-time payment of DM 40 million. Companies make different market viability assessments based on these amounts. The success of switched resellers rests on the fact that low fees enable a higher number of companies to enter the market. As the license fee is one of the few fixed costs, if it had remained at this amount, many new suppliers would not have been able to enter the market.

The government had said that the license fee would be fair, only covering administrative costs. Additionally, it had explicitly stated that it wanted competition through smaller enterprises and new ventures. However, a DM 40 million payment, is not quite in line with these goals. In 1996, the Federal Minister for Post and Telecommunications stated in parliamentary discussions about the federal budget for 1997, that it expected to receive DM 1.8 billion from telecommunications licenses.⁵⁵ This money was needed in order to contribute to a budget which was in imbalance with the criteria set out in the Maastricht treaty for European Currency Union.

2.4.2. Interconnection

Regulation in the areas of interconnection and access is absolutely crucial for the development of competition. Interconnection is regulated in the larger framework of network access, which is addressed in the TKG and in the *Netzzugangsverordnung* (NZV), the network access implementing ordinance. Network access is defined as “the physical and

⁵⁴ *Federal Ministry of Education and Research, and the Federal Ministry of Economics and Technology*, 7, 19.

⁵⁵ Karl-Heinz Neumann and Ernst-Olav Rühle. “The New Regulatory Regime and Market Entry in Germany.” Paper presented at the 26th Annual Telecommunications Policy Research Conference in Alexandria, Virginia, October 3-5, 1998, 7.

logical connection of terminal equipment or other equipment to a telecommunications network or parts thereof as well as the physical and logical connection of a telecommunication network to another telecommunications network or parts thereof for the purpose of obtaining access to functions of such telecommunications network or to the telecommunications services provided via such network” (§ 3 Nr. 9 TKG).

The granting of network access is mandatory for a dominant carrier, as is interconnection. These must be based on objective, transparent, and non-discriminatory agreements which have to be approved by the regulatory body and which are to be published. Not only dominant carriers, but all operators of public telecommunications networks are obliged to negotiate interconnection if demanded.

An unbundling requirement is contained in the law itself. It says that dominant carriers have to grant access to their networks “or parts thereof” (§ 33 Sec. 1 TKG), and unbundled elements have to be offered so that the user does not have to pay for elements which were not requested. The NZV specifically mentions the customer access line as an unbundled element to be offered by a dominant operator (§ 2 NZV).

2.4.2.1. Pricing Interconnection

The level and structure of the tariffs (relatively low for long distance, and relatively high for local) support the new operators differently depending on the approach they have chosen (switched resale vs. own network) to enter the market. Resale has not been mandated according to the TKG. In contrast to the United States, resale is a non-regulated issue in Germany. There is a short provision for enabling resale in the customer protection ordinance (TKG) but there are no rules on how pricing for resale is to be set.

2.4.3. Universal Service

Universal service goes beyond immediate social impact to affect a country's overall economic prosperity. The World Bank recently suggested that a country's gross domestic product increases an average of \$3 for every \$1 spent on a nation's telecom infrastructure.⁵⁶ In Germany, universal service means access at an affordable price (meaning an equal price all over the country). The definition of universal service encompasses:

- Voice telephony with a number of ISDN features, as far as technically possible
- Specific transmission lines according to the annex of EU directive 92/44
- Emergency calls, directories, and inquiry services

The EC currently defines basic service as providing telephony, voice and fax band data transmission via modems, directory services, and public telephones. Deutsche Telekom voluntarily provides around DM 300 million (US \$158 million) annually to connect schools to the Internet, and another DM 500 million (\$263 million) annually for toll-free personal emergency services, such as call centers for abused women and children.⁵⁷

2.4.4. Comparison with the United States

The discussions in the United States and in Germany are much the same. Regarding market entry, access must be fair, non-discriminatory, and transparent. The major problems are the place and number of interconnection and access points, the unbundling of network elements), and the resale and price of these. There are also differences. The U.S. system

⁵⁶ Blau.

⁵⁷ Ibid.

relies more on individual agreements. The German system, not surprisingly, involves itself more in the contract process than the U.S. system, with fees and content requirements for contracts.

In comparing the regulation of the two, the U.S. regulation goes much more into detail, seeking to anticipate problems. This is possibly due to the fact that in American law, the FCC has the ability to interpret the 1996 Act in a legally binding manner. The German *Regulierungsbehörde*, however, does not have this ability with respect to the TKG. Companies must therefore sometimes wait through lengthy legal processes to clarify the law. This leads to regulatory uncertainty for both competitors and Deutsche Telekom alike. The detailed rules of the FCC bring both parties more clarity and give them the ability to plan. The regulators have much more expertise, and it is easier for a court to decide whether an already existing FCC regulation is against the law, than it is for the court to interpret the law itself. However, the German system can be more flexible, as the court can make judgements taking current technical advances into account. The U.S. system, in contrast, must re-write the law when new technical developments have an impact on competition. This difference in the amount of detail of the regulation can explain a difference in the market opening in the two countries.⁵⁸ In Germany, it has primarily been the new competitors who have fought Deutsche Telekom AG to solidify their new rights and gain market access, while in the United States in the past few years it has been the old monopolist AT&T which has been on the fighting side. This is an indication that the FCC has made sure that competitors had more rights from the beginning of the market opening. Germany, however, has never had a separation of local and long distance providers. Deutsche

⁵⁸ Bernd Holznapel, Axel Bysikiewicz, Christoph Eaux, and Christian Nienhaus. *Grundzüge des Telekommunikationsrechts*. (Münster, Germany: Lit Verlag Münster, 2000), 253.

Telekom is still the dominant player in both areas, and the German regulators will have to be tougher than those in the United States because of this.

2.5. Incumbent Slows Internet Development

Telecom monopolies and a lack of liberalization have held Internet access back. The lack of development in the local loop, for example, has prevented EUnet from offering high-bandwidth services in less developed areas outside of major cities. Even in the cities, only the largest companies can afford high-capacity leased line access to the Internet. There is a tenuous relationship between Internet Service Providers (ISPs) and the big phone companies. The underdeveloped networks in this areas means scarce capacity which monopolists want to reserve for voice services. Whatever is left for ISP services goes for a premium. The benefits of the Internet could be more fully realized if local telephone charges were kept as low as possible.

Service providers need to be able to connect to the network. The problem in Europe has been that the PTT monopolies controlled the approval process for connecting to the public network. So, companies hoping to provide new services in competition to the incumbents, essentially had to apply to the incumbent PTTs for permission to do so. The source of the PTT power was their control of the infrastructure.

The infrastructure-supported providers will seek ever more to build up their own networks in order to by-pass the old monopolist with new technology. As copper and fiber optics lines are expensive, it may be that wireless local loop technology has a great potential to change the market. Cable networks have potential, but there are upstream and downstream issues.

3. COMPETITION AFTER LIBERALIZATION

The question now is, has liberalization been successful in bringing competition to the market? “The full liberalization of the German telecommunications market on January 1st of [1998] has turned this market into one of the most liberalized and open markets in Europe and worldwide,” claims Hans-Willi Hefekäuser, Senior Executive Director of Regulatory Strategy, Competition, and Pricing Policy at Deutsche Telekom AG. “This fact is globally acknowledged and illustrated over and over again, for example, through open licensing procedures without any foreign ownership restrictions. Furthermore, interconnection, call by call, number portability, equal access, and access to the local loop have all been available since January 1, 1998.”⁵⁹ Despite some problems, it is a more competitive market, with a wide range of competitors.

The number of customers using alternative suppliers is a measure that competition is working. However, although the market for telecommunications is officially open, alternative carriers still complain about practices of Deutsche Telekom, which they say are hurting competition. We will look at the competitors’ claims, what is being done about them, and why this could affect the market. But first, we will start with a look at the competitive carriers themselves.

3.1. Competitive Carriers

One measure of the success of liberalization is the presence of carriers other than the incumbent provider in the market. Since 1992, the number of suppliers of

telecommunications service has increased six times, and by 1999 numbered around 1,700.⁶⁰

New competitors expected to invest DM 4 billion in 1999 to expand their fixed network infrastructures.⁶¹ With a growth in employment of more than 30% in 1999, they are also helping to ease the situation in the labor market.⁶²

The German telecommunications market, valued at about US \$60 billion, is the largest and among the most liberalized in Europe, representing about 25% of the market in the European Union.⁶³ Both national and foreign carriers are naturally attracted to this market, and by 1999, there were more than 400 licensees and more than 1000 non-licensed service providers active in the market.⁶⁴ We will see that there are now many alternative carriers available in Germany. We will talk about the different types of alternative carriers, and then take a more specific look at several of these companies.

3.1.1. Alternative Carriers in German Cities

Not only the long-distance market has opened up to competition, but also the local and regional market. Customers in over 60 cities and regions can now call using alternative carriers. (See Figure 3-1). These carriers are concentrated mostly in the metropolitan areas of the former West Germany, in Berlin, and in the densely populated industrial areas along the Rhein and Ruhr, but small carriers are beginning to offer service even in some rural areas. Almost half of the German cities with populations over 100,000

⁵⁹ Hans-Willi Hefekäuser. "The Changing Telecoms Regulatory Environment in Germany." Address by Mr. Hefekäuser, Senior Executive Director of Regulatory Strategy, Competition, and Pricing Policy Deutsche Telekom AG, to the International Communications Studies Program, 24 March 1999. *The Center for Strategic and International Studies (CSIS)*, [www.csis.org].

⁶⁰ *Federal Ministry of Education and Research, and the Federal Ministry of Economics and Technology*, 37.

⁶¹ *Ibid.*

⁶² *Ibid.*

⁶³ Hefekäuser.

⁶⁴ *Ibid.*

Figure 3-1: Alternatives to Deutsche Telekom in German Cities⁶⁵

| City | Alternative Carriers |
|----------------------|-----------------------------------|
| Ahlen | Ahlencom (Helinet) |
| Augsburg | Augustakom |
| Bergisch Gladbach | Netcologne |
| Berlin | Berlikomm, Arcor, Otelo, Mobilcom |
| Bieberach a.d. Riss | Tesion |
| Bielefeld | Bitel |
| Bochum | TMR |
| Bottrop | Gelsenet |
| Bremen | Ewe Tel, Nordcom |
| Bremerhaven | Nordcom |
| Cuxhaven | Ewe Tel |
| Darmstadt | Heag Medianet |
| Delmenhorst | Ewe Tel |
| Dortmund | Dokom, Mobilcom |
| Düsseldorf | Isis (Arcor) |
| Duisburg | Isis |
| Emden | Ewe Tel |
| Erlangen | Nefkom |
| Essen | CNE, Arcor, Otelo |
| Flensburg | Komtel |
| Frankfurt am Main | Arcor, Otelo, Mobilkom |
| Freiburg im Breisgau | Breisnet |
| Fürth | Nefkom, Arcor, Otelo |
| Gelsenkirchen | Gelsenet |
| Gera | Encotel |
| Gladbeck | Gelsenet |
| Hamburg | Hansenet, Arcor, Otelo, Mobilcom |
| Hameln | Teleos |
| Hamm | Hamcom (Helinet) |
| Hannover | HTP, Arcor, Otelo |
| Herford | Teleos |
| Herne | TMR |
| Husum | Komtel |

| City | Alternative Carriers |
|-------------------|------------------------------------|
| Kassel | Netcom |
| Kamen | GSWCom (Helinet) |
| Kiel | Kielnet |
| Köln (Cologne) | Netcologne, Arcor, Otelo, Mobilcom |
| Leverkusen | Telelev |
| Lünen | Lüntel (Helinet) |
| Lübbecke | Teleos |
| Meppen | Ewe Tel |
| Minden | Teleos |
| München (Munich) | M'net, Otelo, Arcor, Mobilcom |
| Münster | Citykom |
| Neumünster | Komtel |
| Neuss | Isis |
| Nürnberg | Nefkom, Arcor, Otelo, Mobilcom |
| Offenbach am Main | Arcor |
| Oldenburg | Ewe Tel |
| Osnabrück | Osnatel |
| Ravensburg | Tesion |
| Remscheid | Telebel |
| Rendsburg | Komtel |
| Schleswig | Komtel |
| Schwerte | Ruhrnet |
| Soest | Soestcom (Helinet) |
| Solingen | Telebel |
| Stuttgart | Arcor, Otelo, Mobilcom |
| Wilhelmshaven | Ewe Tel |
| Witten | TMR |
| Wolfsburg | Wobcom |
| Wunsdorf | Teleos |
| Wuppertal | Telebel |

(Source: *Capital: das Wirtschaftsmagazin*)

⁶⁵ Daniela Eckstein. "Angriff im Ortsnetz." *Capital: das Wirtschaftsmagazin*, 9-23 March 2000, Nr. 6/2000, 117.

had alternative carriers by 2000.⁶⁶ Areas in the former East Germany, however, have not been quite as lucky, and only Gera had a City Carrier by 2000.

In addition to those companies listed in Figure 3-1, Stuttgart's Tesion (a subsidiary of Swisscom), wanted to establish ISDN service in all centers of the southwest, from Mannheim to Freiburg by the end of 2000. Netcologne planned to start service in Bonn and Leverkusen in 2000. Gelsennet, an exception among the City Carriers because it operates without its own infrastructure and simply resells Telekom's service, will soon connect Recklinghausen. Hilcom wants to move into Hidesheim, and Arcor's subsidiary, Isis, has said it wants to start service in Krefeld, Mönchengladbach, Essen, and Mülheim/Ruhr. In all Arcor, with its subsidiaries, wanted to wire 100 cities by the end of 2000, while Mobilcom's goal was twenty-two.⁶⁷

3.1.2. Types of Competitive Carriers

As we can see, there are quite a few new players on the scene. The development of competition in the German telecommunications market started in 1992, with the awarding of two licenses in the new area of wireless communications, the D1-Netz license to Deutsche Telekom, and the D2-Netz license to Mannesmann Mobilfunk GmbH.

More recently, deregulation has brought in the second type of competitive carriers, the so-called Call-by-Call players, which mostly resell Telekom capacity. They invest in a few switches and a billing system and keep all other costs minimal, and can be scaled very quickly. These carriers benefit significantly from Germany's call-by-call system (hence their name), which allows customers to choose a carrier for each call by just dialing a

⁶⁶ Ibid.

⁶⁷ Ibid.

different five-digit code before the usual telephone number, with the Call-by-Call provider's charges appearing on the customer's monthly Deutsche Telekom bill. These Call-by-Call providers have brought a drastic reduction in rates with them and put pressure on the incumbent. They are however, mostly reacting to arbitrage opportunities, and once the price is wrong, many of these competitors may retire.

We talk about getting bigger pipes for the Internet, but in Germany you really might have to call the plumber. This third category of operators is called city or regional carriers. Many of these providers, surprisingly, turn out to be arms of the public utilities. They rely on already existing networks, which they have to enhance in scope and technology, mostly upgrading it with fiber optics. Around 30 of these so-called City Carriers, which as a rule are subsidiaries of the local utilities, connect private customers to their telephone network, and the Internet too. Why would the public utilities be involved in the phone business? This is not quite as surprising once we realize that these companies already operate large infrastructures and already have rights-of-way, access to customers, and are familiar with the local business and regulatory climate. In a strange twist, the public utilities have been getting into telecommunications as a way to survive the liberalization of the energy market. Also, the subsidiaries of the public utilities have an advantage in that they can use the already existing passages, such as sewer tunnels, to run lines.⁶⁸

Other providers too, are looking to facilities-based competition for future profits. Their approach is one of long-term business viability. They build their own long-distance networks, invest heavily and expect medium to long-term payback periods. Until now, their focus has been on voice long distance as the main product. Not only the City Carriers are taking this route, but also many International players moving into the German market.

In 1998, Gerhard Schmid, of the Mobilcom group, virtually ridiculed Germany's large power utilities – Veba, RWE, and Viag – for investing heavily in building telecommunications networks.⁶⁹ He had seen enormous arbitrage opportunities in simply renting lines from Deutsche Telekom at Germany's low interconnection rates and offering cut-price telephony to a mass market. Now, however, the opportunities for such profits are drying up, and German providers are finding facilities-based competition more attractive.

The telecommunications arms of these utilities are evolving into, or are being bought by, some of the most competitive players on the market. These actors are set to be more powerful competitors to Deutsche Telekom because they are facilities based. This type of competition is gaining popularity, because it allows companies to by-pass Deutsche Telekom, and the problems involved with having core aspects of a company's business owned by or dependant on a main competitor. This is especially relevant to providing services like Internet access.

3.1.3. A Closer Look at the Competitors

Early on, utility companies in Germany were set to operate telecommunication services. Some had been doing this previously, under a clause in the telecommunications law that allowed them to operate their own networks for their own use only. In 1996, RWE AG, had 2,688 miles of fiber optic cable with a transmission rate ranging from 622 Mbps to 2.6 Gbps. RWE's corporate network and its trunk private mobile radio (TPMR) were the most important parts of its telecommunications business, and it operated 8 of 12 TPMR

⁶⁸ In Berlin they are doing this with the aid of robots.

⁶⁹ Ralph Atkins and Alan Cane. "Mobilcom Plans to Add Fibre to Low-Cost Diet: the Internet is Central to Group's Growth Target." *Financial Times*, 28 April 1999.

areas in Germany.⁷⁰ Viag AG, through its power partner, Bayernwerk, had 2,500 miles of fiber optic cable and was allied with MCI. Veba owned over 1,250 miles of high-speed telephone lines through its German utility partner Preussen Elektra. Together with the privatized Deutsche Bahn (German Railways), Veba planned to develop a network of infrastructure along the nationwide rail network. Thyssen, traditionally a German steel maker, had several communication networks, and managed the cellular system E-1 with Veba.⁷¹

Arcor had operated the telecommunications system for the Deutsche Bahn. Deutsche Bahn still has a blocking share of the voting rights at Arcor (25% plus one share and an actual 18.8% stake). By not attending an Arcor board meeting last December, it put the breaks on a public listing. The other shareholders in Arcor are Vodafone, which has a 73.2% stake, and Deutsche Bank, with an 8% stake.⁷² It is important to note that these cross-holdings are quite common across all business sectors in Germany, and can have major effects on business decisions. Deutsche Bahn, for instance, had two main reasons for seeking to ensure that any change in the shareholding structure of Arcor was not rushed. One was that the trains are controlled by a telematics system, which is part of the Arcor telecommunications network, and the railway company needs to be certain that this system is safe. It is not clear whether the 5% share which would have remained in its hands under the terms of the first listing plans would have guaranteed enough influence over the network. Another reason is that Deutsche Bahn is under pressure to put its own financial house in order. Although it is still 100% owned by the German State, like many of the other German national companies, Deutsche Telekom included, Deutsche Bahn is set to be privatized.

⁷⁰ Andreas Barth. "Telecommunication Infrastructure in Germany," in *Information Technology in Germany*.

⁷¹ Ibid.

⁷² Ouida Taaffe. "Mannesmann Arcor Listing is De-Railed." *Total Telecom*, 11 December 2000.

Arcor is a valuable asset that Deutsche Bahn cannot afford to let go for a song, and the figure put on Mannesmann Arcor as a whole in March this year was €24 billion.⁷³ Arcor is also interested in acquiring city carriers that provided local loop access in key areas. One company that has long been on the market and could be of interest to Arcor is Berlikomm. The Berlin City Carrier is another example of public utilities in the communications business, as it is majority held by the city water board. Prior to the Vodafone take-over, Arcor had bought Isis in Düsseldorf, and WuCom in Würzburg.⁷⁴

Mannesmann is neither a Call-by-Call nor a City Carrier, but it is a serious player in the German telecommunications market. It was Deutsche Telekom's first competitor, starting in 1992 with the wireless market, at the time the only telecommunications market open to competition, and has since allied itself through a variety of partnerships and mergers. Mannesmann had originally built its D2 mobile phone system on leased lines and microwave relays to connect base stations to switching centers for supplying cellular services. Mannesmann's Eurokom GmbH and rival Vega's Vebacom GmbH formed a joint venture with Cable & Wireless to build a nationwide communications network. The new network included Veba's 1,250 miles of fiber optic cable and more than 18,750 miles of Mannesmann's microwave antennae networks and the corporate networks run by Veba's unit Meganet and CNI Communications Network International.⁷⁵ One of the biggest winners in a liberalized marketplace, Mannesmann Arcor with its subsidiary Otelo, which it bought from REW and Veba, planned to have 100 large cities networked by the end of 2000.⁷⁶ Otelo had promised to undercut Deutsche Telekom by 15-20% on long-distance calls. The preselect customers who have totally changed to Arcor or Otelo will increase by the end of

⁷³ Ibid.

⁷⁴ Ibid.

⁷⁵ Andreas Barth. "Telecommunication Infrastructure in Germany," in *Information Technology in Germany*.

2000 to around 2 Million.⁷⁷ In response, Deutsche Telekom has been aggressively cutting rates. What has not taken place, is the expected number of 100,000 ISDN customers. By December 2000, there were only 60,000 customers who changed entirely to Arcor. Also, not as many cities as hoped have built their own networks. Instead of the planned 100 cities, it is only realistic to expect 50-60 by the end of 2000, according to the *Frankfurter Allgemeine Zeitung*.⁷⁸

Telegent, a global leader in broadband communications, and Mannesmann Arcor AG & Co., the telecommunications subsidiary of industrial giant Mannesmann AG, announced the formation of “ArcTel”, a joint venture that will provide high speed, low cost voice, data, and Internet services to businesses throughout Germany. ArcTel intends to have broadband, fixed wireless links up and running in 44 major German markets by November. Carrying both data and voice traffic, these links will be built in major business markets near Munich, Frankfurt, Bonn, Düsseldorf, Hamburg, and more than 10 other major cities, using a total of 198 regional spectrum licenses already granted to Teligent and Mannesmann Arcor. These licenses, in the 26 GHz and 3.5 GHz bands, cover approximately 40% of German businesses.⁷⁹ ArcTel will complement Mannesmann Arcor’s strategy by offering broadband services to business customers where wireline infrastructure and unbundled access are not available or economically competitive. Chief Executive Officer, Dr. Jan B. Rittaler commented, “We consider the deployment of fixed wireless networks as our main priority in order to provide high-quality, high-bandwidth service for our customers as soon as possible.”⁸⁰

⁷⁶ Eckstein, 117.

⁷⁷ *Frankfurter Allgemeine Zeitung*. “Mannesmann Arcor: Akquisitionen auch ohne Börsengang.” 14 Dezember 2000, Nr. 291, 23.

⁷⁸ *Ibid*.

⁷⁹ *Asia Pulse*. “Telegent and Mannesmann Arcor Launch ArcTel JV in Germany.” 22 June 2000. [<http://web.lexis-nexis.com>].

⁸⁰ *Ibid*.

Another example of utilities' involvement in telecommunications is Netcologne. Kölner Stadtwerke GEW (Cologne City Works), is the majority shareholder in the Netcologne, the biggest Citynet provider in Germany. Netcologne is the most successful local telephone carrier. More than 53,000 local Cologne inhabitants have switched from Deutsche Telekom to Netcologne, and its fast ISDN connections.⁸¹ However, Netcologne may be taken over by the American cable concern, Callahan, and due to the sale, Deutsche Telekom would indirectly be part owner of the company, as Callahan had taken over 55% of the regional cable company in the German state of Nordrhein-Westfalen from Deutsche Telekom in February 2000.⁸²

There are now quite a few alternative carriers, providing customers with options when choosing a provider. In addition, many of these providers are building their own infrastructure, with the capability to carry new services such as DSL. More than anything, the new carriers have lower prices than Telekom for local calls, which has an effect on Internet usage. Many newcomers are cheaper than the old monopolist. Even people who cannot yet change their carrier benefit from the pressure on Deutsche Telekom to lower prices. However, most City Carriers cannot meet the low long-distance tariffs of Call-by-Call firms, which have lowered the long-distance charges at peak times to 8 pfennigs (about 4 cents) per minute.⁸³ However, whichever has its own local infrastructure, can offer the customers Internet access at a flat rate. An advantage for customers who spend large amounts of time online, and difficult for carriers using Deutsche Telekom infrastructure.

The ex-monopolist is well positioned for the competition in local service, and is running after the others with its prices, so that it does not lose more market share. Just 2%

⁸¹ Eckstein, 116.

⁸² *Frankfurter Allgemeine Zeitung*. "Netcologne: Übernahme durch Callahan steht bevor." 28 November 2000, Nr. 277, 26.

⁸³ Eckstein, 117.

of all local calls will be conducted over the new carriers – 98% with Telekom.⁸⁴ Not surprisingly, Telekom is fighting the requirement that it open up the last mile to competitors. Without this, unless Telekom improves its competitive edge, only the DM 24,40 monthly basic service bill will remain. Many carriers will only offer the lucrative ISDN connections. The question for the future is will these competitive carriers provide for the telecommunications needs of all consumers, or just for those of the most profitable?

3.2. Liberalization Road-bumps: Competitors' Challenges with Deutsche Telekom

Competition is still new in Germany, and all parties involved are trying to figure out what is “fair.” Deutsche Telekom, now officially a private company, is struggling to balance its profit-seeking mission, with the requirements still placed on it as the former monopoly telecommunications provider. Naturally, it would want to hold on to as many legacy advantages as possible. And naturally, the competitors are likely to cry foul when they are forced to do business with their main competitor, and these dealings are not concluded to their satisfaction. Deutsche Telekom has had to adapt to much new legislation designed to stimulate competition, many of the details of which it feels are unfair. On the other side of the coin, Deutsche Telekom’s competitors still feel that many of the former monopolist’s practices remain contrary to what the regulators have ordered.

3.2.1. Interconnection

Deutsche Telekom was surprised by regulators setting what it considered to be unexpectedly low prices for interconnection between its networks and those of its rivals, but competitors think these rates are too high. Deutsche Telekom had a DM 50 trillion

⁸⁴ Ibid.

investment program to modernize East Germany's antiquated telecommunications system, and it feels that recognition of these costs was not reflected in the interconnection tariffs, and since 1995, it has cut staff by 30,000 in order to cut costs.⁸⁵ Mannesmann and AOL Europe, however, allege that Deutsche Telekom is abusing its dominant position in Germany with the complicity of the German authorities. They claim that the price brokered by the German telecommunications regulator to use Deutsche Telekom's local lines was too high.

"DTAG [Deutsche Telekom AG] has not made available even the most basic cost and operations data that are critical for any meaningful public review or rebuttal by competitive carriers," said Carol Ann Bischoff, CompTel's Executive Vice President and General Counsel. CompTel⁸⁶ alleged that Deutsche Telekom's practices, from lease commitments to penalties for failure to reach certain traffic benchmarks, were overly rigid and unnecessary for Telekom's stated purpose of network planning and investment risk minimization. For example, Deutsche Telekom had requirements that all retail long-distance network operators who originate traffic pay DM 3 million up front for a national license. According to CompTel, this clearly violated the spirit and the letter of European law and the pro-competitive tenets of the WTO agreement.

Deutsche Telekom also proposed to base interconnection rates on the number of points of interconnection established by an interconnecting network operator, which bears no relationship to the amount of traffic that a network operator actually places on the network. CompTel stated that Telekom's contention that qualification for interconnection requires network operators to switch all international traffic in Germany before they interconnect

⁸⁵ Atkins, 3.

⁸⁶ CompTel is the principal national industry association representing competitive telecommunications carriers and their suppliers. CompTel's 335 members include large nationwide companies as well as scores of smaller regional carriers. (www.comptel.org).

with its network blatantly discriminates against transborder traffic and violates European Community law.⁸⁷ Network operators are entitled to interconnect with the incumbent under cost-based rates, unless Telekom can demonstrate that such interconnection imposes demonstrable special costs to accommodate atypical traffic or network integrity or security concerns, CompTel noted, “DTAG bears the burden of establishing these costs.”⁸⁸

3.2.2. The Local Loop

The last mile has been largely untouched by a decade of European telecommunications deregulation and liberalization, preserving one of the most important cash sources of the former monopolies. In the 1990’s there was growing recognition of the importance of telecommunications infrastructure to the overall economy. With this realization, pressure has grown to open up the local loop to competition. The Internet has only added urgency to this movement.

In the United States, the local loop market was opened up in 1996, with the passing of the Telecommunications Act. The market has grown since to be worth over \$100 billion a year, says Steve Gleave, vice president of marketing at Jetstream Communications, the developer of a technology that allows the local loop to support up to 16 voice channels plus data.⁸⁹ New loop operators pay some \$10 to \$15 per month to use the telecommunications provider’s lines. Through the use of bandwidth expanding technologies, such as DSL, they can leverage the connection to create advanced telecommunications services which they can sell on for up to \$700 a month.⁹⁰ This has allowed the creation of a substantial business in

⁸⁷ *PR Newswire*. “Comptel warns German Regulators that Deutsche Telekom’s Interconnection requirements are unsupported, anticompetitive, and discriminatory.” 22 April 1999. [www.globalarchive.ft.com].

⁸⁸ *Ibid.*

⁸⁹ Peter Purton. “Opening Up the Local Loop.” *Financial Times*, Survey – FT Telecommms, 21 June 2000, 20. [<http://web.lexis-nexis.com>].

⁹⁰ *Ibid.*

its own right, as well as the widespread provision of lower-cost / higher-performance Internet access for U.S. consumers and businesses earlier than would have been provided by the former monopolies themselves. One of the earliest countries to take initiative was Germany, which, through unbundling, has seen costs drop dramatically.

Competitors, however, claim that Deutsche Telekom had benefited from regulators setting relatively high costs for access to the local loop. They say that if it is not now possible to break the quasi-monopoly of Deutsche Telekom in the this area, then the chance is lost for many years to come, as Telekom uses its market power to “the full extent.”⁹¹ Beginning April 2001, however, Deutsche Telekom has asked the regulators to allow it to raise the price for the last mile to €17.40 per month.⁹² (about DM 34). Its competitors had hoped to pay less than the current DM 25.40 in the future.⁹³ According to Harald Stöber, chief at Arcor, this should cost no more than DM 17 – 18.⁹⁴ For comparison, in the United States, the maximum presubscribed interexchange carrier charges paid by the long distance companies were set between \$1.04 - \$2.53 per line per month (approximately DM 2.29 – DM 5.58) for primary residential lines and single-line business lines, in 1999.⁹⁵ The FCC plans to eliminate these charges altogether in the future.

Urged by heads of state, the European Parliament in October, passed a local-loop unbundling regulation in record time. This order, now adopted, went into effect January 1, 2000. Now, a new entrant would have the power to sue an incumbent who does not comply with the national regulator’s guidelines for unbundling. The regulation does not mandate unbundling by 2000, but regulators must have a framework in place, and incumbents must

⁹¹ *Frankfurter Allgemeine Zeitung*. “Pfründe im Ortsnetz.” 29 Dezember 2000, Nr. 302, 24.

⁹² *Ibid.*

⁹³ *Frankfurter Allgemeine Zeitung*. “17,40 Euro für Telefonanschlu■.” 28 Dezember 2000, Nr. 301, 15.

⁹⁴ *Frankfurter Allgemeine Zeitung*. “Mannesmann Arcor: Akquisitionen auch ohne Börsengang.”

⁹⁵ *Federal Communications Commission*. “Factsheet: Presubscribed Interexchange Carrier Charge.” [http://www.fcc.gov/Bureaus/Common_Carrier/Factsheets/picc.html], visited 11 April 2000.

publish their offers for unbundling and colocation starting at the beginning of 2001. New entrants had been reluctant to use the new order, even though it gives operators the right to sue incumbents directly, for the first time. However, Colt Telecommunications Group, which is building metropolitan business networks throughout Europe, stepped up to the plate to be the first to file a legal complaint on unbundling against Deutsche Telekom with the RegTP, the national regulatory authority in Bonn. Colt Telecom has asked for penalties to be imposed on Deutsche Telekom every time it delays colocation and unbundling requests. “Telekom has not been keeping its promises to us but because there has not been a penalty Telekom has been able to get away doing things as it pleases,” said Horst Enzelmuller, managing director of Colt Telecom GmbH in Frankfurt. Enzelmuller said that Telekom has “been playing silly games and offering lame excuses” for delays and not meeting agreed to deadlines. “They’ll tell us that it’s seven weeks [un]til the multiplexer can be installed and then a week before they tell us it’s not possible,” he said.⁹⁶

3.2.3. Colocation

Colt Telekom GmbH, has complained to the regulators because Telekom has not followed the time requirements for colocation. They had a grace period of 16 weeks for new colocation, and 7 weeks for the conversion of existing equipment. Colt claims that by delaying colocation, Telekom is abusing its position, while at the same time its own bargain DSL offer is already on the market. Deutsche Telekom still has a 97% share in the local

⁹⁶ Michelle Donegan and Peggy Salz-Trautman. “German, UK operator in bid to force DSL unbundling progress.” *Communications Week International*, 13 November 2000.

network market.⁹⁷ Many other companies complain of similar difficulties with Deutsche Telekom, like Colt has.

The further away a DSL access multiplexer (DSLAM) is from a customer, the less bandwidth can be delivered. Willem Verbiest, Antwerp-based vice president, DSL, at Alcatel, describes distant location as a double-edged sword, “If you put remote cabinets in the field, you reduce the loop length, which reduces capacity. But it avoids discussions with telcos about space.”⁹⁸ “Philosophically, it works beautifully,” says Rupert Baines, European product manager at First Telecom GmbH, based in Frankfurt. “But you have to find a space near the central office because every meter reduces coverage by that much.”⁹⁹ That is why the colocation / distance location trade-off can be so important.

In Germany, distant location is only available when Deutsche Telekom runs out of room in an exchange. Then, Deutsche Telekom is obligated to build a box outside its exchange. “The outdoor cabinets are difficult to implement, but they work,” says Stefan Weyhenmeyer, director of national regulatory affairs at QS Communications AG, based in Cologne, Germany¹⁰⁰ To create colocation space, Deutsche Telekom has redesigned the insides of many exchanges, which can be as big as three-story buildings. QS even has DSL equipment located in a former bathroom, according to Weyhenmeyer.

According to the conditions set out by the RegTP in June 2000, Telekom must provision colocation space in its local exchanges within 10 weeks, if space is available. Before this ruling, the provisioning process could take 16 weeks or more.¹⁰¹ The RegTP is already investigating similar complaints from other operators, but the case with Colt is the

⁹⁷ *Frankfurter Allgemeine Zeitung*. “Regulierer eröffnet neues Mißbrauchsverfahren gegen die Telekom.” 21 November 2000, Nr. 271, 17.

⁹⁸ Donegan, Michelle. “Virtual Colocation – Is going the distance worth the exchange?” *Communications Week International*, 13 November 2000. [www.totaltele.com].

⁹⁹ *Ibid.*

¹⁰⁰ *Ibid.*

first to ask the RegTP to look over Telekom's shoulder and exact penalties if Telekom fails to comply.

Acor, however, says that these are delay tactics from Deutsche Telekom. It says, for example, that in Wiesbaden, Arcor had filed all the necessary papers with Telekom for interconnecting its own local network with the Telekom network. Although Arcor has, in the mean time, gotten all the equipment on its side in place, the connection to Telekom's leased lines is still missing.¹⁰² To prevent such practices from Deutsche Telekom, the regulator will have to be active. Until now Deutsche Telekom has gotten a one-time change fee of about DM 200. According to Mr. Stöber, this is way over costs, which he estimates at no more than DM 50 per connection.¹⁰³

Telekom, however, dismisses the charges, arguing that with a 600% increase in orders for colocation space in the local exchanges, "It's a tall order to fill and it takes time and capacity to respond to this tremendous demand," said a Telekom spokesperson.¹⁰⁴

3.2.4. Incumbent's Delaying Tactics Shortsighted

European incumbents' reluctance to unbundle damages broadband access market opportunities, both for themselves, and for their new competitors. A report from Analysys Limited, of Cambridge, England, casts doubts on the effectiveness of incumbents' delaying tactics. It says that by hindering unbundling and colocation processes, incumbents are diminishing competitive carriers' incentives to invest in digital subscriber line (DSL) technology, and is driving them to consider other access technologies. The report concludes

¹⁰¹ Michelle Donegan and Peggy Salz-Trautman.

¹⁰² *Frankfurter Allgemeine Zeitung*. "Mannesmann Arcor: Akquisitionen auch ohne Börsengang."

¹⁰³ *Ibid.*

that while this may appear at first to be an attractive outcome for the incumbents, foreshortening the opportunities for new DSL will be a net loss for all involved. “incumbent operators need to adopt a different attitude,” said Abe Ajibulu, senior consultant at Analysys, and joint author of the report, *Delivering DSL in Europe*. “Their strategy is to slow down [unbundling] as much as possible without drawing too much regulatory attention. This is an incumbent’s natural instinct, but it hurts the whole market.”¹⁰⁵ “[DSL carriers] are scaling back their DSL deployments,” he said. “They are used to much speedier responses and processes.” But even with all of these regulatory and colocation challenges, DSL, along with cable will be the primary Internet access methods for small and medium-sized enterprises (SMEs) in 2005, Analysys predicts.¹⁰⁶

In the mean time, colocation complexities are causing carriers to rethink their access options. There is a renewed interest in locating DSL equipment outside of local exchanges, such as in street cabinets, and competitors are also examining alternative access technologies, such as fixed wireless, cable modems, and even fiber to the customer’s premises. From the incumbents’ point of view, the net effect is a loss of potential wholesale DSL revenues. If incumbents persist in making colocation so difficult for competitors, then they open the path for a wholesale service provider to take business away from them. “The more difficult the process is, the more room there is for a wholesaler to come in and master the process,” said Ajibulu.¹⁰⁷ It is vital for incumbents to view unbundling as a partner opportunity rather than as a regulatory imposition.

Although the market for telecommunications is officially open, alternative carriers still complain about practices of Deutsche Telekom which they say are hurting competition.

¹⁰⁴ Michelle Donegan and Peggy Salz-Trautman.

¹⁰⁵ Ibid.

¹⁰⁶ Ibid.

Whether these are anti-competitive or just a giant bureaucracy trying to cope with change is hard to say. In a way, both sides are right. Deutsche Telekom is undergoing enormous structural and market changes, and is expected to react quickly to competitors orders. On the other hand, competitors are benefiting from open access to the network, without much thought to managing these resources. Deutsche Telekom does have a point that it is somewhat unfair to expect it to worry about all the management while allowing the others to reap the profits. Despite these snags, the market still seems to be an open one. “Quick” deregulation has brought in fierce competition, fast. And the competitive pressure is working on Deutsche Telekom, and bringing choices to customers. However, the foot-dragging on the part of Deutsche Telekom may backfire even more in the long-run, as it has provided even more incentive for competitors to invest in their own networks, and, as these things usually go, they skim the cream of the customers off the top, leaving Deutsche Telekom with the less profitable ones.

¹⁰⁷ Ibid.

4. TELECOMMUNICATIONS COSTS & INFORMATION TECHNOLOGY

We started with the question of what was behind liberalization in Germany – what was the impetus behind reforms. We found that the desire to capture the economic advantages of the Internet is partially responsible. There are still some challenges to making the German market perfectly competitive, but the age of monopoly is past. Liberalization is a trend taking place not just in Germany, but throughout Europe and the world. It brings more efficient markets and improvements for consumers. Competition *has* been successful in bringing lower prices, increased selection, and new services to Germany. It is not hard to see that this is being driven by competition, and the fear that as the stakes become global, every little bit counts.

From the standpoint of price, the reforms have been successful. From January 2000 to January 2001, prices have dropped across the board. Without competition, this simply would not have happened. The decreases in telecommunications costs have been significant enough that the German Reserve Bank (*Bundesbank*) calculates that the price index for living costs for private households from 1995 through 2000 would have been 0.5 % higher, had these changes not taken place.¹⁰⁸ Most striking were the decreases in costs for Internet access. What effects will this price drop have in the future? People will use telecommunication services more, and those who previously did not use some services (such as Internet access) will now find it more attractive to do so.

¹⁰⁸ *Frankfurter Allgemeine Zeitung*. “Ferngespräche kosten nur noch ein Zehntel von 1997.” 20 Dezember 2000, Nr. 296, 18.

Figure 4-1: Change in Price for Telecommunications Services¹⁰⁹

Change in Price for Telecommunications Services

| Service | 1998-1999 | 2000-2001 | 1998-2001 |
|-----------------------|-----------|-----------|-----------|
| Fixed Network | -10.9% | -4.2% | -- |
| Local Calls | +7.4% | -0.7% | -- |
| Long Distance | -41.2% | -8.2% | -47.3 |
| International | -15.5% | -36.5% | -56.1 |
| Mobil | -20.5% | -14.7% | -- |
| Internet | -- | -32.5% | -- |
| Intenet (heavy usage) | -- | -42.3% | -- |
| Overall | -11.4% | -10.2% | -- |

(source: Statistisches Bundesamt / Tagesspiegel)

The price index for telecommunications overall showed a 10.2% decrease in price from January 2000 to January 2001, with all segments also showing price decreases. Most significant was the change in prices over the previous year for Internet access. Rates fell 32.5% for those with the same sort of connection as the previous year. Heavy users benefited the most, largely due to the introduction of flat rate plans, with total costs falling 42.3% over the previous year.¹¹⁰

By mid-2000, long distance calls within Germany (local long distance) cost 90% less than in 1997, the last year before liberalization of voice communications. Part of the reason was that the Postal Service and local calls had been subsidized by long distance calls. The

¹⁰⁹ Statistisches Bundesamt: "Verbraucherpreise für Telefondienstleistungen 1999," 5 Januar 2000, [www.statistik-bund.de/presse/deutsch/pm2000/p0030051.html]; "Verbraucherpreis für Telekommunikationsdienstleistungen im Januar 2001," 1 Februar 2001, [www.statistik-bund.de/presse/deutsch/pm2001/p0410051.html]; and *Tagesspiegel*. "Telefonpreise sind weiter auf Talfahrt." 1 September 1999, Nr. 16 800.

¹¹⁰ Statistisches Bundesamt. "Verbraucherpreis für Telekommunikationsdienstleistungen im Januar 2001." 1 Februar 2001. [www.statistik-bund.de/presse/deutsch/pm2001/p0410051.html].

removal of these subsidies caused a readjustment, and local calls became 7.4% more expensive between 1998 and 1999.¹¹¹ Compared to 1995, they had increased by almost one-fourth by the middle of 2000.¹¹² However, since then, even these charges have started dropping, as we can see with a modest decline of 0.7% in January 2001, compared to the same month of the previous year.¹¹³ The decline in international rates was accompanied by a 50% reduction in Deutsche Telekom's share of business in this market.¹¹⁴

Figure 4-2, is a comparison of rates compiled by the German business magazine *Capital*. The table compares analog and ISDN connections, and the monthly telephone costs of the customer for different providers. The study used two sample families, one couple, both working; and a family with parents and one schoolchild. The couple makes 120 calls. Twenty percent of the calls are local and local long-distance, 50% long-distance, 10% with the mobile phone. Eighty percent of the couple's calls are during evenings, nights, or weekends. The family makes 200 calls, 60% of which are local, local long-distance, and long-distance, and 20% mobile calls. (The author of this paper assumes that the remaining 20% was for Internet usage, although the study did not make this clear). The average call lasts 3.5 minutes. The family makes 70% of its local and local long-distance calls during the expensive peak hours. The table shows the cheapest charge for each provider, with Deutsche Telekom in three cases with "Aktiv Plus." The basic charges are included in the model's prices. The sample bills show average usage, not that for people who spend a lot of time online, and who profit more from the cheaper local charges of the new carriers. It is clear that from a price standpoint, it is worthwhile to use alternative carriers.¹¹⁵

¹¹¹ *Tagesspiegel*. "Telefonpreise sind weiter auf Talfahrt." 1 September 1999, Nr. 16 800, 21.

¹¹² *Frankfurter Allgemeine Zeitung*. "Ferngespräche kosten nur noch ein Zehntel von 1997."

¹¹³ *Statistisches Bundesamt*. "Verbraucherpreis für Telekommunikationsdienstleistungen im Januar 2001."

¹¹⁴ *Frankfurter Allgemeine Zeitung*. "Die Regulierung der Deutschen Telekom lockern." 28 November 2000, Nr. 277, 20.

¹¹⁵ Eckstein, 118.

¹¹⁶ Eckstein, 118.

Figure: 4-2: Telecommunications Rates Comparison ¹¹⁶

Telecommunications Rates Comparison

| PROVIDER | | BASIC RATE | | COUPLE | | FAMILY | |
|------------------|------------------|------------|-----------|--------|------------|--------|--------|
| Name | Website | Analog | ISDN | Analog | ISDN | Analog | ISDN |
| Deutsche Telekom | dtag.de | 34.71 | 56.30 (1) | 82.05 | 101.78 (1) | 128.40 | 149.99 |
| Arcor | arcor.net | -- | 39.90 | -- | 88.33 | -- | 139.66 |
| Augustakom | augustakom.de | -- | 44.00 | -- | 99.66 | -- | 148.06 |
| Berlikomm | berlikomm.net | 49.95 | 59.95 | 112.39 | 122.39 | 148.43 | 158.43 |
| Breisnet (2) | breisnet.de | -- | 45.80 | -- | 96.97 | -- | 136.83 |
| Bitel | bitel.de | 24.00 | 38.00 | 82.04 | 96.04 | 134.15 | 148.15 |
| Citykom | citykom.de | 24.40 | 45.00 | 83.20 | 103.80 | 132.97 | 153.57 |
| CNE | cne.de | -- | 39.00 | -- | 90.30 | -- | 138.42 |
| Dokom | dokom.de | 23.71 | 29.00 | 84.11 | 89.40 | 140.90 | 146.19 |
| Encotel | encotel.de | 24.00 | 38.00 | 71.45 | 85.44 | 118.92 | 132.92 |
| Ewe Tel | ewetel.net | 24.00 | 45.00 | 79.12 | 100.12 | 120.98 | 141.98 |
| Gelsen-Net | gelsen-net.de | 24.82 | 44.39 | 88.09 | 107.66 | 144.61 | 164.18 |
| Helinet | helinet.de | 23.60 | 39.00 | 79.70 | 95.10 | 130.60 | 146.00 |
| Hansenet | hansenet.com | 39.90 | 39.90 | 82.52 | 82.52 | 117.91 | 117.91 |
| Heag Medianet | heag-medianet.de | -- | 40.00 | -- | 96.87 | -- | 144.10 |
| HTP | htp-tel.de | 29.00 | 39.00 | 80.63 | 90.63 | 127.30 | 137.30 |
| Isis | isis.de | 29.90 | 44.90 | 86.85 | 101.85 | 131.84 | 146.84 |
| Kielnet | kielnet.de | 19.00 | 38.00 | 114.98 | 133.98 | 159.31 | 178.31 |
| Komtel | komtel.de | 25.00 | 30.00 | 82.34 | 87.34 | 119.34 | 124.34 |
| M'net | m-net.de | -- | 99.00 | -- | 162.28 | -- | 208.54 |
| Mobilcom | mobilcom.de | 29.00 | 39.00 | 87.62 | 97.62 | 123.14 | 133.14 |
| Nefkom | nefkom.de | 29.00 | 43.50 | 80.13 | 94.63 | 123.67 | 138.17 |
| Netcologne | netcologne.de | 29.00 | 45.00 | 81.66 | 97.66 | 124.51 | 140.51 |
| Netcom | netcom-kassel.de | 25.95 | 29.95 | 78.87 | 82.87 | 130.78 | 134.78 |
| Nordcom | nordcom.net | 24.00 | 40.00 | 70.38 | 86.38 | 102.80 | 118.80 |
| Osnatel | osnatel.de | 29.90 | 39.90 | 86.14 | 96.14 | 141.90 | 151.90 |
| Otelo | otelo.de | -- | 39.90 | -- | 96.73 | -- | 152.43 |
| Ruhrnet | ruhrnet.net | -- | 39.90 | -- | 81.50 | -- | 115.91 |
| Telebel | telebel.de | 22.00 | 36.00 | 83.88 | 93.88 | 134.04 | 141.87 |
| Telelev | telelev.de | 26.00 | 40.00 | 75.16 | 89.15 | 117.39 | 131.39 |
| Teleos | teleos.de | -- | 40.00 | -- | 92.41 | -- | 139.45 |
| Tesion | tesion.de | -- | 49.90 | -- | 93.45 | -- | 130.70 |
| TMR | tmr-online.de | -- | 39.90 | -- | 81.87 | -- | 116.12 |
| Wobcom | wobcom.de | 28.50 | 44.50 | 83.40 | 99.4 | 132.18 | 148.18 |

Prices in German Marks as of February 29, 2000. (1) Couple without Aktiv Plus, base rate 46.40. (2) Starting April 1, 2000.

(Source: Capital / Teletarif.de)

As prices have dropped, usage of information technology has increased. Due to high sunk-costs, the decrease in prices is likely due to the introduction of competition, not the increasing numbers of customers, as once a network is in place, the marginal cost of servicing an additional customer negligible. As we can see in Figure 4-3, although the eastern Länder still lag behind those of the West, each year has shown an increase in the use of information technology in Germany.

Figure 4-3: Information Technology in Private Households¹¹⁷

| Information Technology in Private Households | | | |
|---|-------------|--------------|--------------|
| | 1998 | 1999 | 2000 |
| Modem | 8.6% | 11.3% | 14.0% |
| Western Laender | 9.4% | 12.2% | 14.9% |
| Eastern Laender | 5.3% | 7.8% | 10.6% |
| Internet or Online Service | 7.2% | 10.7% | 16.4% |
| Western Laender | 7.9% | 11.4% | 17.4% |
| Eastern Laender | 4.4% | 7.7% | 12.2% |
| ISDN Connection | 4.2% | 5.2% | 7.7% |
| Western Laender | 4.7% | 5.6% | 8.7% |
| Eastern Laender | 2.3% | 3.4% | 3.8% |

Percentages represent total private households as of January 1 of each year.

(Source: Statistisches Bundesamt Deutschland)

The big winners, have been the customers, who have benefited from lower prices, and increased service offerings. Whether this will last, however, is being tested in many

¹¹⁷ *Statistisches Bundesamt Deutschland*: “Ausstattung privater Haushalte mit Informationstechnik – Deutschland,” [www.statistik-bund.de/basis/d/evs/budtab2.htm]; and “Ausstattung privater Haushalte mit Informationstechnik – Früheres Bundesgebiet,” [www.statistik-bund.de/basis/d/evs/budtab21.htm]; and “Ausstattung privater Haushalte mit Informationstechnik – Neue Länder und Berlin-Ost,” [www.statistik-bund.de/basis/d/evs/budtab22.htm], visited 9 April 2001.

national telecommunications markets. In this initial rush, business and residential customers are benefiting, but as regulatory control diminishes, we may find that the most profitable customers get served like kings, and the rest receive the beggars share.

One theme seems constant however, voice is not where the future is. The Internet is what everyone is excited about, and at the foundation of the Internet are those cables and switches which send the data on its way. Germany has just discovered the Internet, is sure it is going to be big, and is counting on, if they play their cards right, it to bring prosperity and power to Germany. The struggle now, is to get that hand which will allow the companies to win in this crucial game. Because, Germany is seen as the key to unlock Europe, it is an important market. Not to mention, that Germany is determined not to fade into a country of second-rate technology, and is still busy building a bright and rosy future for the new Germany.

5. BROADBAND INTERNET ACCESS

Many believe that there is a pot of economic gold at the end of the Internet rainbow. Businesses and governments alike, see it as a source of huge potential economic benefits for society, and for this reason, are keen to do anything possible that will help this medium reach its full potential. In Germany, however, critics are constantly proclaiming that in comparison with other nations, Germany is not preparing itself to reap the benefits of this medium as quickly or as well as it should. In particular, the deployment of more advanced Internet access technologies, such as DSL, has been rather slow. Also, the pricing practices for Internet related services have come under fire. There have even been claims that Germany's communications infrastructure cannot handle widespread Internet use. In looking for causes of this state of affairs, we will look at technology options for Internet access in Germany, including ISDN, DSL, and cable access. Part of the answer may lie in the vestiges of the national telecom monopoly, and we will examine Deutsche Telekom's practices as well as seeing that the introduction of competition is pushing the deployment of new services.

5.1. Faster Access Important

If Germany is to move to an Information Society, the applications which from the base of this will require more bandwidth, and the ability to stay connected for longer periods of time, more often. An IDC/LINK 1997 U.S. Home Media Consumer Survey, users who quit their subscriptions to ISPs, 10% of respondents cancelled because of the Internet's slow

response time.¹¹⁸ When a website takes 8 seconds to download, 20% of the visitors give up; 20 seconds to download, 40% give up; and at 40 seconds 75% give up.¹¹⁹ This demonstrates that faster broadband access could really impact web use. Around 85% of the private Internet users in Germany log on at least 56 Kilobits per second, 43% have ISDN access, and over 16.6% have higher access speeds – with 14.1% using an always-on connection, and 2.5% with an ADSL or cable modem.¹²⁰

The Yankee Group estimates that 83% of European companies operate on sub-10 megabit networks, while in the United States, 80% are using high-capacity gigabit networks.¹²¹ Mike Mahoney, chief executive officer at Viatel, says, “I keep hearing that there is too much bandwidth in Europe. But there are 14 high-capacity networks operating in the U.S. and only four or five in Europe – and it is a much bigger market.”¹²²

Applications such as streaming video and multimedia content will soon use up the bandwidth, if priced properly.

Government and industry both think that high-speed access in both residential and business settings are vital to Germany’s inclusion in the global Internet economy. DSL is one of the major technologies which can help bring this about.

¹¹⁸ *European Commission – DGIII*. [<http://europa.eu.int/comm/dg03/publicat/iscoop/usa/year97/year97.htm>], 14.

¹¹⁹ *Kommerzielle Kommunikationen*. “Web-Werbung in der EU.” Dezember 1998. 7.

¹²⁰ *Net-Business*. “Die Internetzugänge werden immer schneller.” 29 Mai 2000, 10.

¹²¹ Philip Manchester. “New optical network links 53 cities across Europe.” *Financial Times*, 15 November 2000, Survey, 9.

¹²² *Ibid.*

Figure 5-1: Households with Broadband Connections¹²³

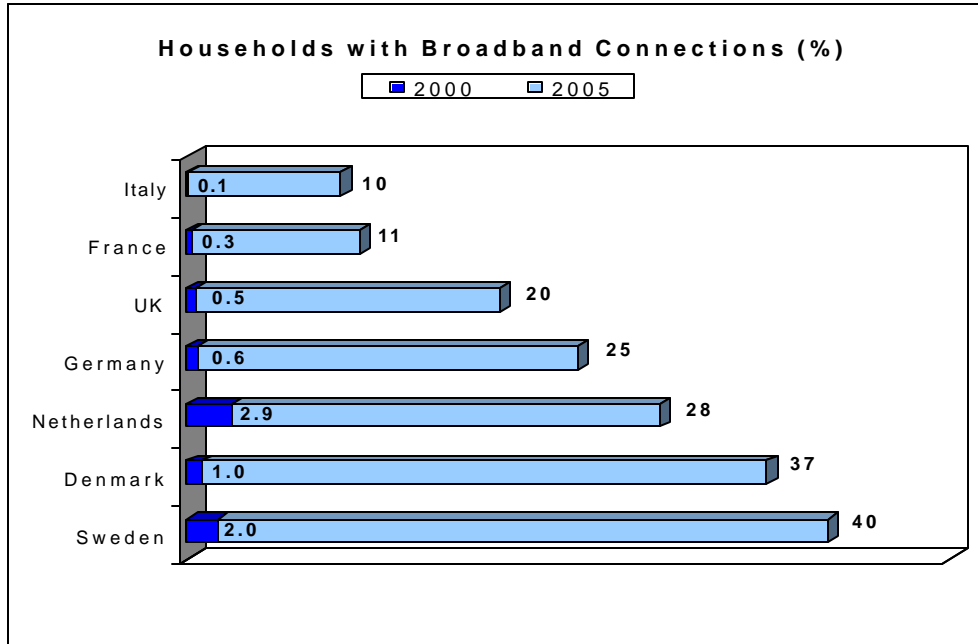
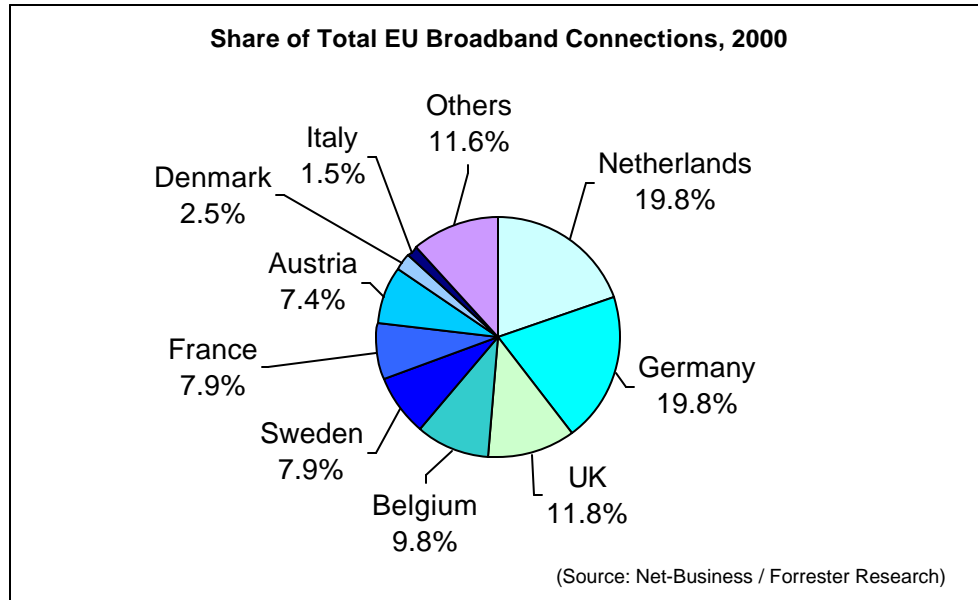


Figure 5-2: Share of Total EU Broadband Connections¹²⁴



¹²³ Net-Business. "Wartende Kunden im Web: High-Speed im Internet." 21 August 2000, 50. Citing Forrester Research.

¹²⁴ Ibid.

5.2. Competing Technologies: ISDN, DSL, and Cable

The development of DSL (Digital Subscriber Line) in Germany is behind what one would think it would be. This is in part due to the large and early build-out of ISDN (Integrated Services Digital Network) services by Deutsche Telekom, and its subsequent attempt to maximize return from this network service. Competition in the telecommunications market is also relatively new, and competitors are just beginning to develop their own services, a fact which is proving to put pressure on the incumbent carrier. We will look at plans of several of these carriers, and also see that cable will not prove much of a threat to new DSL services. Germany is taking steps to become the top country in Europe for DSL services, just as it became a hot spot for ISDN services in the Nineties.

5.2.1. ISDN

Germany represents one of the largest infrastructures of ISDN, as it was widely deployed by Deutsche Telekom early on. Basic ISDN access lines numbered 281,000 in 1993, rose to 509,000 by 1994,¹²⁵ and in September 2000, numbered three million.¹²⁶ ISDN is a system to create digital connectivity over the local loop copper wire pair to deliver digital data and voice communications. ISDN capacity is equal in each direction. In the United States, a 23B+D configuration is used for the primary rate interface, the B voice and data channels operating at 64 kbps and one D signaling channel also at 64 kbps. Twenty-four 64-kbps digital circuits multiplexed together makes a standard DS-1 or T1 digital signal, at 1.544 Mbps. In Europe, however, the configuration is 30 B (64-kbps) channels and one 64-kbps D channel as the primary rate operating at 2.048 Mbps.

¹²⁵ Kubicek, 5.

¹²⁶ *Frankfurter Allgemeine Zeitung*. "Telekom zieht positive Jahresbilanz und klagt über die Regulierung." 20 Dezember 2000, Nr. 296, 22.

5.2.2. DSL

The first DSL varieties appeared in the Eighties. However, questions about this technology's economic viability, and problems relating to range and disturbance thwarted its development. The current DSL-generation, however, offers rate-adaptive systems, which can cut the data quantity to achieve higher ranges by using several channels simultaneously running over conventional twisted-pair copper telephone wires. These services are primarily targeted at small and medium-sized companies, as well as companies employing teleworkers, and drastically reduce access time to corporate networks or the Internet. The high bandwidths at which DSL operates are particularly suitable for transmitting high-quality audio and video files.

ADSL (Asymmetric Digital Subscriber Line), is a variety of DSL which can accommodate 1.5 Mbps to 6 Mbps from the central office to the subscriber and from 16 kbps to 640 kbps from the subscriber back to the central office. Analog voice and digital data are multiplexed together on a single pair of copper wires in the local loop. ADSL does not touch the voice band, unlike a modem that modulates data using the voice band. Therefore, with ADSL, data and voice can be used at the same time. SDSL (Symmetric Digital Subscriber Line), a second DSL variety, has the advantage over ADSL that it offers the same rate for both upstream and downstream data traffic.

With these technologies, the time taken to stream 2 MB can be reduced from 4.5 minutes with ISDN down to 8 seconds.¹²⁷ For example: The transmission of a high resolution 16-bit graphic of 13 MB, which takes 28 minutes with ISDN (64-kbps), can be completed in just 48 seconds using a 2.3 Mbps DSL connection. An X-ray image of 64 MB

¹²⁷ QS Communications AG. "WorldCom offers high-speed SDSL - contract with QSC opens door to broad range of customer services on DSL market." 11 December 2000. [www.qsc.de/english/index.htm].

can be transferred within 4 minutes. Using ISDN, the same procedure would take 2 hours.¹²⁸

5.2.3. Cable: Not a Threat

Cable modems for broadband access will outnumber ADSL lines in the residential market for at least two more years, according to a report from the Yankee Group Europe.¹²⁹ At the end of 1999, there were approximately 300,000 cable modems installed in Europe, outnumbering ADSL by ten to one.¹³⁰ In 1996, Deutsche Telekom claimed to own and run the largest cable TV network in the world. This network was a one-way distribution network completely built of coax cable. Cable TV rights fell under the telecom monopoly, and Deutsche Telekom only gave local licenses for building or marketing subnets in certain housing areas.

Deutsche Telekom's monopoly has ended, though, and now United Pan-Europe Communications (UPC) Germany is buying up other cable operators. The company is still skeptical, however, about investing in and upgrading Telekom's outdated cable infrastructure. Although Germany has extensive cable networks, which could also offer always-on Internet connection at high speeds, these systems would need a massive overhaul before they could compete with DSL. "Upgrading the coax cable infrastructure to 862 MHz transmission required for two-way service would require an investment of up to DM 5 billion, and would take between 12-18 months. Which gives fast-moving DSL operators a chance to capture the market well before the CATV companies can hope to launch comparable services," said Joerg von Wienskowski, managing consultant with Eutelis

¹²⁸ QS Communications AG. [www.qsc.de/english/index.htm].

¹²⁹ *Telecom Markets*. "DSL to Overtake Cable Modems for Local Broadband Access." 2 June 2000. [http://web.lexis-nexis.com].

¹³⁰ *Ibid.*

Consult in Germany.¹³¹ The potential of cable modems is also limited by the penetration of cable networks, which average 45% in Europe.¹³²

5.3. DSL Development

One thing to consider in what is the apparently slow deployment of DSL technology in Germany, is the providers' motive for doing so. Up until now, competitors have been preoccupied with the quick and easy profits that could be made in the long-distance market. With this revenue stream becoming more mature, they are now looking to new services to expand their business. According to Sven-Erik Heun, a telecommunications expert with the law firm Clifford Chance in Frankfurt, Germany's focus on the long-distance voice market is partially responsible for the slow development of DSL there. "Initially, everyone jumped into long-distance because they saw a chance for quick profits. Now, as markets mature, operators are under pressure to control prices. With long-distance revenue shrinking in the face of intense competition, they need to develop new products. For telecoms businesses, the result has been a new rule for success in Germany: own your own infrastructure."¹³³

5.3.1. Deutsche Telekom's Switch from ISDN to DSL

The incumbent telecommunications operator, Deutsche Telekom started its ADSL service at the end of June 2000, but it is in danger of being overtaken by these alternative carriers moving into the market. Up until recently, Deutsche Telekom has been concentrating on ISDN, for two reasons: First, with scarce competition, there was little reason to focus on a new technology; second, it was trying to maximize its revenue stream

¹³¹ Vanessa Mock. "Germany Gears Up for Competitive DSL Service." *Telecom Markets*, 30 June 2000. [<http://web.lexis-nexis.com>].

¹³² *Telecom Markets*. "DSL to Overtake Cable Modems for Local Broadband Access."

¹³³ Mock.

from ISDN. Amit Kazzaz, vice president for marketing and sales for Orckit Communications Ltd., the Israel-based manufacturer of ADSL equipment for Deutsche Telekom, explains that Germany has by far the highest ISDN coverage within Europe, and estimates the coverage as over 40%.¹³⁴

Another reason for the delay from Deutsche Telekom, may be the technical challenges of reconciling its existing ISDN infrastructure with ADSL. The company has been trying to roll out DSL on existing ISDN lines, which has presented some technical challenges. “In order not to jeopardize revenue from ISDN services, a new application had to be devised for Deutsche Telekom whereby ADSL runs over ISDN lines,” said Kazzaz.¹³⁵ This involves using a splitter, which divides voice from data services for ADSL using an ISDN line.

Deutsche Telekom has been deploying its own brand of ADSL, T-DSL. Gerd Tenzer, a member of Deutsche Telekom’s Board of Management responsible for networks, said that in 2000, “we will have set up the new technology [T-DSL] in a total of 220 local networks, covering some 17 million households in Germany.”¹³⁶ Ron Sommer, chairman of Deutsche Telekom, figures that by the end of 2000, the company will have around 600,000 DSL connections to customers.¹³⁷

However, just because the lines are there, does not mean that the customers are. Deutsche Telekom was aiming to have 100,000 ADSL subscribers by mid-2000, but by its own estimates, a maximum of 50,000 customers had subscribed, while competitors estimate 20,000.¹³⁸ “Numbers are undoubtedly well below what they wanted,” said Mr. von

¹³⁴ Ibid.

¹³⁵ Ibid.

¹³⁶ Edward Harroff. “Deutsche Telekom expands optical infrastructure.” *Lightwave*, May 2000, Vol. 17, No. 6, 31.

¹³⁷ *Frankfurter Allgemeine Zeitung*. “Telekom zieht positive Jahresbilanz und klagt über die Regulierung.”

¹³⁸ Mock.

Wienskowski, who adds that downward pressure on pricing prompted by a more competitive DSL market could eventually help boost subscriber numbers for the incumbent.¹³⁹

Figure 5-3: Deutsche Telekom's T-DSL Offers¹⁴⁰

Deutsche Telekom's T-DSL Offers:

| Required Telephone Connection | Monthly Base Rate | Additional Monthly Price for T-DSL | Total | Remarks |
|-------------------------------|-------------------|------------------------------------|-------|---|
| T-ISDN Standard | 44.89 | 14.89 | 59.78 | Signed-up before December 31, 2000 From January 1, 2001 |
| | 44.89 | 19.90 | 64.79 | |
| T-ISDN 300 | 54.88 | 9.90 | 64.78 | Only with a 12-month contract, otherwise the price is the same as by T-ISDN Standard. |
| T-ISDN xxl | 59.90 | 9.89 | 69.79 | Only with a 12-month contract, otherwise the price is the same as by T-ISDN Standard. |
| T-Net Analog | 24.82 | 29.89 | 54.71 | Signed-up before December 31, 2000 From January 1, 2001 |
| | 24.82 | 39.89 | 64.71 | |

One-time hook-up fee for DSL regardless of telephone connection type: DM 100.86
T-DSL installation by a Telekom technician (optional): DM 100.86
(Source: Frankfurter Allgemeine Zeitung/Nettraffic ISP Watch)

Figure 5-4: Internet Service Providers Available over T-DSL¹⁴¹

| Internet Service Providers available over T-DSL: | | |
|---|--|------------------------|
| Provider | Monthly Charge and Usage Limitations | Min. Contract |
| 1 & 1 Internet | DM 29, includes 1 GByte of data volume, thereafter, 9 pfennig each MByte. | 3 months |
| SurfEU | DM 19.90 for 500 MBytes, then 5 pfennig per MByte | 12 months |
| T-Online | all T-Online rates available, special DSL-flatrate offer for DM 49 per month | 12 months for Flatrate |

(Source: Frankfurter Allgemeine Zeitung/Nettraffic ISP-Watch)

¹³⁹ Mock.

¹⁴⁰ Frankfurter Allgemeine Zeitung. "T-DSL-Angebote der Deutschen Telekom." 18 Dezember 2000, Nr. 294, 29. Citing Nettraffic ISP Watch.

¹⁴¹ Ibid.

Deutsche Telekom only provides the DSL line. The customer must then go on to arrange a provider for Internet access. Even when you live in an area which has already been connected, however, wait times of a month are more the rule than the exception.¹⁴² The customer also has to install his own equipment. Two things are included in the T-DSL charge: the splitter for the splitting of the telephone and DSL signal, and the DSL modem. The modem is connected to the PC with a cable to a standard Ethernet Card. This costs around DM 50.¹⁴³ Regardless which ISP a person uses, Telekom charges a hook-up fee of DM 100.86. To have a Telekom technician install a network card and Internet software, it costs another DM 100.86. SurfEU, a DSL provider, thought this was too much, and offers the whole installation from another service firm for a total price of DM 169.¹⁴⁴

Until now, incumbents have been slow to embrace DSL, to avoid eroding existing revenues from other service such as ISDN. Antoin O'Lachtnain, chief technical advisor for the Irish-based Internet consultancy, Nua, points to ADSL's lack of market penetration in Europe. "Everyone is mostly doing field surveys, some more advanced than others, but they are still trying to figure out commercial and investment issues," says O'Lachtnain.¹⁴⁵ New operators' plans to provide ADSL services, however, is motivating incumbent operators in Europe to develop their own offerings more quickly. These market drives, along with regulatory advantages will boost European ADSL installation from 29,380 in 1999 to 12,772,800 in 2005.¹⁴⁶ In 2005, it is estimated there will be DSL penetrations of 8.6% in Germany, 7.8% in France, and 6.4% in the UK. The highest penetration will be in Finland,

¹⁴² *Frankfurter Allgemeine Zeitung*. "Lieferschwierigkeiten der Telekom bei DSL-Anschlüssen." 18 Dezember 2000, Nr. 294, 29.

¹⁴³ *Ibid.*

¹⁴⁴ *Ibid.*

¹⁴⁵ *Ibid.*

¹⁴⁶ *Ibid.*

at 19.2%, and the lowest in Portugal at 3.9%.¹⁴⁷ Now let us take a look at other competitors, this time not ones competing with DSL, but with Deutsche Telekom.

5.3.2. DSL Providers

The new arena for competition is data communications, not voice. The following section examines competitive carriers involved in bringing new data services to German customers.

The first facilities-based competition in the German DSL market was QS Communications AG (QSC), headquartered in Cologne. QSC is quite a young firm, launching its competitive nationwide service first in November 1999. The company deploys SDSL technology over the existing local-loop infrastructure to provide customers with broadband, always-on access at scalable speeds ranging from 144 Kbps to 2.3 Mbps. QSC holds Class 3 and Class 4 telecommunications licenses and has negotiated a national interconnection and colocation agreement with Deutsche Telekom, positioning itself to become the first nation-wide provider of SDSL service in Germany. The company is spending DM500 million (US \$2.3 million)¹⁴⁸ to develop a network that will connect 44 major cities. QSC sold more than 9,000 broadband lines during the fiscal year 2000,¹⁴⁹ and had achieved 100 percent coverage in eight cities: Augsburg, Berlin, Bremerhaven, Brunswick, Cologne, Düsseldorf, Halle, and Oberhausen.¹⁵⁰ It has the bulk of its network

¹⁴⁷ *Telecom Markets*. "DSL to Overtake Cable Modems for Local Broadband Access."

¹⁴⁸ Mock.

¹⁴⁹ QS Communications AG. "QSC boosts DSL line sales beyond market expectations." 22 January 2001. [www.qsc.de/english/index.htm].

¹⁵⁰ QS Communications AG. "QSC achieves one hundred percent broadband coverage in eight major German cities." 4 December 2000. [www.qsc.de/english/index.htm].

built, and has equipped more than 800 central offices with DSL technology, enabling the company's network to cover 20 million potential local access users.¹⁵¹

“We observed strong development of this technology in the U.S. market, and realized that this could easily translate to Germany, which until now has been relatively slow to embrace Internet connectivity,” said QSC spokesperson, Suzan Fiederer.¹⁵² The company markets its offering directly to ISPs with basic service priced at DM 290 per month for a 144-Kbps connection.¹⁵³ “We believe DSL will be a very lucrative market,” says Fiederer, “I think many other operators now also see the opportunities, but we’ll benefit from a six-month head-start on our nearest new competitor.”¹⁵⁴ The company is now building a network of distribution partners and plans to launch a service to residential customers next year. QSC markets its DSL service via sales partners, including Cable & Wireless Germany, and MCI WorldCom Deutschland.

Since 1999, Mobilcom, First Telecom, Mannesmann Arcor, KPNQwest, and Easynet have joined QSC as competitors. MobilCom, the northern German fixed-line and mobile operator owned 28.5% by France Telecom, is the most likely competitor for QSC. MobilCom has launched a flat-rate DSL service in eight cities, rolling out to cover the twenty largest population centers by the end of 2000. MobilCom will be focusing on the most profitable customers, businesses. First Telecom, the UK-based subsidiary of Atlantic Telecom, is another competitor. By the end of 2000, it expected customers numbering only in the hundreds, but by the end of 2001, it plans to cover 30 major metropolitan areas. Its service will start with Frankfurt, then move on to Munich, Berlin, and Hamburg, eventually covering 80% of all business locations. It has established partnerships with some 30 ISPs,

¹⁵¹ QS Communications AG. “QSC boosts DSL line sales beyond market expectations.”

¹⁵² Mock.

¹⁵³ Ibid.

including Interaktiv in Frankfurt, in order to offer its service through them.¹⁵⁵ Pan-European operator, KPNQwest, planned in December 1999 to roll out a retail DSL service to businesses in nine European countries, with Germany at the top of the list, due to the country's availability of unbundled access. Easynet has also announced plans to build a German network. This will serve as the hub for its DSL deployment plans in other European countries. Construction of the new network initially serving ten major cities was scheduled to start in late 2000.¹⁵⁶ C TeleBel, a German regional carrier, also plans to introduce DSL Internet access to businesses and residential customers.¹⁵⁷

Alternative carriers are particularly strong in the area of SDSL, targeted to small-to-medium-sized enterprises (SMEs). SDSL is more appropriate for SMEs since the up and down-stream data speeds are the same. ADSL is more suited to the residential market, as residential customers have little need for the same bandwidth on the return path. For this reason, Deutsche Telekom may regret focusing just on ADSL. By not aggressively following SDSL customers, Deutsche Telekom is letting competitors become established in this market, gaining the most profitable customers first. Furthermore, companies currently focusing on SDSL may later seek to expand into the ADSL market once the SDSL one is saturated, further challenging Deutsche Telekom. As we can see, these competitors are just starting off with DSL, and the majority of them plan to focus on the more profitable business customers. The next challenge is pricing of these services, a task made more difficult by Deutsche Telekom's legacy of monopoly.

¹⁵⁴ Ibid.

¹⁵⁵ Sylvia Dennis. "Atlantic Telecom Rolls Out German DSL Service." *Newsbytes*, 22 June 2000. [<http://web.lexis-nexis.com>].

¹⁵⁶ Mock.

¹⁵⁷ Wayne Walley. "Speed Zone." *Global Telephony*, TechTalk, September 2000. [<http://web.lexis-nexis.com>].

5.4. Outlook

Germany has good ISDN and cable infrastructures, which are part of the reason why DSL has been slower to spread. The fairly recent introduction of competition to the German telecommunications market has helped to push the implementation of this technology, and soon DSL will be widely available. DSL appears to be the new technology of choice for Internet access, and it will help support more applications to make the Internet an even more every-day part of our lives.

Ultimately, ADSL will take over cable modems as the preferred access medium, and the future for DSL in Germany looks promising. Deutsche Telekom as the former monopoly, is still in the dominant position in the market, although its position is slowly being eroded as more and stronger competitors enter the market. These competitors, as we mentioned however, are new to the market, and progress takes time. They are, however, pushing the incumbent in the move to DSL despite Deutsche Telekom's desire to maximize revenues from its ISDN network. The cable infrastructure in Germany at this point requires too much upgrading to inhibit the growth of DSL services.

6. INTERNET SERVICE PROVIDERS: T-ONLINE AND OTHERS

T-Online, has provided some of the impetus for expansion by creating an explosion in the number of Internet users to over 17 million, and by dramatically increasing e-commerce traffic volume to DM 300 million, according to a recent estimate.¹⁵⁸ T-Online is the biggest ISP in Germany, and in Europe, thanks in large part to its parent company, Deutsche Telekom, which still retains an 81.7% stake in the company.¹⁵⁹ In 1977, Deutsche Bundespost demonstrated its *Bildschirmtext* (BTX) at the International Radio exhibition in Berlin. Originally, it was accessible only using a TV screen and a hardware decoder. The system started September 1983 across Germany, beginning with just 20,000 "telereaders," as the users were called.¹⁶⁰ From 1992, BTX was called Datex J, however just three years later the name was changed to T-Online.¹⁶¹ Around 750,000 "Telereaders" used the service.¹⁶² Under an agreement with AT&T, Telekom offered ISDN with 56 Kbps restricted speed, or 64 Kbps unrestricted speed and 112 Kbps for video conferencing. By 1995, Telekom had sold three million ISDN channels.¹⁶³ In September of 1995, T-Online, established itself as an ISP and took over around 850,000 BTX customers.¹⁶⁴ T-Online had seven million customers as of September 30, 2000, up from 3.6 million at the same time in 1999. (Included in this number are 500,000 customers of its French subsidiary Club Internet).¹⁶⁵ T-Online is used by 8.6 million people at least occasionally, with 7 million of these using it

¹⁵⁸ Harroff, p.31.

¹⁵⁹ Hendrik Sackmann. "T-Online aims to double Web-site revenue by 2004." *Reuters*, 14 March 2001.

[www.totaltele.com/view.asp?ArticleID=37920&pub=tt&categoryid=0].

¹⁶⁰ Niels Kruse. "BTX-Teleleser und Call-by-Call-Surfer." *Net-Business*, 3 April 2000, 3.

¹⁶¹ *Ibid.*

¹⁶² *Ibid.*

¹⁶³ Andreas Barth. "Telecommunication Infrastructure in Germany," in *Information Technology in Germany*.

¹⁶⁴ Olaf Mischer. "T-Aktie: Chance für den Turnaround (Chronik: Postableger wird Global Player)." *Net-Business*, 7 August 2000, 3.

¹⁶⁵ *Reuters*. "T-Online customers at 7 million." 31 October 2000. [www.totaltele.com].

as their main service provider.¹⁶⁶ It is Europe's biggest ISP, but has so far failed to create a pan-European Internet company to challenge AOL and Yahoo, which are way ahead in the United States and are making inroads in Europe.¹⁶⁷

The first competitor to T-Online was CompuServe, which started in Germany in 1989 with services in English.¹⁶⁸ With five million users, however, AOL is Germany's number two Internet service provider, far ahead of other providers such as Yahoo!, Online, Freenet, Mannesmann Arcor, and VIAG Interkom.¹⁶⁹ In 1999, there were only 625 Internet Service Providers in Germany, compared to 7,600 in the United States.¹⁷⁰ Most Germans use well-known providers, with around 16 million people aged 14 to 69 accessing the Internet using online services such as T-Online, AOL, or CompuServe.¹⁷¹

Only three European Internet portals will be able to compete successfully with American rivals America Online and Yahoo, according to a report by Forrester Research. The winners will be Spanish Telefonica's "Terra Networks, France Telecom's "Wanadoo", and Deutsche Telekom's "T-Online."¹⁷² Only these three dominant national portals backed by deep-pocketed telecoms will succeed on a European-wide level, the report said. The markets in France and Germany are moving toward a situation like the current one in Britain, where the top three portals have 14% of traffic – nearly three times as much as the next 10 portals combined – and 39% of the online advertising revenue.¹⁷³ The top five

¹⁶⁶ *GfK Online-Monitor* (www.gfk.de). "Internet-Boom hält weiterhin an." 24 Februar 2000. [<http://194.175.173.244/gfk/pressemeldung/presse.php3?zeige=details&id=14>].

¹⁶⁷ *The Economist Intelligence Unit*. "Germany company: Business disorder." 8 September 2000, Country Finance Alert, country view. [<http://db.eiu.com>].

¹⁶⁸ Kubicek, 13.

¹⁶⁹ *GfK Online-Monitor* (www.gfk.de). "Internet-Boom hält weiterhin an."

¹⁷⁰ CIA. "The World Factbook 2000." [www.cia.gov/publications/factbook/indexgeo.html].

¹⁷¹ *GfK Online-Monitor* (www.gfk.de). "Internet Boom Set to Continue." 24 February 2000. [<http://194.175.173.244/gfk/english/pressemeldung/presse.php3?zeige=details&id=110>].

¹⁷² *Reuters*. "Only three European portals in U.S. league." 31 October 2000. [www.totaltele.com].

¹⁷³ *Ibid.*

players would be successful because of their early mover advantage, while their parent companies would help them grow internationally.

Figure 6-1, lists the largest German Internet providers. For an indication of the most popular ISPs in the German marketplace, we turn also to the results of a survey by Fittkau & Maass GmbH in Spring 2000 (Figure 6-2). Due to the study's questionnaire format, the results do not indicate an absolute ranking of ISPs, but do give us an idea of which service providers are prevalent in the market.

*Figure 6-1: Largest German Internet Providers*¹⁷⁴

Largest German Internet Providers

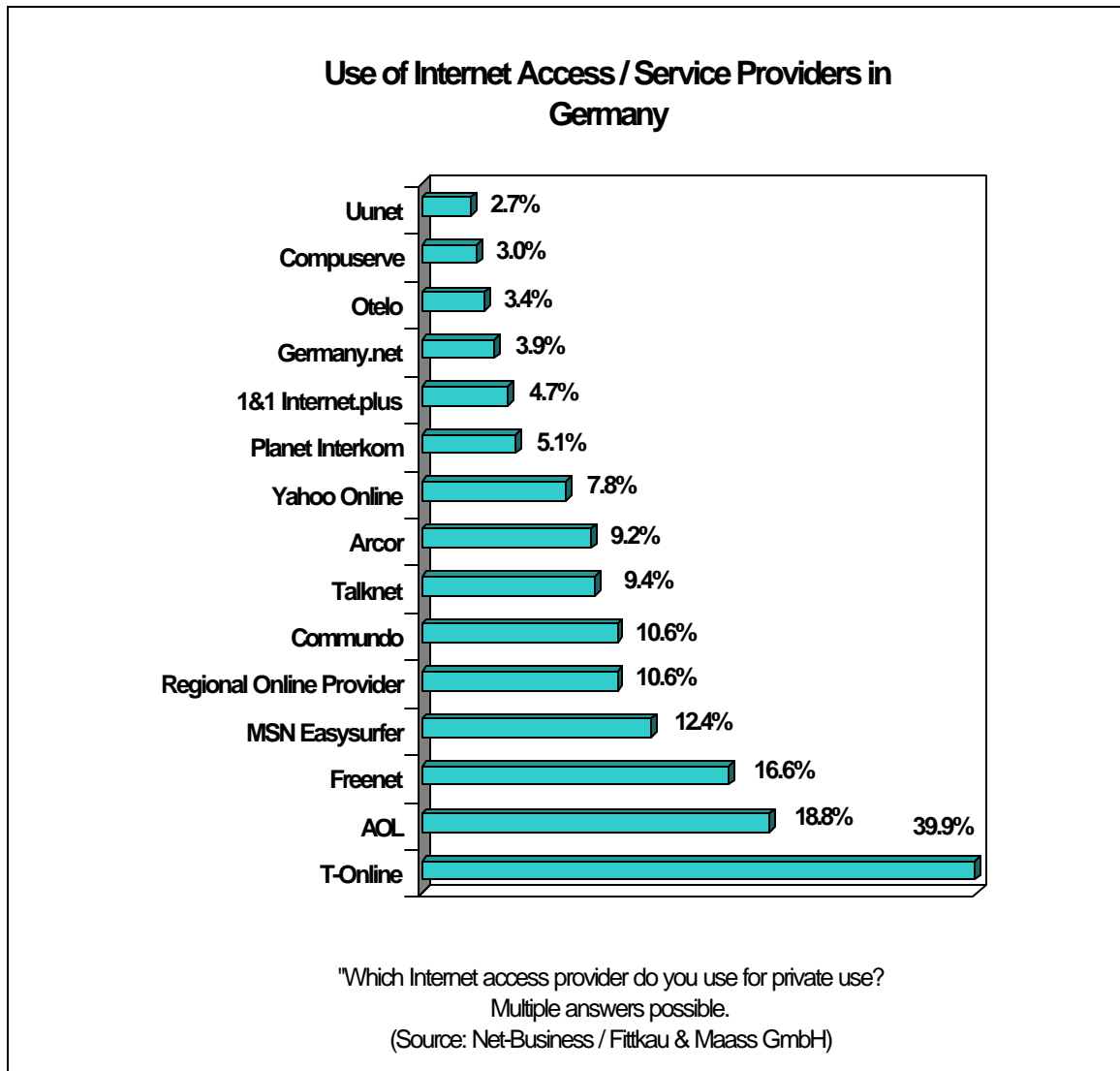
| Name | Users | Price per Minute* (Pfennigs) |
|---------------|-----------|---------------------------------|
| T-Online | 7,100,000 | 5.0 |
| AOL | 3,400,000 | 3.9 |
| Viag Interkom | 400,000 | 5.0 |
| Cityweb | 200,000 | 3.9 |
| Compuserve | 200,000 | 14.5 |
| 1&1 | 100,000 | 3.9 |
| Germany.net | 100,000 | 5.9 |
| Netsurf | 100,000 | 8.0 |

* Weekday mornings, not including base rate

(source: Net-Business / Gfk Medienforschung)

¹⁷⁴ Christoph Hus. "Nur der Zugang zum Kunden zählt." *Net-Business*, 3 April 2000, 3. Citing Gfk Medienforschung.

Figure 6-2: Use of Internet Access / Service Providers in Germany¹⁷⁵



¹⁷⁵ Net-Business. "Die Internetzugänge werden immer schneller." Citing the W3B Study from the market research company Fittkau & Maass GmbH.

7. FLAT-RATE INTERNET ACCESS

No matter which way we try to get around it, the price of Internet access remains a key determinant of usage and despite dropping telecommunication prices in Germany, Internet access costs are still too high. As of May 2000, 29% of the population of Germany were online, compared to 55% in the United States as of February 2000.¹⁷⁶ The ICT Benchmarking Study, from Booz Allen & Hamilton, concluded that “virtually all countries with high access costs have low [Internet] penetration,”¹⁷⁷ making Internet pricing plans a vital part in the debate on how to increase the range and positive effects of the Internet in Germany. The bad news: in a study, 62% of those questioned said the cost for Internet Access was still too high,¹⁷⁸ and among those who use the Internet often, 71% think it costs too much.¹⁷⁹ Robert Verrue, of the European Commission, estimates that an Internet connection can cost as much as 30 times more in Europe than in the United States.¹⁸⁰

7.1. Cheaper Access Important

Due to the high costs to use the network, the prices for Internet usage are too high. In 1995, when Deutsche Telekom lowered the price for ISDN service, the result was a tremendous growth in the number of users who connected their computers to the Internet.¹⁸¹ The effect of the high connection costs can also be seen in statistics from AOL: after 9:00pm with the beginning of Deutsche Telekom’s evening rates, usage explodes. Thomas

¹⁷⁶ *Net-Business*. “Eine Flatrate von 20 Mark wird gewünscht.” 26 Juni 2000, 6.

¹⁷⁷ *Commission of the European Communities*. “eEurope: an information society for all, Progress Report, for the special European Council on employment, economic reforms and social cohesion - towards a Europe based on innovation and knowledge, Lisbon, 23 and 24 March 2000.” Brussels, 8.3.2000 COM (2000) 130 final, 24.

¹⁷⁸ *FU-Nachrichten*. “Die (unkommentierten) Ergebnisse der Studien.” 7/2000, p.9. See also [www.stanford.edu/group/siqss].

¹⁷⁹ *Net-Business*. “Eine Flatrate von 20 Mark wird gewünscht.” 6.

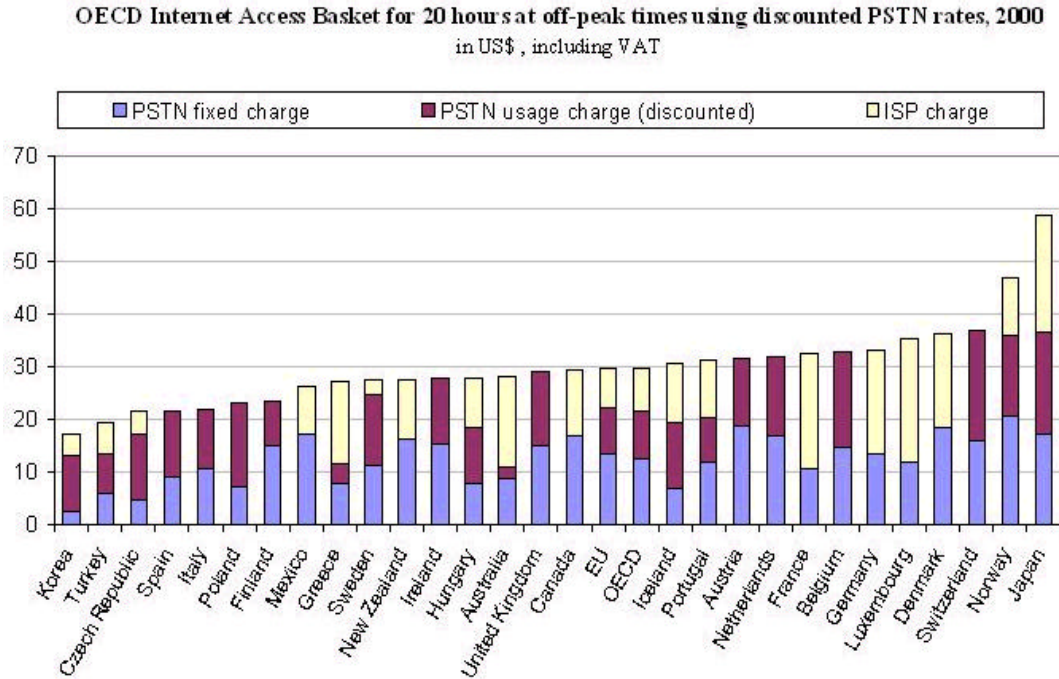
¹⁸⁰ Verrue.

¹⁸¹ Bill Gates. *The Road Ahead*. (New York: Viking Penguin Books USA Inc., 1995), 236.

Middelhoff, head of Bertelsmann AG, says that this shows that the interest in the Internet and online services is there, but is blocked through exceedingly high usage costs.¹⁸² These examples show that consumers are very price sensitive and that increasing the use of the Internet can be achieved by lower costs. As we can see from the bar graphs below that Germany is on the high-end for Internet access costs compared to other countries. For E-commerce to be truly successful in Europe, telecommunications and Internet access must become cheaper, because people will not shop or use other services online if the pricing is a disincentive.

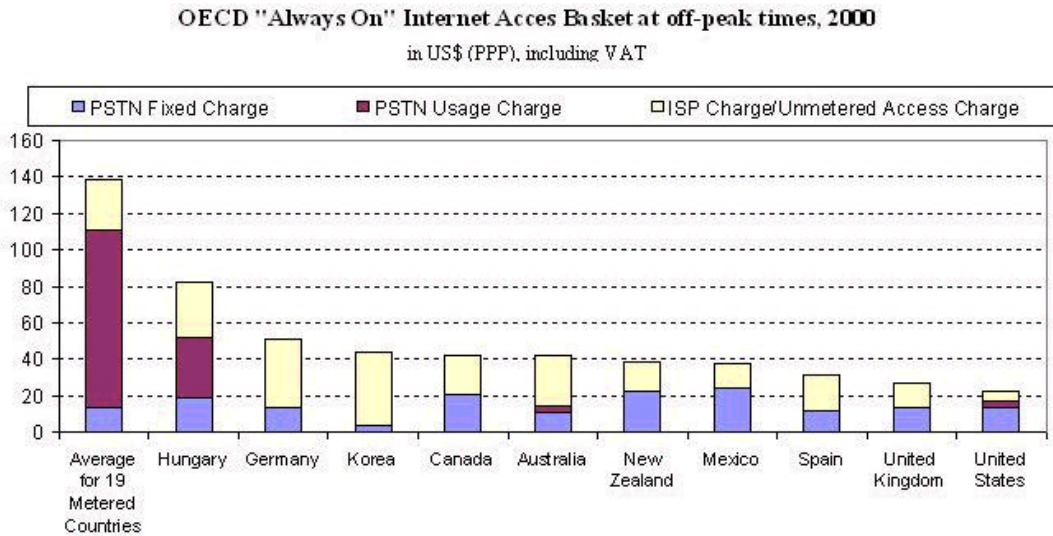
¹⁸² Thomas Middelhoff. "Eine Strategie für die digitale Medienwelt: Gesetze der Schwerkraft in der Internet-Ökonomie außer Kraft gesetzt." *Bertelsmann Briefe: Medien in der New Economy*, Heft 141 (Sommer 1999): 38.

Figure 7-1: Internet Access Charges in OECD Countries¹⁸³



Note: PSTN fixed charges include monthly rental fee. The basket includes 20 one-hour calls. Off peak is taken at 20h00. In some countries, ISP and PSTN usage charges are bundled and included under either the ISP or the PSTN charge.

Source: OECD, <http://www.oecd.org/dsti/sti/it/cm/>



Note: PSTN fixed charges include monthly rental fee.

The basket includes 30 five-hour calls, for a total of 150 hours of Internet access per month. Off-peak is taken at 20h00. "Average" includes all OECD countries with metered telecommunication charges for Internet access.

Source: OECD, <http://www.oecd.org/dsti/sti/it/cm/>

¹⁸³ Organisation for Economic Co-operation and Development. "OECD Internet Access Price Comparison." Latest update 23 October 2000. [www.oecd.org/dsti/sti/it/cm/stats/isp-price99.htm].

7.1.1. Types of Access Plans

German Internet access plans come in several flavors. Although not all are right for all customers, flat-rate access seems to be the long awaited favorite. First, there is the Call-by-Call model applied to Internet Access. Under this system, a caller simply dials up an ISP using a special number, just like for Call-by-Call voice telephony access. The caller pays a high price per minute, between 3 and 10 pfennigs,¹⁸⁴ but has no contract or monthly fee. Theoretically, under this system, a surfer could change ISPs every time he or she logged on. A second plan for Web access includes a monthly service plan with a basic fee of around DM 10 per month, plus a per-minute dial-up charge which is cheaper than the Call-by-Call rates, ranging somewhere between 1 to 2.8 pfennigs per minute.¹⁸⁵ The third and most interesting option for our purposes, is the flat rate.

Under flat-rate plans, customers pay one amount, including telephone charges, regardless of how much time they spend online. German ISP's have been offering flat-rate subscriptions since June 2000. T-Online offers residential customers with Analog and ISDN telephone connections a flat rate of DM 79 for unlimited Internet surfing. AOL's offers the same for DM 78. Currently nine firms offer flat rates between DM 40 and DM 250 per month for unlimited time in the Internet.¹⁸⁶ However, a flat-rate plan would usually only makes sense for those who are online more than 70 hours per month. The availability of a flat rate is important for the future because although customers are already online, and may only use the Internet occasionally, if Germany is to move to an Internet economy, the applications that form the base of this will require more bandwidth, and the ability to be connected for longer periods of time, more often.

¹⁸⁴ Michael Hagemann. Geschäftsführer, Profideal GmbH, Berlin. Private E-mail message to author. 26 January 2001.

7.1.2. Access Prices

The following is a comparison of Internet access plans in Germany as of December 15, 2000.¹⁸⁷ As there are many variables in determining final costs, four user profiles are used to make comparison easier. User profile 1 is an occasional web surfer of 5 hours per month, without any particular usage time or day. User 2 is the average residential user, at 10 hours per month, 5 hours during weekdays between 6pm and midnight, 5 hours on the weekends between noon and midnight. User profile 3 is someone who surfs at the office, 25 hours per month during weekdays between 9am and 6pm. User profile 4 is a habitual residential surfer who is online 50 hours per month, 30 hours weekdays between 3pm and midnight, and 20 hours on weekends between noon and midnight. Amounts are listed in DM.

For those who surf only 5 hours per month, Callino Plus is the cheaper option. For the occasional surfer of ten hours per month, Mannesmann is the best bet, coming in at DM 11.40. Heavy surfers, those who are online 50 hours or more a month, would do best to use Comundo as their ISP of choice, as under its plan they would only pay DM 54. Callino, Arcor, and Freenet are not far behind, at DM 57. A flat-rate plan, while convenient, really only makes economical sense for those who plan to be online more than 70 hours per month. Although these plans may not always make the most economical sense for all users, customers often prefer flat rate schemes as they eliminate uncertainty – there are no surprises when the bill comes at the end of the month. We see this same psychological effect with Internet access plans and prepaid calling-cards in the United States.

¹⁸⁵ Ibid.

¹⁸⁶ *Frankfurter Allgemeine Zeitung*. “Telekom will Endkunden-Flatrate notfalls abschaffen.” 17 November 2000, Nr. 268, Wirtschaft 13.

¹⁸⁷ *Frankfurter Allgemeine Zeitung*. “Die neuen Internet-Tarife im Vergleich.” 18. Dezember 2000, Nr. 294, p. 29. Citing Nettraffic ISP - Watch.

Figure 7-2: Internet Access Plans in Comparison¹⁸⁸

| Provider | Cost for User Profile | | | | Base rate | free hours | Pfennig per Minute | | |
|-------------------------------------|-----------------------|---------------|---------------|---------------|-----------|------------|--------------------|---------|-------|
| | 1 | 2 | 3 | 4 | | | 9am-6pm | 6pm-9am | Sa-Su |
| 12Move Shell/World Online | 780 | 1560 | 3900 | 7800 | none | none | 2.6 | 2.6 | 2.6 |
| Addom Internet by Call | 744 | 1488 | 3720 | 7440 | none | none | 248 | 248 | 248 |
| AOL Classic | 2160 | 3330 | 6840 | 12690 | 990 | none | 3.9 | 3.9 | 3.9 |
| Flat (1) | 7800 | 7800 | 7800 | 7800 | 7800 | all | 0.0 | 0.0 | 0.0 |
| Start | 1680 | 1680 | 4200 | 8400 | 1680 | 10 | 2.8 | 2.8 | 2.8 |
| Top | 3960 | 3960 | 3960 | 6600 | 3960 | 30 | 2.2 | 2.2 | 2.2 |
| Arcor Nexgo Power | 2280 | 2280 | 2850 | 5700 | 2280 | 20 | 1.9 | 1.9 | 1.9 |
| Arcor Otdo Nexgo by Call | 650 | 1140 | 4350 | 6300 | none | none | 2.9 | 1.9 | 1.9 |
| Callino Surf Callino Plus | 570 | 1140 | 2850 | 5700 | 570 | 5 | 1.9 | 1.9 | 1.9 |
| Compuserve Office (2) | 1100 | 2490 | 2850 | 11100 | none | none | 1.9 | 4.9 | (5) |
| Comundo (3) New Call by Call | 750 | 1500 | 3750 | 7500 | none | none | 2.5 | 2.5 | 2.5 |
| Plus | 1980 | 1980 | 3300 | 6600 | 1980 | 15 | 2.2 | 2.2 | 2.2 |
| Profi | 2700 | 2700 | 2700 | 5400 | 2700 | 25 | 1.8 | 1.8 | 1.8 |
| Freenet Power Tarif | 2280 | 2280 | 2850 | 5700 | 2280 | 20 | 1.9 | 1.9 | 1.9 |
| Sorglos Tarif | 750 | 1500 | 3750 | 7500 | none | none | 2.5 | 2.5 | 2.5 |
| MSN Easy surfer (4) | 870 | 1740 | 4350 | 8700 | none | none | 2.9 | 2.9 | 2.9 |
| SurfEU | 750 | 1500 | 3750 | 7500 | none | none | 2.5 | 2.5 | 2.5 |
| T-Online T-Online Eco | 1670 | 2540 | 5150 | 9500 | 800 | none | 2.9 | 2.9 | 2.9 |
| T-Online Flat (1) | 7900 | 7900 | 7900 | 7900 | 7900 | all | 0.0 | 0.0 | 0.0 |
| Vag Interkom by Call (4) | 813 | 1500 | 4800 | 7920 | none | none | 3.2 | 2.5 | 2.5 |
| Premium Max | 750 | 1500 | 3750 | 7500 | none | none | 2.5 | 2.5 | 2.5 |
| | 5 hrs | 10 hrs | 25 hrs | 50 hrs | | | | | |

(1) minimum 12-month contract, (2) calculated in three-minute units, (3) Lycos, (4) no sign-up necessary (open Internet by call), (5) same as weekdays

(Source: Frankfurter Allgemeine Zeitung/Nettraffic ISP-Watch)

¹⁸⁸ Ibid.

7.1.3. Flat-Rate Access

Members of the Internet coalition in Berlin, including AOL Deutschland, Mobilcom subsidiary Freenet.de, user platform Dooyoo.de, the European Institute for International Wirtschaftsbeziehungen (Business Relations) at the University of Potsdam, the CDU political party, and the SPD political party's Internet-speaker Jörg Tauss, want a flat rate for the local network.¹⁸⁹ At the end of June 2000, the coalition supported a flat rate of DM 40 per month.¹⁹⁰ The CDU Internet-speaker, Thomas Heilmann, said that only with a low flat rate can Germany become a competitive Internet country.¹⁹¹ Of German Internet users, 45% see a monthly cost of DM 20 as reasonable, 20% think that DM 30 would be correct.¹⁹²

No other medium costs as much or is as time intensive as the Internet. In the United States, flat-rate fees are common, which allow users to stay online for unlimited amounts of time, without incurring additional charges from their Internet Service Provider (ISP). Additionally, as long as the ISP is located within a customer's local calling area, which (except for very rural areas) most are, the local telephone call to the ISP is included in the monthly telephone rate, and incurs no additional charges. On a daily basis, this means that once a person has telephone service and an Internet hook-up, the cost is no different whether that person is online for 5 minutes, or 5 hours. The effect has been to make the Internet an everyday communication tool for millions of people in the United States.

Flat-rate Internet service has long been a dream of many in Germany. In June 2000, companies launched the first flat-rate pricing plans in Germany, but that is where the trouble began. Flat-rate pricing is much more difficult in Germany, owing to a telecommunication system that charges callers by the minute, even for local calls. Therefore, even after a

¹⁸⁹ *Net-Business*. "Gemeinsam für Flatrate." 24 Juli 2000, 3.

¹⁹⁰ *Net-Business*. "Volks-Flatrate gefordert." 26 Juni 2000, 2.

¹⁹¹ *Ibid.*

customer has contracted with an ISP for service, they still have to pay per-minute charges for the phone call, even for a provider just down the road. Many ISPs have tried to overcome this barrier by absorbing users' phone charges, but when customers spend too long online, this becomes an economically unfeasible operating model. Flat-rate plans in Germany have been problematic, both from a business and a regulatory perspective, and ISPs are now taking legal steps to force Deutsche Telekom, the former German national carrier, to open the local loop in such a way that will allow flat-rate Internet connection to be feasible, and not just for the incumbent provider. These competitive ISPs, and both the European Union and German regulatory bodies, see flat-rate Internet access as vital to the health of the Internet economy, which in turn they see propelling the German and European economies in general.

7.2. Difficulties Implementing A Flat-Rate Plan

Flat-rate pricing is thought to be required to expand Internet usage to levels necessary to bring about the vision of an Information Society. Telecommunication pricing models, however, make offering flat-rate access plans difficult for competitive ISPs. Bill Gates told a gathering at the World Economic Forum in Davos, Switzerland, that European Internet commerce continues to be crippled by high per-minute telephone tolls. "A country's communications will determine how quickly the Internet takes off in that country," Gates said.¹⁹³ Because of the per minute phone charges from Deutsche Telekom, flat-rate plans are risky and often unprofitable for many competing firms. Due to Telekom's

¹⁹² *Net-Business*. "Eine Flatrate von 20 Mark wird gewünscht."

¹⁹³ Chet Dembeck. *E-commerce Times*. "EU to Force Telco Competition." 16 February 2000. [www.ecommercetimes.com/news/articles2000/000216-4.shtml].

continuing hold on the last mile to the customer, many competitors are turning to strategies involving owning their own infrastructure.

7.2.1. Flat Rate Problematic : Unworkable model for ISPs

At the beginning of 2000, Ron Sommer announced that Deutsche Telekom would be offering flat-rate service starting August 1, 2000. This did not cause much of a stir, as there were already providers offering monthly flat-rate service. What riled competitors was Deutsche Telekom's price, DM 79, for the service, which was less than half of the average price customers had been paying up until then. AOL saw no choice but to follow suit, and set up a similar offer for DM 78, in order not to lose customers. The result was a snowball effect of providers offering flat-rate service. However, although German ISPs see these flat-rate offerings as essential to their survival in a competitive market, they are finding such offerings difficult to maintain. Critics charge that the flat rate handicaps Deutsche Telekom's online competitors. Deutsche Telekom, which owns the entire local telephone network in Germany, charges other ISPs per-minute tolls, and these providers' customers wind up paying the metered costs. Germany is virtually alone in using billing models based on volume of data or time spent online, rather than unlimited monthly access rates favored in the United States or Britain. Deutsche Telekom's chief rival, AOL Europe, has led the outcry. Sonne, a company which introduced its flat-rate residential portal in June 2000, was surprised by consumer usage, which was four-times greater than expected, leading them to cancel the service that same September.¹⁹⁴

¹⁹⁴ Peggy Salz-Trautman. "Service File: Flatrate Internet Access – German ISPs demand new pricing structure." *Communications Week International*, 13 November 2000. [www.totaltele.com].

Many ISPs had not calculated exactly beforehand what this type of service would cost for them to offer, and they were confronted with increasing losses as a result. These losses were largely due to charges from Deutsche Telekom. Operators in Germany have been charged a per-minute dial-up rate for access to Deutsche Telekom's local loop network, making it almost impossible for competitive providers to offer flat-rate Internet access, and especially difficult to compete with Deutsche Telekom's own flat-rate offer through its subsidiary, T-Online. For every minute their customers spent online, the ISPs have had to pay 1.5 to 2.5 pfennigs per minute for use of the local network. Old set-rates from the RegTP were 2.6 Pfennigs per minute with 16% added value tax, that comes to about 3 pfennigs.¹⁹⁵ As a result, customers who stayed online for long periods ended up costing the ISPs much more than the price of the flat-rate service. "Because Telekom [is] billing us by the minute and we offer our product at a monthly rate to the customer, there is no way to calculate the future risk," said Susanne Stenig of the Versatel Internet Group GmbH in Dortmund. If the consumer stays online for over 50 hours a month, paying 1.7 pfennigs per minute, Versatel has to pay DM 100 a month for access.¹⁹⁶ Bodo Kohlenbach, telecommunications analyst with Durlacher Research Ltd. in Bonn says, "What we're seeing in Germany is that no one is making profit on flat rate and that is why ISPs competing against T-Online are so anxious to have the same conditions here as ISPs have in the U.K."¹⁹⁷ The regulators in Britain have required the ex-monopolist British Telecom to offer a wholesale flat-rate tariff for online service, which calculates to around DM 15 per customer.¹⁹⁸ Even AOL Germany recognizes that its DM 78 flat-rate offer is too low to be

¹⁹⁵ Jan Boris Wintzenburg. "Ron Sommer startet die Internet-Offensive." *Net-Business*, 21 Februar 2000, 2.

¹⁹⁶ Salz-Trautman.

¹⁹⁷ Salz-Trautman.

¹⁹⁸ *Frankfurter Allgemeine Zeitung*. "Regulierungsbehörde entscheidet über Pauschaltarif von T-Online." 15 November 2000.

cost effective, with its head, Uwe Heddendorp, saying that a metered flat-rate model is simply not economical.

7.2.2. Per Minute Charges Unfair?

Yet, somehow, T-Online manages to continue offering the service at this low rate. ISPs became suspicious of the tie between Deutsche Telekom and its Internet subsidiary, T-Online. AOL argued that Deutsche Telekom was discriminating in favor of T-Online, Europe's largest ISP. T-Online's losses show up on Telekom's books as sales, which means that Deutsche Telekom could continue to offer the service through its subsidiary without too much worry. This was exactly what sparked the criticism of competitors, and after complaints from Mediaways and AOL Deutschland, the RegTP opened an investigation on September 15, 2000, into Telekom's Internet pricing, including allegations that Deutsche Telekom was offering T-Online preferential rates. The European Commission also announced that it would be leading an inquiry into Deutsche Telekom's charges to phone users for access to T-Online itself. Deutsche Telekom has been charging access fees as low as six pfennigs per minute for access to the Internet. "This rate is lower than Deutsche Telekom users would pay for a local (voice) call," said a spokesperson at ChiP Online.¹⁹⁹ Mannesmann argued in March 1999, that there is no reason competitors should have to pay 20% more per month than Telekom charges its own residential customers.²⁰⁰

As of December 15, 2000, the authorities have prohibited Deutsche Telekom from giving 8% discounts to companies which reach certain usage volumes, saying that this is impermissible discrimination, since it was almost impossible for any carrier other than T-

¹⁹⁹ Steve Gold. "EC investigates Deutsche Telekom Internet Charges." *Newsbytes*, 22 February 1999. [<http://web.lexis-nexis.com>].

²⁰⁰ *Financial Times*. "German response awaited." 28 April 1999. [www.globalarchive.ft.com].

Online to qualify.²⁰¹ It would also be anti-competitive if Telekom, by accepting the losses of its subsidiary T-Online, would have charged excessive rates to all online providers, in order to shut these competitors out of the market. The authorities have not determined that these allegations are true, however.

AOL Deutschland had argued that Deutsche Telekom should get rid of its per-minute charge altogether, and have more transparency in its pricing structure. At a formal hearing before the RegTP, AOL Deutschland charged that Deutsche Telekom had deliberately prevented other providers from learning how Deutsche Telekom calculates its own prices, and how T-Online is able to offer Internet access so cheaply and still make a profit. “It’s no wonder that Telekom is blocking our demands for a change so aggressively,” said Gunnar Bender, director of public policy and government relations for Hamburg-based AOL Deutschland. “That [charge] is Telekom’s biggest cash cow and [the] best way to lock other ISPs out of the running.”²⁰²

AOL Europe also alleged that Deutsche Telekom is abusing its dominant position in the German telephony market to weaken competition for Internet access, including discrimination in the provision and pricing of Internet-related services, and predatory pricing attempting to undercut competition by effectively operating at a loss. In addition, AOL Europe alleges that Deutsche Telekom is using its nationwide billing structure to bundle T-Online invoices illegally, and in doing so attempting to set up T-Online as the gatekeeper for all E-commerce in Germany.²⁰³

Ron Sommer calls the accusations, “demonstrably false,” saying that T-Online pays the same prices as the competitors, gets the same volume discounts as the competition, and

²⁰¹ *Frankfurter Allgemeine Zeitung*. “Telekom will Endkunden-Flatrate notfalls abschaffen.”

²⁰² Salz-Trautman.

²⁰³ Gold.

that the suggestion that Deutsche Telekom is accepting the losses of T-Online in order to force competition out of the market, is “unjustified.” T-Online follows the strategy, he says, of trying to expand the market as quickly as possible due to the chance for future profits from Internet commerce and advertising. “In the Internet business of the future, money will be made less through the connection, but rather earned through E-commerce and advertising,” explained Mr. Sommer.²⁰⁴ T-Online is trying to build up its customer base to enable it to take advantage of these other, more profitable, areas.

Every time a customer stays online for an hour, it costs T-Online DM 1.80.²⁰⁵ If a 100-Mark-Flat-Rate customer stays online more than 56 hours a month, it costs T-Online more than they are getting for the service.²⁰⁶ Despite this, it is in T-Online’s interest to grab as many customers as possible, since what they loose in telephone costs, they just might make up not only through the avenues mentioned above, but also on the stock market, since a larger customer base can increase share values.

We are standing before a gigantic demand for bandwidth and must increase the capacity of such by a hundred times. In this situation, AOL wants to secure for itself the increasing income, but shirk the ‘production costs.’ This investment has to be shared by everyone,” says Mr. Sommer.²⁰⁷ He points out that Telekom’s adversaries are not overmatched, saying that, “It has always been made out as if Telekom has been involved with small competitors. However, our competitors are AOL, Vodafone/Arcor, Mobilcom/France Telecom. Those are not small companies. Deutsche Telekom cannot just

²⁰⁴ *Frankfurter Allgemeine Zeitung*. “AOL möchte sein Risiko bei uns abladen.” 17 November 2000, Nr. 268, 19.

²⁰⁵ Wintzenburg.

²⁰⁶ Ibid.

²⁰⁷ Ibid.

take over all of their risk in Germany. In their home countries, there isn't any comparable right, not even the promise of an unbundled connection."²⁰⁸

7.2.3. Regulators Speak

The RegTP, however, has ruled against Deutsche Telekom for now. The president of the regulatory authority, Klaus-Dieter Scheurle clarified the ruling, saying that from February 1, 2001 on, Deutsche Telekom will be required to offer ISPs an Internet connection through Deutsche Telekom's telephone network, on an unmetered wholesale flat-rate basis. Now they pay on average around 1.5 pfennigs per minute.²⁰⁹

In addition to that, in the future, Deutsche Telekom must do without price differences between peak and off-peak times. "Telekom's refusal to establish a wholesale flat rate, represents discrimination against the competitors," said Scheurle.²¹⁰ Since T-Online offers end-customers a flat rate, Telekom must offer competitors a flat-rate service. Matthias Kurth, vice president of the RegTP, said that a capacity-oriented flat rate would also be thinkable. Under which, Kurth understands that the ISP would buy the carriage of a certain data volume. With that, a part of the risk of the flat-rate price would be taken off Deutsche Telekom and placed on the ISP.

When asked if he could live with a model like Kurth's, Sommer said, "Anytime. Every model that is feasible, we would gladly do. In Germany, all competitors can rent carriage from us for less than DM 25 per month, and with that the connection to the customer. The competitor just has to invest in the technology, which the most do not want

²⁰⁸ Ibid.

²⁰⁹ *Frankfurter Allgemeine Zeitung*. "Telekom will Endkunden-Flatrate notfalls abschaffen."

²¹⁰ Ibid.

to do.”²¹¹ Sommer said that the prices of Internet connections will not become cheaper as a result of the ruling, however, as “The prices will always be based on costs, as has always been the case.”²¹²

7.2.4. Can a Wholesale Flat Rate Block the Network?

Deutsche Telekom claims that offering competitors unmetered wholesale flat-rate network access will overload the network, and that the interconnection provisions will be not adequately compensate Telekom for this. In effect, Telekom argues, ISPs will be engaging in risky business models, but passing a large portion of the risk onto Deutsche Telekom by offloading their costs on the previous national carrier. Telekom says it will be forced to spend too much money enhancing a network based on old technology, solely for its competitors’ benefit, and without even being justly compensated therefor.

Deutsche Telekom has not been taking the RegTP’s ruling lying down. Ron Sommer said in an interview with a German magazine in November 2000, that the group would take “massive action” to oppose the RegTP ruling, and Deutsche Telekom has escalated the dispute, threatening to withdraw T-Online’s flat-rate service, in an attempt to forestall the requirement to offer other providers wholesale access.

Mr. Sommer claims that Deutsche Telekom’s existing narrow-band telephone network is not designed to cope with the additional rates of traffic that flat-rate access available to all providers will bring. Hans-Willi Hefekäuser, Senior Executive Director of Regulatory Strategy, Competition, and Pricing Policy at Deutsche Telekom, says that a flat rate for the narrow-band Internet connection is “not possible.”²¹³ The telephone network is

²¹¹ *Frankfurter Allgemeine Zeitung*. “AOL möchte sein Risiko bei uns abladen.”

²¹² *Ibid.*

²¹³ *Frankfurter Allgemeine Zeitung*. “Die Telekom bleibt im Streit um die Internet-Flatrate hart.” 13 November 2000, Nr. 264, 18.

set up for usage by 10% of the users at any one time. The long-time usage by a larger number of customers due to an Internet flat rate would block the carrier lines. In his opinion, Telekom cannot invest billions of dollars in a dead-end technology, as the Internet access technology of the future is broadband DSL connection.

Mr. Hefekäuser points out that a flat rate would causes several problems, the first of which is atypical traffic streams caused by some operators' nationwide traffic being routed through a small number of POPs, or even just through one. According to Hefekäuser, this has created congestion in some parts of the Deutsche Telekom network, which has in turn lead to quality problems. In order to avoid these problems, he says, "Deutsche Telekom has been forced to undertake risky and uneconomical investments in its network, which are by no means covered by the interconnection rates."²¹⁴ Second, the current regulation does not create sufficient incentives for infrastructure investment. "This goes against one of the fundamental goals of liberalization in Germany: the creation of facilities-based competition," he said.²¹⁵ Third, he claims that Deutsche Telekom is at a disadvantage when compared to other European incumbents, which benefit from differentiated interconnection rates for network operators and service providers.

Deutsche Telekom has filed a tariff application regarding surcharges for this type of atypical traffic. Mr. Hefekäuser says, "Of course, these surcharges are strictly cost-based." Deutsche Telekom wants these only for existing interconnection agreements, that is, those concluded before Deutsche Telekom's introduced its network concept providing for market entry with only one POP. With this, carriers already in the market will have to pay surcharges depending on their past and future atypical traffic. No carrier complying with the

²¹⁴ Hefekäuser.

²¹⁵ Ibid.

network concept under the modified interconnection agreement, and thus avoiding atypical traffic, would have to pay surcharges.

In Germany, almost every service provider can gain access to the interconnection rates of Deutsche Telekom. Unlike many other European countries, Germany does not provide for a differentiated structure of interconnection rates according to the competitor's level of infrastructure or value added. As a result, switch-based service providers with only two POPs receive the same interconnection rates as carriers which have a comprehensive network.

CompTel points out, however, that network operators are entitled to interconnect with Deutsche Telekom AG under cost-based rates, unless Deutsche Telekom can demonstrate that such interconnection imposes demonstrable special costs to accommodate atypical traffic or network integrity or security concerns, and it says, "DTAG [Deutsche Telekom AG] bears the burden of establishing these costs."²¹⁶

When asked by the Frankfurter Allgemeine newspaper, if the network costs weren't fixed costs which could be taken care of well by this type of rate scheme, Sommer replied, "A flat rate will lead exactly to the situation that customers will leave their connection on around the clock. With this, the danger increases that it will lead to an overload on the telephone network."²¹⁷ He says that Deutsche Telekom's competitors have always denied this danger, and why should Deutsche Telekom take on the risk and have to dramatically expand the network? "That would be an investment of billions in a technology that would not do anything for the Internet. ADSL, in contrast, is the ideal technology for around-the-clock Internet," he says. "And we are building up this technology like no one else in the

²¹⁶ *PR Newswire*. "Comptel warns German Regulators that Deutsche Telekom's Interconnection requirements are unsupported, anticompetitive, and discriminatory."

²¹⁷ *Frankfurter Allgemeine Zeitung*. "AOL möchte sein Risiko bei uns abladen."

world. Germany will become the most technologically advanced online nation.”²¹⁸

Scheurle, however, thinks that traffic jams on the network are “unlikely,” and Kurth points out that, “a certain requirement to build the network cannot be taken off Deutsche Telekom.”²¹⁹

It seems rather inconsistent, if a flat rate will lead to an overloading of the telephone circuits, that T-Online also offers it. Mr. Sommer replied to this question by saying, “It does not have to do with a long-term offering for the majority of customers. We see the chance to win many customers and influence the upgrade to T-DSL. But we are taking a great risk. I can take on the risk for myself, but not for my competitors. My shareholders would not stand for that.”

Sommer said that he so vehemently rejects the flat-rate payment method because, “AOL wants to offload its entrepreneurial risk on us.”²²⁰ “Here they want to go by the creed, ‘Telekom gives us the service and we get the money.’”²²¹ Sommer says that flat rate is a risky business model, that brings losses to both T-Online and competitors like AOL, and that there is no reason to pass the risk on to the supplier, Deutsche Telekom.

Deutsche Telekom said the decision by the RegTP would force it to spend an additional DM 2 trillion on its narrow-band network in 2001,²²² and would divert resources it had intended for ADSL technology. Deutsche Telekom already plans to spend DM 10 billion between 2000 to 2001, on the building of the national infrastructure. Another DM 4

²¹⁸ Ibid.

²¹⁹ *Frankfurter Allgemeine Zeitung*. “Telekom will Endkunden-Flatrate notfalls abschaffen.”

²²⁰ *Frankfurter Allgemeine Zeitung*. “AOL möchte sein Risiko bei uns abladen.”

²²¹ Ibid.

²²² Bertrand Benoit. “Deutsche Telekom tackles RegTP, Telecommunications German Telephone Carrier Considers Withdrawing Flat-Rate Access to Internet.” *Financial Times (London)*, 27 November 2000, 34.

billion is seen for the investment in the international network,²²³ both on the basis of Internet protocol and DSL.

7.2.5. Deutsche Telekom Reluctant to Offer Flat-Rate Access

The RegTP argues that in order to stay competitive, ISPs must be able to buy unmetered service, in order to offer their customers flat-rate Internet access. However, Ron Sommer had threatened to cancel T-Online's flat-rate service, rather than provide wholesale unmetered rates to competing ISPs. Sommer said, "When Telekom has to offer the competitors a wholesale flat rate, because T-Online has a rate for the end customers of DM 79, we will call off the offering. Otherwise we would just be insurance for the losses of our competitors. Anyway, the future is in ADSL technology."²²⁴

At the beginning of December, Deutsche Telekom had even started two proceedings against the decision. The first challenges that connection prices for dialing into the Internet should be set between peak and non-peak rates, as the RegTP has suggested. The authorities have not been involved in the establishment of new tariffs in a long time and Telekom, with this case, wants to hinder them from doing so in the future too.²²⁵

Since filing these proceedings, Telekom has decided to be more cooperative and will offer T-Online's competitors a flat-rate price model for wholesale Internet access using its network "more quickly than expected", contrary to what Sommer had said in November, when he claimed the group would not accept a ruling by the RegTP.²²⁶

²²³ *Frankfurter Allgemeine Zeitung*. "Telekom zieht positive Jahresbilanz und klagt über die Regulierung."

²²⁴ *Frankfurter Allgemeine Zeitung*. "AOL möchte sein Risiko bei uns abladen."

²²⁵ *Frankfurter Allgemeine Zeitung*. "Deutsche Telekom legt Klage gegen die Flatrate ein." 22 Dezember 2000, Nr. 298, 19.

²²⁶ *Reuters*. "Deutsche Telekom accepts flat-rate Internet decision." 8 December 2000.

7.3. Flat Rate Vital to Internet Economy

If the vision of an Information Society is really to be reached, the Internet in Germany must become commonplace. For this to occur, access prices must sink, and flat-rate pricing plans are vital to the whole scheme. The suggestion is that through their high prices, Telekom is preventing the Internet from becoming a mass media in Germany. AOL Deutschland said that Internet usage in Germany would not pick up until Internet providers could lower their flat-rate packages to DM 50 per month.²²⁷ The German Industry and Trade Congress (*Deutsche Industrie- und Handelstag*) expects as a result of the decision a wider usage of electronic commerce in Germany. A study by the European Institute for International Economic Relations (*Europäisches Institut für Internationale Wirtschaftsbeziehungen*), found that up to 400,000 new jobs in the Internet industry could be created when the flat rate comes into effect.²²⁸

According to the regulators, the three biggest German ISPs, T-Online, AOL, and CompuServe together at the end of 1999 had 5.8 million customers, and by the end of 2000 expect 9.3 customers.²²⁹ The number of Internet users is much higher, however. The number of users increased 70% in 2000, and now number about 24 million. The increase in the average use-time since early 2000 from 7.5 – 8.5 hours to 10 hours in late 2000, the regulators think is due to the introduction of the flat rate.²³⁰

Ron Sommer rejects the criticism that Deutsche Telekom is hindering wider usage of the Internet through its price politics, saying, “That is false. Thanks to Deutsche Telekom, Germany is the most successful Internet nation in Europe. We are better than England, France, Italy, or Spain. That also goes for the number of online connections, their quality,

²²⁷ Benoit, 34.

²²⁸ *Net-Business*. “Flat Rate bringt Arbeit.”

²²⁹ *Frankfurter Allgemeine Zeitung*. “Telekom will Endkunden-Flatrate notfalls abschaffen.”

and their usage. Only with the United States does a comparison supply a different result: we are worse in Internet usage, but we are growing faster. In the quality of the offers, the network, we are also much better. And the implementation of ADSL is happening much more quickly with us.’²³¹

Andreas Schmidt, AOL Europe’s president, continues to promote the argument that the current structure of the telecommunications market in Germany and Europe is stifling the growth of emerging Internet-based economy. “We must overhaul the outdated telecoms pricing structure which sustains artificially high call rates for customers,” he said, adding that the Commission now has an historic opportunity to build an information-based economy that will fuel job creation and provide consumers and businesses with an unprecedented array of new choices. Schmidt says this will only happen if Europe eliminates high local call prices and per minute charging for consumers. “Think about what would happen to high street stores if they started charging customers for the time they actually spend browsing their stores. Similarly, online customers are less willing to use the Internet and shop online as long as they continue to be charged by the minute,” Schmidt said.²³²

The Frankfurter Allgemeine Zeitung asked Sommer if the strong Internet use in the United States does not have something to do with the prices. Sommer: “No. Show me a flat rate there with a faster ADSL Internet connection for DM 49 [per month], like we have. Show me a price there like our DM 59.78 for a T-DSL connection. When it comes to the Internet, we are no nation from the back woods, as the chief of AOL Germany would like to

²³⁰ Ibid.

²³¹ *Frankfurter Allgemeine Zeitung*. “AOL möchte sein Risiko bei uns abladen.”

²³² Gold.

depict it. And by the way, also in the USA no one can give away service.”²³³ However, the DM 49 per month will not get you online. First, you have to contract for DSL service, pay a connection fee, pay a set-up fee, then contract and pay for access through an ISP. We should not confuse simple Internet access with high-speed access here. Deutsche Telekom may be preparing Germany to be the most technically advanced nation in Europe, but having the network does not mean that people will use it, or that they will want to afford to use it. Advanced services are great for those customers who need the bandwidth. For those who do not, a variety of service plans with a variety of rates would better serve the goal of increased Internet access. Studies have shown that high prices discourage usage, and customers in Germany still think the prices are too high. Limiting services options only to those with the best technology (and most often highest price) would not help the spread of the Internet in Germany.

Competition has put pressure on the incumbent, Deutsche Telekom, and is bringing down prices. Flat-rate Internet access is seen as a vital part in bringing the Internet economic miracle to Germany. Hopefully, Germans will soon be enjoying faster, cheaper Internet connections, leading to an improved economy and more jobs.

²³³ *Frankfurter Allgemeine Zeitung*. “AOL möchte sein Risiko bei uns abladen.”

8. EMPLOYMENT AND FUTURE CHALLENGES TO ECONOMIC PROSPERITY

Let us take this opportunity to refocus and remind ourselves of the reason behind this push for Internet access and usage... jobs, jobs, jobs!!! No, that is not Steve Jobs,²³⁴ but employment for the German workers. The government hopes to improve the German economy and secure more jobs through a strategy to encourage the development of the Internet in Germany. Employment is a favorite political theme in any country, but it is especially so in Germany, due to the high levels of unemployment there, and the high expectations for the Internet economy to provide employment.

After reunification, the unemployment rate in Germany has continued to be very high, even reaching 25% recently in some areas.²³⁵ This is especially a problem in the new Länder of the East, whose populations remember life under communism "where at least we all had jobs." Although the general consensus is that life is better now after the fall of the Wall, capitalism has created losers as well as winner, and the staggering unemployment creates a real stability problem for the country.

Unemployment can only be combated if Germany succeeds in mastering the transition from an economy based on industry, to one based on information. Currently, only temporary additional employment is being created in many economic sectors.²³⁶ Stable employment is mostly found in the service sector. Modern information and communications technologies are among the driving force in this shift toward service.

However, since the early nineties, Germany has encountered growing difficulties. The growth in employment in the services sector has not been enough to make up for job

²³⁴ Steve Jobs, one of the founders of Apple Computers.

losses in industry. Germany has lost world market share in services that are growing, such as legal and corporate consultancy, engineering, advertising, and the media. In some cases, it has developed a negative trade balance. This is due to both insufficient exploitation of the international market opportunities for high quality service and highly skilled services work, and the relatively low level of employment in the simpler services areas.²³⁷ “We have structural problems,” says Hermann Kues. Excessive pay increases destroy jobs. Higher payroll taxes to finance generous unemployment benefits and early retirement schemes further inflate labor costs. This gives companies incentives to replace workers in industry with machines, or move production overseas. This has led to even more people receiving unemployment benefits, and therefore even higher payroll taxes.²³⁸ One-third of the unemployed in Germany have been so for longer than a year. Around 80% are over 50 years old, a large portion are unqualified, have health impairments, or are handicapped. Two-thirds have all of these problems.²³⁹ These are most likely not the people who will benefit from new jobs in the New Economy. But following the theory that all boats rise with a high tide, improvements in the overall economy should bring advantages to most segments of the population.

Economic stability and with that, welfare, will no longer be achieved through State subsidy of firms and federal job programs.²⁴⁰ The classical job market will no longer exist in the future. This affects wage politics. The challenges of the new job markets come from globalization and the need for workers with new qualifications. The belief is that the expansion of the Internet gives companies the ability to realize growth in productivity that

²³⁵ *Tagesschau Nachtmagazin* (TV Broadcast) 20 Februar 2001. [www.tagesschau.de].

²³⁶ *Federal Ministry of Education and Research, and the Federal Ministry of Economics and Technology*, 6.

²³⁷ *Federal Ministry of Education and Research, and the Federal Ministry of Economics and Technology*, 54.

²³⁸ Holger Schmieding. “Europe’s chance for full employment.” *Financial Times*, 11 July 2000, 21.

²³⁹ Hermann Kues. “Das Soziale muss zukunftsfähig werden.” *Die politische Meinung*, Nr. 366/Mai 2000, 12.

²⁴⁰ Gerhard Preyer. “Neue Sozial- und Wirtschaftspolitik.” *Die politische Meinung*, Nr. 366/Mai 2000, 5.

has not been possible before, and will open up new markets. “No country can take it for granted that it can keep the position it gained in income and employment in the industrial age in the information age. Knowledge and innovative ability are the decisive production factors now.”²⁴¹ The German government sees the utilization of these to generate employment as the central task for the 21st century.

Many growth companies, for example those in telecommunication, are able to provide more than average number of new jobs because of their high growth potential. According to a study from the Deutschen Aktieninstituts, those new to the market in 1998 alone in the first year accounted for 10% of new jobs.²⁴² They include software engineers, specialists in communications, media designers, and employees in the electronic entertainment sector. In addition, according to estimates of the Information Technology Association (FVIT), there are about 300,000 IT specialists working with users in a variety of sectors.²⁴³ The development in every other area of the economy depends, to a decisive degree, on the spread of information and communication technologies, which are affecting the labor market across the board, as almost every workplace is influenced by progressive ‘informatization.’²⁴⁴

The Information industry is already on of the most important for growth and employment in the German economy. In 1999, it employed 1.7 million people.²⁴⁵ There was an expected increase in the market for information and communications technology from DM 191 billion in 1998, to DM 206 billion in 1999, or an increase of 7.8%.²⁴⁶ This

²⁴¹ *Federal Ministry of Education and Research, and the Federal Ministry of Economics and Technology*, 6.

²⁴² Rüdiger von Rosen. “Regierung bremst Venture-Captial-Investoren.” *Handelsblatt*, 20 Oktober 1999, 22.

²⁴³ *Federal Ministry of Education and Research, and the Federal Ministry of Economics and Technology*, 17.

²⁴⁴ *Ibid.*

²⁴⁵ *Federal Ministry of Education and Research, and the Federal Ministry of Economics and Technology*, 6.

²⁴⁶ *Bundesministerium für Bildung und Forschung, and the Bundesministerium für Wirtschaft und Technologie*. “Innovation und Arbeitsplätze in der Informationsgesellschaft des 21. Jahrhundert: Aktionsprogramm der Bundesregierung.” (Bonn: Köllen GmbH Druck und Verlag, September 1999). [www.iid.de], 7.

would represent the first time that this sector had come out ahead of the automotive industry. Additionally, the growth in employment from 1998 to 1999 was expected to be 3%, considerably out-pacing the growth rate of the previous year.²⁴⁷ Estimates say that as many as 350,000 additional jobs could be created in this sector in Germany by the year 2002, if the appropriate conditions are created.²⁴⁸ Werner Müller, the German economics minister, is even more optimistic, saying that the growth of the Internet and e-commerce could create as many as 750,000 jobs in Germany by 2010.²⁴⁹ However, according to Klaus Löbbe, of the research group “Sektorale Strukturanalysen” of RWI, “The prognosis for 750,000 jobs should be understood as a best-case-scenario.”²⁵⁰ German still faces many challenges in this complex issue.

In spite of high unemployment rates, every second firm has problems finding qualified personnel. A study by the International Data Corporation forecast that around 180,000 jobs for network skills are likely to go unfilled in Germany by 2002.²⁵¹ “The personnel shortage in many companies endangers its competitiveness, as needed innovations are delayed or not able to be realized,” complained the manager of the Institute of German Business (*Instituts der Deutschen Wirtschaft*), Winfried Schlaffke, at the presentation of a survey of 480 companies from Nordrhein-Westfalen.²⁵² More than anything, they are looking for experts, masters, technicians, mathematicians, computer scientists, engineers, and natural scientists. In 1999, the German labor market was 75,000 short in information technology and media, and demand for highly trained staff is expected to grow in the

²⁴⁷ Federal Ministry of Education and Research, and the Federal Ministry of Economics and Technology, 6-7.

²⁴⁸ Federal Ministry of Education and Research, and the Federal Ministry of Economics and Technology, 7.

²⁴⁹ Haig Simonian. “E-commerce ‘offers jobs bonanza’.” *Financial Times*, 11 July 2000, 2.

²⁵⁰ *Net-Business*. “Minister Müllers Milchmädchenrechnung.” 24 Juli 2000, 3.

²⁵¹ Federal Ministry of Education and Research, and the Federal Ministry of Economics and Technology, 18.

²⁵² *Frankfurter Allgemeine Zeitung*. “Wirtschaft beklagt Mangel an qualifiziertem Personal.” 12 Juli 2000, Nr. 159, 19.

²⁵³ Federal Ministry of Education and Research, and the Federal Ministry of Economics and Technology, 17.

Figure 8-1: Number of People Employed in the Information Sector

| AREA | People Employed 1997 | People Employed 1998 | People Employed 1999* | 98/97 | 99/98* |
|---|----------------------|----------------------|-----------------------|-------------|------------|
| Hardware, Software, & Services | 973,500 | 1,001,500 | 1,037,420 | 3% | 4% |
| Information Technology | 379,000 | 396,000 | 433,160 | 4% | 9% |
| Office machines and EDP equipment | 147,000 | 128,000 | 135,680 | -13% | 6% |
| Software and IT services | 232,000 | 268,000 | 297,480 | 16% | 11% |
| Telecommunications | 322,000 | 338,000 | 338,000 | 5% | 0% |
| Production of technical news equipment (1) | 101,000 | 101,000 | 101,000 | 0% | 0% |
| Telephone services | 221,000 | 237,000 | 237,000 | 7% | 0% |
| Electronic elements (2) | 83,500 | 83,500 | 81,500 | 0% | -2% |
| Entertainment electronics | 41,000 | 36,000 | 35,280 | -12% | -2% |
| Trade & distribution* | 148,000 | 148,000 | 149,480 | 0% | 1% |
| Media | 692,000 | 691,020 | 698,690 | 0% | 1% |
| Publishing | 222,000 | 217,000 | 219,170 | -2% | 1% |
| Printing | 285,000 | 2,840,000 | 284,000 | 0% | 0% |
| Film/Video production, distribution, sales, cinemas | 24,000 | 32,000 | 32,640 | 33% | 2% |
| Radio/TV, program production | 72,000 | 62,000 | 65,100 | -14% | 5% |
| Correspondence/news, agencies, freelance, journalists | 38,000 | 44,000 | 45,760 | 16% | 4% |
| Book, magazine and music trade* | 51,000 | 52,020 | 52,020 | 2% | 0% |
| TOTAL | 1,665,500 | 1,692,520 | 1,736,110 | 2% | 3% |

(1) Communications Technology Association; (2) Constructin Elements Association; (*) Estimated

(Source: Information Technology Association in the VDMA and ZVEI; Federal Statistical Office)

medium term.²⁵⁴ If measures are not taken to change this, “in 5 years we won’t have 75,000 unfilled jobs, but 250,000,” warned Jörg Harms from the Fachverband Informationstechnik im VDMA and Zentralverband Elektrotechnik und Elektronikindustrie (ZVEI).²⁵⁵ Every year there are up to 40,000 new jobs in information technology alone, said Harms. However, only 10,000 students graduate in Computer Science and like majors. The number of students starting in these disciplines is rising, but is still below what is needed.²⁵⁶

To make up for this, Germany has started offering special “Greencard” visa permits to technology professionals, good for three to five years. Up to 20,000 overseas IT specialists are expected to come to Germany in 2001.²⁵⁷ These “Greencards” will not prove much help to SMEs, unfortunately, as the minimum salary required for the work permit is DM 100,000, more than many smaller firms can afford.²⁵⁸ This brings into question the effectiveness of this policy, as Germany’s SMEs (under 1000 employees) account for 70% of the industrial workforce and 60% of turnover.²⁵⁹ These issues are serious ones, as they directly impact the economic viability of firms operating in Germany. Even if the Internet economy takes off in this country, the proceeds and jobs will only stay in Germany if the companies are located here.

²⁵⁴ *Federal Ministry of Education and Research, and the Federal Ministry of Economics and Technology*, 7, and 33.

²⁵⁵ *Handelsblatt*. “Computerbranche klagt über Fachkräftemangel.” 19 Oktober 1999, Nr. 202/42, 1.

²⁵⁶ *Ibid.*

²⁵⁷ *Net-Business*. “IT-Fachkräfte: 10 000 Greencards sofort.” 20 März 2000, 2.

²⁵⁸ Werner Pluta. “100 000 Mark sind den Startups zu viel.” *Net-Business*, 29 Mai 2000, Nr. 12/2000, 2

²⁵⁹ *Germany Online: German Information Center of the German Embassy*. [www.germany-info.org/facts/intro.htm]. 29 April 1999.

9. CONCLUSION

“We are the most successful Internet Nation in Europe.” Mr. Ron Sommer of Deutsche Telekom claims.²⁶⁰ Indeed, due to the number of German speakers in Europe, the size of the country, and the pace of reforms there, Germany will be a critical country for anyone interested in the Internet economy in Europe.

Although behind the United States, Germany is about average for European countries in the use of Internet technologies, and on a worldwide scale, far ahead of the pack. German leaders see the country’s ranking among Internet nations as an important measure of current and future economic prosperity. Despite the bursting of the dot.com bubble, the Internet Economy will still be an important contributor to the overall wealth and welfare of nations. While Germany’s ranking is not bad, the country’s leaders would like to place Germany at the forefront. The federal government has undertaken a series of reforms to accomplish this goal. The European Union is pushing the pace of reform in Germany, but what really has German politicians excited about the Internet economy is its potential to alleviate the country’s high unemployment rates.

Germany hopes to secure a bright future for its citizens. This is comparable to the goals of liberalization and unification within the European Union. During this process, the countries of Europe are taking a hard look at policies that have defined the legal, political, and economic aspects of their societies for many years, and are seeing areas for growth and improvement. Germany, like so many other “western” nations, finds itself faced with an aging population and a low birthrate. This, coupled with the economic woes, gives politicians real concern about the future, and the future of the social welfare state. In a

country where “made in Germany” is a mark of quality, a country highly advanced in sciences, industry, and all areas of learning, it seems unacceptable that this great nation should face high unemployment and atrophy in some economic sectors. Politicians in Germany are reexamining the structural aspects of the economic environment in Germany, and looking for areas to improve. The real challenge, however, is helping to develop the total economy, to support all business, not just the Internet economy and its e-businesses, and thereby improve economic welfare and create jobs. Although these reforms stretch to many aspects of the German economy, this paper has focused on changes taking place in the telecommunications sector.

Privatization of the German national telecommunications carrier, Deutsche Telekom, has removed the inefficiencies of cross-subsidization, and subjected the company to the scrutiny of market forces. Liberalization of the telecommunications laws has opened up the market to competition. Due to the number of competitive providers we see, and the fall in prices, it does look like the introduction of competition has been a success. These factors combined have not only led to lower telecommunication prices, but are also pushing a faster build-out of technologies important to the Internet, as well as pushing for competitive Internet access pricing.

The early and wide build-out of ISDN capabilities by the former monopoly has somewhat slowed the introduction of DSL in Germany, although ADSL and SDSL technologies for Internet access will be widespread in the future, and cable access will not really be a serious competitor.

Reunification with East Germany has had many challenges, but the threat of a new competitor gaining ground in this region provided incentive for the former monopoly to bid

²⁶⁰ *Frankfurter Allgemeine Zeitung*. “AOL möchte sein Risiko bei uns abladen.”

hard for the right to service this area, and resulted in the rapid introduction of state-of-the-art communications equipment, leaving Germany, the former eastern Länder especially, with one of the most modern communications infrastructures in the world. Without the 1996 Telecommunications Law reform, of course, none of this competition would be possible.

Also important to realizing Germany's dream of an Information Society is the amount it costs businesses and residential consumers to use the Internet. Despite the drop in phone charges, compared to other countries, these costs are too high in Germany, and are arguably deterring a wider-spread utilization of this medium. One proposed solution has been the introduction of flat-rate Internet access, through both a wholesale flat rate for ISPs leasing capacity, and flat-rate monthly Internet access plans for consumers. Flat-rate access appears to be vital if Internet usage in Germany is to increase significantly. Implementation of flat-rate plans has proven difficult, however, due to Deutsche Telekom's continued control of the last mile connection to customers, and its per-minute charges for this access, even for local phone access. Going through the incumbent carrier can be both slow and expensive, and if nothing else, the per-minute price structure can create psychological disincentives to use.

Deutsche Telekom has been fighting the changes that would be needed to bring about a flat rate in Germany. These changes would most likely decrease its revenue, cause it to lose some control over the market, and expose its ISP subsidiary, T-Online, to heightened competition. However, in the long-run, these delay tactics may not prove to be the best strategy, as it impedes the spread of advanced technology in Deutsche Telekom's home market, and encourages its competitors to build infrastructure of their own. If Germans lag behind on their use of the newest technology, it will not help Deutsche

Telekom to gain experience which it can then use to move into other markets – part of its international strategy.

In all, although telecommunication rates in general have dropped dramatically in Germany, the rates for Internet access still remain too high, and therefore a challenge. However, with the liberalized telecommunications marketplace and the deployment of advanced infrastructure the basis for a successful Internet economy is in place. Germany is on its way to the new, digital Deutschland.

APPENDIX

Figure A-1: Deutsche Telekom's International Involvement²⁶¹

| COUNTRY | COMPANY | MARKET POSITION | OWNERSHIP | CUSTOMERS / MARKET SHARE | EARNINGS 1999 |
|----------------|----------------------------|---|-----------------|---|---------------------|
| Austria | Max Mobil | Second largest mobile provider in Austria | 100% subsidiary | 1.5 Million customers / 38% market share | 811 million Euro |
| France | Siris | Second private landline company | 100.00% | -- | 113 million Euro |
| Britain | One 2 One | Fourth largest British wireless carrier | 100.00% | 17% market share | 544 million Euro |
| Switzerland | Multilink | Fixed network operator with headquarters in Geneva | -- | -- | -- |
| Czech Republic | Radio Mobil | Wireless provider | 41.00% | 1 million | 297 million Euro |
| Hungary | Matav | One fixed and two wireless networks | 59.53% | -- | 1.5 billion Euro |
| Poland | Polska Telefonia Cyfrowa | Market leader for wireless in Poland | 44.70% | 1.75 million customers / 44.7% market share | 614 million Euro |
| Russia | Mobile Telesystems | Russian/German joint-venture | 46.00% | 400,000 | 338 million Euro |
| Slovenia | Slovenske Telekomunikacije | Former Slovenian fixed network monopolist and wireless operator | 51.00% | -- | 840 million Mark |
| Croatia | Hrvatske Telekomunikacije | Croatian wireless and fixed network provider | 35% | -- | 694 million Euro |
| USA | Voicestream | Eighth largest US wireless carrier | 100% | -- | 475 million Dollars |

(source: Net-Business 2000)

²⁶¹ *Net-Business*. "T-Aktie: Chance für den Turnaround." 7 August 2000, 3.

Figure A-2: Deutsche Telekom's Most Important Subsidiaries:²⁶²

| |
|----------------------------------|
| T-Mobil |
| T-Online |
| T-Mobile International |
| DeTeMedien |
| DeTeCSM |
| DeTeCardService |
| DeTeCon |
| DeTeImmobilien |
| Kabel Deutschland |
| MediaServices |
| Mat·v |
| DeTeSystem |
| T-Nova |
| DeTeAssekuranz |
| DeTeLine |
| Multimedia Software GmbH Dresden |
| DeTeSat |
| DeTeKabelService |
| T-Data |
| Danet |
| Max.mobil |
| One2One |
| Siris |
| RadioMobil |
| Partnership with VoiceStream |

²⁶² Deutsche Telekom AG. "Tochterfirmen: Die wichtigsten Beteiligungen der Deutschen Telekom AG." [http://www.telekom.de/untern/inv_relations/tochter/index.htm], visited 28 Jan 2000.

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