The impact of German telecommunications deregulation on the industry structure

by

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Submitted to the Alfred P. Sloan School of Management
and the School of Engineering
in Partial Fulfillment of the Requirements for the Degree of

Master of Science in the Management of Technology

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June 1996

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Abstract

The telecommunications industry is in a period of rapid change. The $ 800 billion telecommunications industry is going global. In Europe, after the privatization of British Telecom in the 1980s, France Telecom and Deutsche Telekom (DT), the French and German telecommunications operators are announcing the beginning of their privatization process. This process, mainly driven by new technology and demand from the multinational global phone customers, will completely modified the telecommunications environment.

The analysis will be focused on the German telecommunications industry. I will review the implications of the German market deregulation on the industry structure. I will analyze the history of the German telecommunication industry and the recent developments, to better understand the forces and barriers to change. By drawing lessons from the UK telecommunications experience, I will analyze the potential outcomes of the deregulation in Germany. I will discuss different potential industry scenario, present the most probable short term scenario in Germany, and draw the implications for the new entrants in the industry.

Thesis Supervisor: Henry Weil
Title: Senior Lecturer
ACKNOWLEDGMENTS

I extend my sincere thanks and appreciation to Henry Weil for the very helpful and professional manner in which he guided me through this research experience. My thanks also go to the project group members: Jose Fullaondo, Chris Nielsen, Mauricio Roman, and Troy Ziegler, from the seminar “The Dynamics of Global Competition”. Through their questions these colleagues have helped to clarify this work.

Finally, I would like to thank my wife Dominique, for her emotional support, motivation, and patience.
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Chapter 1 - Introduction

1.1. Objectives of the thesis

The primary objectives of this thesis are to analyze the implications of the future telecommunications market liberalization on the industry structure in Germany, and to define the potential scenarios for the industry after the complete market liberalization. We will then answer some of the key questions raised by the announced full market liberalization:

- Is the telecommunications market liberalization good for the German telecommunications industry, the customers and the German economy in general?
- Is it possible and productive to manage competition during the liberalization process?
- Is there any realistic hope of dislodging the dominant incumbent, Deutsche Telekom (DT)?

In Chapter 4, we will address the question: What are the lessons that can be drawn from the British telecommunications industry?
In Europe the supply industry in telecommunications services is being liberalized at an unprecedented rate. No other industry, in Germany, is facing such dramatic structural changes or such a rapid introduction of new technologies. In this context, we will define potential scenarios of the German telecommunications industry, based on key uncertainties such as: the role of regulation, the rate of new technologies introduction, and the telecommunications market growth.

This thesis seeks to identify potential scenario for the telecommunications industry in Germany, and the key parameters leading to those different scenarios.

1.2. Scope of the thesis

I will first review the telecommunications industry background in Germany. In Chapter 2, I will discuss the history of the German telecommunications industry, and the role of the different competitive forces prior to the beginning of the market liberalization in 1989. I will analyze the industry structure prior to liberalization, and will identify the “modus vivendi” of the telecommunications industry, in particular, the relationship between suppliers (equipment’s manufacturers) and the operator (Bundespost).

In Chapter 3, I will discuss the role of European community in setting the regulatory framework for the telecommunication industry. I will also evaluate the new European Commission initiatives in the regulation of the industry, and the role of the European Telecommunication Standards Institute (ETSI). In chapter 4, the recent development of the British telecommunications industry will be analyzed, and I will identify some of the lessons from the UK’s experience. The most recent evolution of the German market will
be detailed; whom are the Deutsche Telekom’s new competitors? How is DT management reshaping its own organization to prepare for the upcoming competition?

Chapter 5 will explore the main uncertainties of the German market today. I will address several key questions: How will the regulation evolve in the next years? What will be the role of new technologies?

Chapter 6 will detail the potential scenarios for the telecommunications industry in Germany. What could be the immediate and mid-term outcomes of the liberalization process?

In chapter 7, I will answer the different questions presented in the thesis objective, and discuss the main elements of the new entrants’ strategy. Is the telecommunications market liberalization good for the German telecommunications industry, the customers and the German economy in general? Is it possible and productive to manage competition during the liberalization process? Is there any realistic hope of dislodging the dominant incumbent, Deutsche Telekom (DT)?

### 1.3. Methodology

The German telecommunications industry faces major uncertainties about the future. Industry regulations, technological changes, and customer demand will shape the industry structure for the next decade. This thesis will present the potential scenarios for the telecommunication industry in the next 10 years. The scenario building approach will rely on the Porter framework\(^1\). The process is presented in Table 1.

---

\(^1\) Michael E Porter Competitive advantage Creating and sustaining superior performance. The Free Press 1985
I will first analyze the structure of the industry prior to liberalization, present a brief review of the German telecommunication history, and review the five competitive forces (Porter framework) which will permit a better understanding of the German telecommunications industry background.

I will then present recent developments and identify the uncertainties that may affect the existing industry structure. The most important uncertainties that might affect the five competitive forces will be systematically reviewed and the causes of the uncertainties will be determined. A brief review of the UK telecommunications industry will permit to illustrate possible trends for the German industry.

The hypothesis behind the different causes of the uncertainties will then be combined into coherent potential scenarios. Each of the scenarios will imply a prevailing market structure.

The objective of this thesis is not to define the most likely scenario for the German telecommunications industry, but rather to show that each industry scenario has its own set of implications, and key factors must be monitored to anticipate changes in the industry scenarios.

To check the different assumptions made in this work interviews were performed with companies involved in the telecommunications industry in Germany.
1- Structure analysis of today’s industry

2-Recent development: new competitors, EU regulation
   Identification of the industry uncertainties

3-Determination of the cause of those uncertainties

4-Establish hypothesis for each of the important uncertainties and combine them into coherent scenario

5-For each of the scenarios, analyze the prevailing structure and the implication of the new entrants strategy.

Table 1 Methodology for the construction of potential industry scenarios

1.4. Definitions

**ATM:** Asynchronous Transfer Mode, is a way of carrying digital voice, data, or video information as a series of fixed length units called cells, each cell containing a few bytes of control information, plus the data to be carried.

**Fully allocated costs:** An accounting approach under which all costs of the firm are distributed among its various services. The fully allocated costs of a service may therefore include some common costs that are not directly attributed to the service.
**Incremental costs:** The cost that arises from the provision of the specified increment of output. In contrast to the fully allocated costs, the incremental costs of a service include only those costs that are incurred as a result of the provision of the service.

**Intelligent services:** A form of telecommunications network architecture that centralizes networks routing information or service control logic into a few common databases, rather than replicate these at each exchange. In a more general sense, the term “intelligent network” is sometimes used to mean any network providing a rich set of advance services beyond those of ordinary telephony.

**Networks layers:** Public switched telephone network has four major layers which are detailed in the Table 2

**Number portability:** Number portability between operators enables a customer to transfer from one operator to a second operator and retain the same number provided the customer remains at the same address.

![Networks layers diagram](image-url)
**Telecommunications services**; Table 2 presents what is included in the telecommunications services. The list is not exhaustive but is intended to be indicative of the items covered by services.

<table>
<thead>
<tr>
<th>Service Group</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Voice Telephony</td>
<td>Basic Voice Services</td>
</tr>
<tr>
<td></td>
<td>Leased Circuits</td>
</tr>
<tr>
<td></td>
<td>ISDN (Integrated Services Digital Network)</td>
</tr>
<tr>
<td>2. Data, Text, Video</td>
<td>Public Data Network</td>
</tr>
<tr>
<td></td>
<td>Teletex</td>
</tr>
<tr>
<td></td>
<td>Facsimile</td>
</tr>
<tr>
<td></td>
<td>Video-conferencing</td>
</tr>
<tr>
<td>3. Value Added</td>
<td>Electronic Mail</td>
</tr>
<tr>
<td></td>
<td>Database Services</td>
</tr>
<tr>
<td></td>
<td>Voice Messaging</td>
</tr>
<tr>
<td>4. Mobile</td>
<td>Cellular</td>
</tr>
<tr>
<td></td>
<td>PCN</td>
</tr>
<tr>
<td></td>
<td>Paging</td>
</tr>
<tr>
<td></td>
<td>Public Access Mobile Cordless Telepoint</td>
</tr>
</tbody>
</table>

Table 3 Definition of Services
Chapter 2 - History and industry structure

The objectives of this Chapter are to review the German telecommunications history and to analyze the telecommunications industry structure before the reforms that began in 1989.

2.1. History of the German telecommunications industry

In Germany, the central government's authority over telecommunications dates back to German unification in 1871 and the 1919 constitution of the Weimar Republic. The FRG Constitution grants the Federal Government exclusive responsibility for telecommunications, both transmitted or by cable. The telecommunications2 German history can be split in three periods: pre-World War I, between World War I and II, and post World War II.

2.1.1. Pre-World War I

The first public telephone exchange was established in Berlin in 1881 and, during the same year, the Imperial Council declared that telephone service was the exclusive responsibility

of the Telegraph Administration. Under the leadership of the Reichpost, capital investment in exchange facilities, both local and long distance, increased on a regular basis throughout the latter part of the nineteenth and early twentieth centuries. At the same time in Europe (especially in the UK and France), private telecommunications services providers faced very high levels of political risk. In an effort to protect their investment in telegraph plants and equipment and to maintain their control over telecommunications services, the state monopolies lobbied hard to bring telephone service under their authority. The risk was important for private telecommunication firms to lose their franchise and to not receive reasonable compensation for their investment, in case of nationalization. The result is illustrated in Figure 1, which provides a comparison of European telephone penetrations in 1887.

Figure 1 1887 telephone development levels

By the early part of the twentieth century, most of the private telephone service providers in Europe were nationalized, eliminating the political disincentive for investment.

2.1.2. The years between World War I and World War II

Telephone infrastructure growth rates began to slow down after World War I. Figure 2 compares Germany with the UK, France, Sweden and the median penetration rate for a sample of developed countries. After World War I, the costs of expanding the network increased dramatically, straining the government budget. The uncontrollable inflation of the post World War I period meant that revenues were constantly falling below the operating and capital expenditures. As a result, the Reichpost became increasingly dependent upon the federal budget, requiring annual subsides, in contrast to the revenue it had contributed to the treasury prior to the World War I.

Figure 2 Growth of the telephone infrastructure

---

(Data from AT&T, *Telephone Statistics of the World* [New York: AT&T, 1950].)
In 1924, the Imperial Postal Finance Act granted PTT financial and management independence. But in 1933, Hitler assumed power, Germany began preparing for war, and PTT reorganization had little opportunity to affect telephone penetration.

2.1.3. The post World War II period

With the end of the third Reich, the Reichpost ceased to exist and its infrastructure was taken over by allied power. While most developed countries showed a rapid growth in their telephone industry, after World War II German telephone industry expanded at a comparatively slow rate. The industry never reached the level of penetration one would expect, given the country's wealth. Figure 3 gives comparative penetration levels for European countries between 1950 and 1980.

![Figure 3 Telephone penetration levels](image)

---

After World War II, the control of Bundespost was assumed by a coalition of major interest groups. Two groups dominated telecommunications policy-making in Germany since World War II: Labor groups and equipment manufacturers. The Workers Union (DPG) has been one of the major opponents of most proposed changes in the Bundespost's monopoly because of their concerns over employment losses. The telecommunications equipment manufacturers (they were represented by six to ten firms among which Siemens was the dominant one) represented the other important interest group. During that period tariffs ranked among the highest in Europe. Figures 4 and 5 give examples of comparative tariffs in Europe for telephone calls and lease-lines.

<table>
<thead>
<tr>
<th>Country</th>
<th>Local Telephone Calls</th>
<th>Trunk Telephone Calls (&gt; 200 miles)</th>
<th>International Calls</th>
<th>International Telex Calls</th>
<th>Local Telex Calls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>0.082</td>
<td>1.230</td>
<td>7.860</td>
<td>4.310</td>
<td>0.643</td>
</tr>
<tr>
<td>France</td>
<td>0.083</td>
<td>1.210</td>
<td>4.840</td>
<td>3.460</td>
<td>0.484</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>0.088</td>
<td>0.410</td>
<td>1.860</td>
<td>1.740</td>
<td>0.097</td>
</tr>
<tr>
<td>United States</td>
<td>0.053</td>
<td>0.810</td>
<td>2.420</td>
<td>2.860</td>
<td>0.700</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Country</th>
<th>Local Telephone Calls</th>
<th>Trunk Telephone Calls (&gt; 200 miles)</th>
<th>International Calls</th>
<th>International Telex Calls</th>
<th>Local Telex Calls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>0.082</td>
<td>1.230</td>
<td>3.930</td>
<td>2.570</td>
<td>0.643</td>
</tr>
<tr>
<td>France</td>
<td>0.080</td>
<td>1.190</td>
<td>3.150</td>
<td>3.260</td>
<td>0.444</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>0.110</td>
<td>0.350</td>
<td>1.850</td>
<td>1.740</td>
<td>0.104</td>
</tr>
<tr>
<td>United States</td>
<td>0.053</td>
<td>0.590</td>
<td>2.420</td>
<td>3.360</td>
<td>1.020</td>
</tr>
</tbody>
</table>

Figure 4 comparative telecommunication service tariffs in 1986 and 1987⁶

<table>
<thead>
<tr>
<th>Country</th>
<th>Circuit Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10km</td>
</tr>
<tr>
<td>West Germany</td>
<td>$129</td>
</tr>
<tr>
<td>France</td>
<td>25</td>
</tr>
<tr>
<td>Sweden</td>
<td>24</td>
</tr>
<tr>
<td>Switzerland</td>
<td>46</td>
</tr>
<tr>
<td>United Kingdom*</td>
<td>59</td>
</tr>
</tbody>
</table>

Figure 5 leased line charges in 1985⁷

⁶ source National utility service tariff in British pounds
⁷ source logica tariffica
Deutsche Bundespost (DBP) focused its attention on operations, maintaining a technical staff of only 2,700 at the FTZ, in comparison British Telecom, France Telecom and AT&T operated large R&D labs. Rather than develop products in house, DBP had a deliberate policy of purchasing products developed by its "court suppliers" and made in Germany. To avoid interfacing problems and, in principal, maximize economies of scale, the FTZ would select a single design which was then licensed to all suppliers in organized cartel agreements. Siemens became synonymous with Telekom technology, building a DM 20 billion telecom business on this solid base. ITT (now Alcatel SEL) also flourished during this period.

2.2. The relationship between telecommunications equipment suppliers and the operator.

2.2.1. The suppliers

The central business players in the telecommunications industry were located in the equipment manufacturing industry. The most important criteria to be admitted to the “court of suppliers”, was the maintenance of manufacturing facilities in Germany, which was required if one wanted to discuss equipment standards and get orders. Seven firms provided more than 80% of the production capacity of telecommunications equipment in Germany. These firms were:

- Siemens, which produced the whole range of telecommunications equipment;

---

• SEL, which was the German subsidiary of ITT until it was bought in 1986 by Alcatel;
• PKI, which was the German subsidiary of Phillips;
• AEG Telefunken;
• ANT, which belonged to the electronic conglomerate Bosch,
• and Detewe, over which Siemens exercises a strong influence through a large indirect shareholding.

These firms were getting approximately 60% of the telecommunication orders. The rest of the orders was spread over smaller firms, which produced telephone sets and telecommunication cables.

The large firms had intensive contacts with the Bundespost, the Ministry on general policy issues, and the FTZ on technical and purchasing issues. Formally, the telecommunications equipment industry provided half of the members of the post minister’s technical advisory council, and a majority of the executive ZVEI’s information and communication technology.

Practically, most of the strategic technology decisions were discussed with the telecommunications equipment industry. Among the firms involved, Siemens was the leading one. Of Siemens, it was said that in the German industry you can do a lot with it, a bit without it, but nothing against it.

2.2.2. Procurement practices

Procurement practices of the DBP have been a particular bone of contention, both internally and domestically. The German Monopoly Commission found equipment prices
to be generally higher domestically than in North America, and the equipment was of costly design.

In 1960, only 25% of total procurement was subjected to at least a limiting bidding process, this increased over the next 20 years to 40%. In 1976, the Cartel Office imposed fines totaling DM 1 million against twelve telephone equipment manufacturers and twenty of their managers, after finding that in 1974 and 1976 they had rigged for DBP terminal equipment.

The DBP's research and development arm, the Fernmeldetechnisches Zentralamt (FTZ), played a key role in the procurement process through its power over the selection, licensing, and development of equipment. Almost 60% of the DBP's procurement contracts were awarded by the FTZ. Traditionally, it collaborated with a chosen supplier to develop products, with the other manufacturers acting in effect as subcontractors to the primary firm.

In 1981, a report from the German Monopoly Commission stated that the DBP's practices contributed to the rigidity of the supply market structure by its reliance on uniform equipment technology, and a de-facto concentration of procurement. In fact, all the suppliers had to conform to an agreed-upon technology for a product; the four main development firms shared patents that were obtained in the course of the product development.

2.2.3. Example: the Customer Premises Equipment

Since the first private branch exchange (PBX) was introduced in Germany in 1900, the penetration of PBXs was substantial. There are more than a million PBXs in Germany,
connecting about 10 million extension stations. Until 1934, the market for PBXs was relatively free. All private suppliers could enter and install equipment on private premises, though the Reichspost was also a supplier. Competition led to technological development, but it also led to severe price wars. The Reichspost was being undercut by private competitors. In 1934, the PBX manufacturers considered the price competition to be ruinous and set out to stabilize it. They established uniform technical requirements and performance standards. The private suppliers agreed to conform to uniform condition of supply as well as to the prices of Reichpost-supplied PBXs. Any new supplier had to be admitted to the production of PBX, in fact the Reichspost achieved the elimination of the competition that would undercut its own position. The result was a cartel situation, in which the DBP bought, leased, and resold customer terminal equipment. It also provided (though not exclusively) PBXs, modems, and other more sophisticated equipment, including telefax equipment.

2.3. The industry structure: Summary

As we have shown, before the reforms, the telecommunications industry in Germany was the exclusive domain of the Deustche Bundespost, a federal administration with a monopoly over all telecommunications services and infrastructure. The main forces shaping the telecommunications industry structure were:

- The industry association and equipment manufacturers. They both played a significant role in the determination of equipment standards and in the formulation of the strategic technology decision.
The Deutsche Bundespost staff. The Bundespost's status as a public administration had a great impact on personnel issues. The dominant union in the Bundespost was the Deutsche Postgewerkschaft (DPG), a single company union representing civil servants, salaried employees, and wage laborers. The DPG had a great deal of influence within the Bundespost where, by constitution, social considerations were a priority.

Table 4 summarizes the telecommunications industry structure before liberalization.

![Diagram showing the telecommunications industry structure]

Table 4 The telecommunications industry structure prior to liberalization

At that time, both residential and business users were particularly heavily taxed by Germany's high telecommunications tariffs. As we have shown, long distance tariffs (both national and international) ranked among the highest in Europe. These tariffs affected the entire range of business users, regardless of size. The power of the corporatist coalition
(employees, suppliers, and government) maintained very high entry barriers, and new
technologies (new services, value added networks VAN) were introduced very slowly in
an effort to maintain very high profitability of both the operator and the suppliers. It was
in the well understood interest of most of the coalition members to maintain the status
quo.
Chapter 3 - The European Commission role

3.1. The emerging regulatory role of the European Commission

3.1.1. 1987-1994: The European Commission finds its voice

3.1.1.1. The 1987 EC Green Paper on telecommunications

Recognizing the technological, customer, and competitive pressures acting upon the telecommunications industry and pressured by the pace of regulatory change in parts of Europe, the European Community set about formulating a regulatory framework that would provide the basis for the European regulatory environment into the twenty first century. The 1987 EC Green Paper on Telecommunications outlined a proposed regulatory framework⁹.

An important distinction was introduced in this framework between the object of reform, liberalization of the telecommunications industry and the introduction of competition, and the means of reform in any given country, e.g. privatization. The EC stresses that the choice with regard to ownership of the telecommunications operator rests at the national level (as per EC Treaty Article 222).

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The EC’s reform program had three main objectives:

1. Liberalization leading to market and revenue expansion and a strengthened telecommunications base;

2. Provision of the right conditions for the restructuring of telecommunications operators and, in particular, the separation of regulatory and operational functions. This separation is viewed as essential to the restructuring of the industry. Without it, the telecommunications service provider retaining the regulatory role is able to structure the implementation of regulations (if not their content) to keep out competitors;

3. Creation of opportunities for realizing scale economies through pan-European operations.

The first of these objectives was partially realized by an agreement reached between the EC Commission and the EC Council of Ministers in December 1989 that led to an EC Services Directive issued in July 1989. This directive mandated:

- Immediate introduction of competition throughout the community for value added services, that is, services other than basic voice and data telephony;

- Liberalization of data communication services with the resale of capacity in the form of leased lines to be allowed from 1 January 1993 onwards. Certain member states with less developed networks were given an exemption until 1 January 1996;

- Continued *national choice* as to the introduction of competition into the provision of public voice telephony services and network infrastructures.
All EC member countries except the UK chose to maintain national monopolies during this period. However, by the early 1990’s almost all EC members had responded to the pressure from the EC for the separation of regulatory and operational functions. Almost all the EC members decided to split the state owned monopoly telecommunications provider from their PTT’s, and to keep it as a stand alone institution, a process typically described as corporatization.


A major strategic underpinning of the EC’s attitude towards telecommunications was outlined in the Bangemann report, “Europe and the Global Information Society” (May 1994). This report proposed a vision of the European “information society” in which telecommunications infrastructure allowed information to flow freely around Europe, stimulating new services and applications, improving productivity, and boosting economic growth, competitiveness, and job-creation. The Bangemann report stressed the social challenges that such developments posed; in particular the danger of the emergence of a two-tier society split between the information “haves” and “have-nots”. In light of this vision of the future and similar global visions agreed by the G7\(^{10}\), the EC Commission began to further develop its vision of European regulatory frameworks. This vision was

\(^{10}\) The regulatory framework should put the user first and meet a variety of complementary social objectives. It must be designed to allow choice, high quality services and affordable prices. It will therefore have to be based on a environment which encourages the dynamic competition, ensures the separation of operating and regulatory functions as well as promotes interconnectivity and interoperability” (Conclusions of the G7 Summit, Brussels, Feb. 1994)
articulated in the 1994 “Green Paper on the liberalization of telecommunications infrastructure and cable TV networks”\textsuperscript{11}.

The Green Paper recommends a two-stage approach to further telecommunications liberalization\textsuperscript{12}:

- The first stage would lift all remaining restrictions on the use of own and third-party infrastructure for the delivery of all services already liberalized (e.g., value added services, satellite communications, microwave links);
- The second stage would involve the licensing of providers of new infrastructure for all services including public voice telephony.

At the meeting of the EC Telecommunications Committee on 1 November 1994, it was decided to abolish all telecommunications monopolies after 1 January 1998 (Spain, Portugal, Greece, and Ireland have opt-outs until 2003). The Table below outlines the proposed timetable for the implementation of these and other changes detailed in the Green Paper:

The Green Paper also discusses possible definitions of universal service, its recommendations encompass:


• The elements of the service - voice telephony and a minimum set of leased lines, not broadband to the home (for the present), but potentially broadband to each locality (e.g. to a library);

• The adoption of common and progressive costing approaches;

• The development of means of financing Universal Service Provision.

<table>
<thead>
<tr>
<th>Services</th>
<th>Infrastructure</th>
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<tbody>
<tr>
<td></td>
<td>Services open to competition</td>
</tr>
<tr>
<td>Data and other non-voice communication</td>
<td>Since 1990</td>
</tr>
<tr>
<td>Voice telephony for corporate communications &amp; closed user groups</td>
<td>Since 1990</td>
</tr>
<tr>
<td>Mobile communications</td>
<td>Underway</td>
</tr>
<tr>
<td>Public voice telephony</td>
<td>1 Jan 1998</td>
</tr>
</tbody>
</table>

Table 5  Key dates for proposed liberalization of the European telecoms market
In addition, the Green Paper addresses issues of *harmonization*, i.e. questions of interconnection and interoperability, licensing and competition. The stance taken in the Green Paper is that each of these areas are subject to national regulation but that this should take place *within an EC framework*.

The Green Paper two step approach has not yet been endorsed by the Council of Ministers and the EC Commission has been engaged in extensive consultation on the subject. Conclusions from this consultation\(^\text{13}\) are that there is general support for the full liberalization of telecommunications by 1998 and for the shape of the framework, definition of universal service, and development of standards for interconnection *but* there continues to be disagreement on the pace of infrastructure liberalization and on methodologies for pricing and costing services. In effect, although the principles set out in the Green Paper have by and large been agreed there still remains much disagreement on the details. In view of the failure to date to reach agreement and have the Green Paper endorsed by the Council of Ministers the possibility of the Commission adopting the Green Paper's recommendations *without ministerial endorsement* has been mooted. In fact this approach has already been adopted for part of the first stage liberalization process. In December 1994 the Commission proposed a directive allowing cable TV operators to carry any telecommunications services that had already been liberalized - if fully adopted by the Commission, this Directive should come into force on 1 January 1996.

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\(^{13}\) EC Commission Directorate General, 3 May 1995, op cit.
3.1.2. The current position and beyond

3.1.2.1. *The role of the EC - light-handed regulation or activist intervention?*

According to the Commission, the future deregulation of the telecommunications markets will require the dismantling of state monopolies to improve competitiveness for certain services and equipment. Public administrations will partly continue to have a monopoly over certain basic services, however, they will also have to respect the Treaty of Rome which limits the exclusive rights of public enterprises (Article 90), which imposes rules on competition (Article 85) and on the abuse of dominant market position (Article 86) and which provides for the free movement of services (Article 59).

Therefore, it is not the role of the Commission to take over responsibility from local governments for legal frameworks and country specific regulations. The EC Commission sees its role as developing a common vision and giving advice on standards and international interconnections. The role of Brussels has been described as "light-handed regulation"14 that provides a responsive, dynamic push towards a telecommunications market which allows free competition inside Europe. In addition to its work in policy development already described, the

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14 Ungerer, 1992
Commission is also heavily involved in technology initiatives and in the sponsorship of research and development\textsuperscript{15}.

An increasingly important EC role is in the development of standards. Pan European standards are especially critical if independent national, and increasingly sub-national\textsuperscript{16}, infrastructures are to be interconnected. While in the past the EC may have pushed for standards such as Euro-ISDN, it has learned from this experience and has no intention of becoming a standardization body. However, the free exchange of information and data will be possible only with a complex and accurate set of regulations. Increasingly, therefore, the EC finds itself forced to take an activist role contrary to its preferred position as “light-handed regulator”.

Other fields in which the EC is being forced to take a more active role are privacy and data protection. The large discrepancy among the EC Member States concerning these areas and the ‘regulatory gap’ in some of them have stimulated activities by the European Commission in this field\textsuperscript{17}.

\textit{3.1.2.2. The achievements of the EC - European telecommunications in 1995}

As described previously, the EC develops frameworks in which nation states have the freedom to implement appropriate local strategies. This can seem a vague and slow process for achieving change. However, many of the changes the EC put in

\textsuperscript{15} Esprit projects

\textsuperscript{16} For example, the Bavarian State Government is sponsoring the development of a local broad band infrastructure.

\textsuperscript{17} Grande, 1995, op cit
train in the 1980s have been implemented. Achievements for which the EC can claim a large part of the credit include:

- separation of regulatory and operational functions in all of the EC member states;
- free access to procurement contracts in public telecommunications;
- coordinated development of telecommunications and common infrastructural projects (e.g., introduction of the Integrated Services Digital Network (ISDN));
- the creation of a Community-wide market for terminals and equipment and consequently the promotion of Europe-wide open standards; and
- the introduction and development of advanced services and networks in the poorer regions of Europe.

However, without further liberalization, and in particular without the opening up of markets for voice telephony, there is a danger that the new services and infrastructures necessary for the “information society” will remain undeveloped. Telecommunications tariffs in the European Community are still ten times higher than those in the United States. For example, the average price for rental of a leased line to the nearest member state in the EU was ECU 40,922 in 1994 compared with ECU 4,601 for a rental of a similar distance in the United States\(^{18}\).

\(^{18}\) Prieskel & Higham, op cit
3.1.2.3. Issues for the future

An important milestone for the EC will be in 1998, when full competition, including infrastructure, is planned. Simultaneously with all deregulation and liberalization activities, the EC started the big dream of the Information Society, which is at a whole the introduction of new digital services, connecting every thinkable thing which can be used as a network terminal. In discussions with the IT-industry and in EC-workshops the information society is presented as the new industrial revolution, comparable to the introduction of electric power for every household in the first decades of this century. The following areas are covered in the current plans of the Information Society:

- New services with intelligent networks;
- New network technologies with higher speed and capacity;
- New terminal equipment and the world of multimedia;
- Integration of different networks and terminal technology.

The EC is sponsoring much research work and prototype development for these new technologies, but is also somehow competing with local activities in some regions, where the first broadband multimedia field trials have started already.\(^{19}\) From a technician’s point of view, the variety of these approaches is good for the evolution of the technology itself, especially in the beginning of the evolution process. A potentially negative issue is whether local markets are too small for the

\(^{19}\) Berlin, Hamburg, Nuremberg, Leipzig, Dresden and Munich in preparation.
profitability of products. It will be the role of the EC and the Council of Ministers to find the right balance between local activities and general standards, which allow the free flow of information and data. This is also a chance for the European IT-industry to recover and to gain some visibility in global markets.

3.2. European standards: a new framework

The primary trade objective of the European Commission is to build the community into a strong global trading competitor, particularly with respect to Japan and the United States. The goal of a single European Market is the primary mechanism for this objective. In that context, the European commission has been responsible for the creation of the European Telecommunication Standards Institute (ETSI) in January 1988. ETSI has a permanent secretariat and offices at Sophia-Antipolis in the South of France. ETSI has taken over the standards making role for Western Europe and is active over a broad range of issues covering most of the telecommunications service and equipment industry. The output of ETSI is in two forms:

- European Telecommunication Standards (ETS);
- interim ETS (I-ETS) where further development is needed.

The application of ETS is voluntary but, in practice, all of Europe is adopting the new telecommunications standards. The ETSI members are covering a wide range of the industry: Telecommunications Administrations, Private Network Operators, Users, Research Bodies, and Manufacturers. The telecommunications equipment manufacturers are the largest single group with over 50% of the ETSI membership.
Common European standards provide a platform for suppliers to manufacture in high volumes and for network operators to be able to implement multi-vendor purchasing policies.

3.3. The changing shape of telecommunications regulation

The European Commission has not had an easy time defining its regulatory role during the 1980s and 1990s. Throughout this period, it has attempted to walk a middle line between a “hands off”, free market approach and a “hands on” interventionist path:

- In the area of standards, there are great benefits in standardizing to allow “interoperability”, the free connection of devices to the network. Too great a degree of standardization may, however, lock in obsolete standards, limit competition, and encourage commoditization. The EC Commission is currently discovering how difficult it is to reach pan-European agreements on standards when different telecommunications players and national governments are supporting different approaches for reasons of national competitive advantage or political expediency.

- In the area of social issues, the EC Commission is increasingly finding itself forced to take an activist role in developing, and reaching agreement on,
common EU standards on universal service provision and privacy. Once again, however, while the benefit of a common approach is accepted by all, the details of this approach (for example, how services should be charged) are still the subject of heated debate.

- With regard to *industry structure*, the EC Commission to date has developed frameworks and allowed national governments to develop their own approaches to the re-organization of their national telephone monopolies. There is a danger, however, that the this process will result in the establishment of a series of national champions, operating in heavily regulated home markets and creating an oligopolistic European competitive environment. For example, France Telecom continues to dominate the French market but has 10% of the German market, while Deutsche Telekom takes a small share of the French market. The best defense against such an eventuality is for the EC Commission to encourage diversity in the telecommunications industry: diversity in terms of market entry\(^{21}\), diversity in terms of ownership (nationality of company) and diversity in terms of technology. Ultimately, once the current period of national level restructuring is over and European industry dynamics develop, the EC will be forced to take a stance on these issues. How, for example, how would a merger between France Telecom and Deutsche Telekom be viewed?

The European telecommunications industry has passed through, and is still undergoing, a period of very dynamic change. The liberalization of the

\(^{21}\) Ungerer, 1992, *op cit*, stresses that the EC Commission wants to avoid the US approach of regulating telecoms companies lines of business
telecommunications industry is, however, merely a transitional stage on the way to the establishment of a dynamic, competitive telecommunications industry and infrastructure. As the EC Commission has discovered, telecommunications is neither an industry that can be left to the free market, the societal implications of this approach are undesirable\textsuperscript{22}, nor one that Brussels based technocrats can regulate at a detailed level. By taking a middle path between these two extremes the EC Commission is developing a new institutionalist role, a role that will become more common as more and more industries are increasingly structures and being regulated at a European level and a role that goes beyond traditional views of competition vs. monopoly.

\textsuperscript{22} The US provides many examples of the problems this approach can cause - and the danger of commoditization and price competition for the players within the market
Chapter 4 - The road to liberalization: The British example and recent German debate

4.1. The British example

4.1.1. Liberalization a long and complex process

As part of Margaret Thacher's neoliberal industrial policy, the British Telecom market was liberalized in the 1980s. In 1982, Mercury, a cable and wireless subsidiary, was awarded a national license to compete with British Telecom (BT). In 1984, the government sold 50.2% of BT equity, and created the regulation agency OFTEL (office of telecommunications). Several measures were taken to limit the power of the now-private BT including an exclusion from the provision of cable television services. Two mobile telephone operators (Cellnet and Vodafone) were also licensed.

BT went through a period of substantial change. Customer service was radically improved: a decade ago, BT warned 250,000 customers waiting for new lines that it would not even suggest an installation date. Today it installs residential lines within 48 hours. Tariffs fell 40% in real terms. However, most of the savings were obtained through "headcount" reductions, 90,000 staff lost their jobs.

Recently, American operators have entered the cable television market. Nynex has built a network covering the greater Manchester area of England, while Telewest (a joint venture between Time Warner and US West) is strong in the southeast. Both companies lay
telephone cables at the same time they install their coax (cable TV) networks. They then hook up their telephone cables to Mercury's telephone system. Both sides are winners, Mercury avoids substantial capital outlays while the cable companies can spread the cost of installation between two services. By offering 10% reductions compared to BT's prices, 90% of Telewest or Nynex cable customers also subscribe to telephone service. This combination of a local cable/telephone company hooked into a national "backbone" telephone operator has substantial potential.

While "liberalization" of the British Telecom market was implemented with no major problems, several key objectives were not met. It was hoped that Mercury would develop into a major competitor of BT. However, its market share stayed below 10%. Mercury blames restrictive practices on the part of BT. Cynics suggest that Mercury has taken BT's most profitable customers in the City, avoiding residential areas.

A detailed analysis of the liberalization scenario in UK23 permits us to better understand the main reasons of the situation today. The question of equal access to the public infrastructure was raised in the context of the government’s review of the British Telecom-Mercury duopoly policy in 1990. At that time, due to the lack of access points, Mercury had already developed its own strategic vulnerabilities:

- a focus on the large business segment,
- an empty network overnight; Mercury had very few residential customers,
- Its own local network was noncompetitive, compare to the BT local infrastructure,
- the cost of access paid to BT; in 1990 on gross revenue of £351 million they paid to BT £158 million,

23 Interviews performed in the week of March 4th 1996 - Cable & Wireless and Mercury.
• Poor internal IT system due to its own investments limit.

Initially Mercury had a very good start; they gained almost 70% of the City business. But as soon as BT was allowed to modify the tariffs in 1991, the Mercury profits went down. With the ending of the duopoly, Mercury now faces a complex, many-sided market and a new generation of competitors -most with strength in particular niche\textsuperscript{24}. In the meantime British Telecom became a formidable competitor (increased flexibility, productivity improvement, customer focus, new services and new technologies introduction). A recent OCDE report mentioned that after 10 years of market liberalization, BT was still controlling 90% of the market in 1993.

4.1.2. Learning from the British telecommunications industry

The British telecommunications industry analysis shows that market liberalization is a long and complex process and permits to draw some learning which could be applied by the new entrants in the German market.

Mercury started with an “easy” 10 years period during the 1980s. Mercury emerged in the UK through a classic insider deal rather than on the basis of competitive bidding\textsuperscript{25}. Thus, Mercury had a certain leverage over the British policy makers. During this period, Mercury had some help in growing its business.

\textsuperscript{24} Cable & Wireless report and accounts 1995.

\textsuperscript{25} Eli Noam Telecommunications in Europe Oxford University Press 1992
• The weaknesses of BT: BT had an overall poor quality of services, very high costs (in 1984 BT had a ratio of 85 main lines per employees compare to 155 today) and BT was in general disliked by its customers.

• The massive market growth: the market in the 1980s grew from $4 billions to $13 billion. Mercury was able to get its market share without impacting the growth of BT.

• The fact that BT was not allowed to rebalance its tariffs. BT had no price flexibility.

But in 1989 when Mercury reached profitability, its total income was 1.6% of BT’s revenues, and its share of international traffic (4.3%), inland phone call (0.7%), and leased lines (7.6%) were minuscule. In 8 years Mercury invested a total of 825 millions British Pounds, less than one third of what BT invested for the year 1990.

In the meantime, Mercury built up all the elements which has created their current strategic vulnerabilities:

• **A focus on the large business segment.** When Mercury initiated its business, this segment, representing approximately 10% of the market was very profitable (cross-subsidization of the residential segment with the business segment). Most of the large business customers were looking for price discounts, new services introduction, and a radical improvement in the service quality (Mercury got 70% of the city business in London after a long strike by BT employees). Therefore, BT provided very little competition in this segment. But this segment is very price sensitive and represents an ideal market for niche players. After a period of productivity increase and recovery of some level of price flexibility, BT was able to start to compete in this segment.
• **Empty network overnight.** Mercury had very few residential customers, thus, their network investment was not productive at night or during the weekends when most of the businesses are closed.

• **Cost of access paid to BT.** In 1990, on gross revenues of £351 million, Mercury paid £158 million for access to the BT networks. This payment was the direct result of regulation which at that time set the access price at the fully allocated cost of BT (this point will be discussed further in the conclusion), and the very limited Mercury network.

• **Operational vulnerabilities.** As discussed above, the investment level of Mercury was very limited when compared to BT. Their small R&D scale, and their limited investment in IT, network management, and network intelligence did not permit them to take advantage of the recent technological progress which to reduce operational costs and build a competitive advantage in the infrastructure.

What are the key learning which can be drawn from the Mercury experience?

It is very difficult for an outsider to break into the vertically integrated package of the incumbent. BT did not encourage interconnect or equal access, and preferred to continue selling its services as whole “bundles”\(^\text{26}\). The same strategy will probably be adopted by Deutsche Telekom in Germany. Therefore, the new entrants have to obtain the regulatory framework which help their start-up. Equal access, number portability, interconnect cost, and pricing regulation to avoid cross-subsidization for the incumbent are the most important variables which have to be negotiated. Initially, Mercury focused to much attention on the duopoly conditions. The regulatory body must immediately obtain

\(^{26}\) Robin Mansell, The new telecommunications - SAGE publications 1993
resources and power to implement a strong regulation environment. During that period, the new entrants must design their operations to gain a real and long term sustainable advantage, assuming that most of the regulatory frameworks will disappear over time, and that the incumbent will improve its operations very quickly.

On the issue of networks investment, Mercury combined two incompatible strategies: a niche approach (business segment) and some level of networks investment. They quickly established a microwave network service within London and connected this network by digital microwave with Birmingham and Manchester. They also built a fiber-optic trunk system centered in Birmingham. One result of this strategy is that their network is insufficiently used (there is almost no residential traffic) and the return on their investment is not adequate. Mercury is currently trying to increase their number of residential customers. Better strategies would consist of either focusing on niches and minimizing networks investments, or investing in a network and pursuing all the market segments to maximize return on investments. When building a network, the most recent technologies have to be used to allow a cut in operational costs, when compared with those of the incumbent (aging networks). The challenge will be to build the local access networks (20 times the investment of the trunk networks), but mobile communication licenses and joint-ventures or acquisition of cable television companies should permit to build rapidly a significant customer base.

Finally, after 14 years of market liberalization, BT still own more than 85% of the total market and still provides direct services to more than 95% of the residential customers. The experience of the British telecommunications industry prompts us to ask two questions. Can viable competition be created by design? Is it really possible to dislodge entrenched incumbents? We will address those questions in the conclusion.
4.2. The German telecommunications debate

4.2.1. 1987 - 1994: Preparation for liberalization

In Germany the liberalization debate started in 1987. The DPG immediately argued against any reform of the Bundespost for two main reasons;

- this reform would lead to major lay-offs and,
- the reform would lead to a potential loss of the Universal Service guarantee enjoyed by customers in Germany.

The telecommunications equipment manufacturers were also against any major changes to the status-quo. After major conflicts and long negotiations, the government initiated the Postal Reform 1 in 1989. Between 1989 and 1994, the Postal Reform 1 changed the structure of the Bundespost and began the process of liberalization for some telecommunications services in accordance with the EU directives. The Deutsche Bundespost companies (DBP Telekom, DBP Postdienst, DBP Bankdienst) remained government-owned enterprises but operated with budgets separate from that of the Federal government. The law concerning the constitution of Deustche Bundespost defined the principle of operation of each entity, which included covering all expenses and making appropriate profits. Competition was introduced in terminal equipment and mobile voice services in 1990. In 1993, private corporate networks were liberalized and in 1994, competition started in mobile data communication. The next series of reforms addressed the structural constraints to prepare the privatization of Deustche Bundespost and further liberalization of telecommunication market. The government coalition of the Christian
Democrats, the Christian Social Union, and the Free Democrats pushed the privatization for Deustche Bundespost. The opposition came from the DPG and the Social Democrats, but finally, after a huge national strike in 1993, the parliament voted for the change to the basic law in 1994, and the federal government planned a first share offering for Telekom in 1996. During the privatization debate, the DPG won concession from the government. In particular the continuation of all existing contract and employee benefits was ensured.

4.2.2. New market - new competitors

The German telecommunications market is expected to grow by 50% to DM 90 billion by 2003. Almost all of the growth comes from new services with profit margins of 7 to 10%. There is, therefore, considerable private sector interest in providing these services. The bulk of the telecommunications revenues are earned by Deutsche Telekom because of its continued monopoly in basic voice telephony, which represents 90% of the market.

Since 1989, the slow liberalization in mobile telecommunications, private networks, and value added services have allowed a few competitors to enter the telecommunications market. Mannesman received a mobile license in 1992 and built 50% market share to reach a DM 1.5 billion turnover this year. A second competitor, Veba, started its E-Plus service last year. Alliances between several German public utilities and international telecommunications operators have been designed to prepare for full market liberalization in 1998. Veba, one of the German utility giants, created its own communication subsidiary, Vebacom, which teamed up first with Deutsche Bahn AG to create a network along the rail lines and entered into an alliance with Cable & Wireless, the British telecommunication firm. Recently, Vebacom announced an alliance with Mannesman.
Today, Vebacom is one of the most advanced competitors in Germany. Table 6 gives the overall organization of Vebacom.

![Diagram of Vebacom's structure]

Table 6 Vebacom 1996 structure

Another utility company, Viag, the Bavarian utility group, is also preparing to enter the telecommunications market and has teamed up with British Telecom to operate in Germany.

Thyssen has created its telecommunication subsidiary Thyssen Telecom and has a strategic partnership with Bellsouth.

The German energy-based conglomerate, RWE AG, joined forces with six smaller utility companies to form a network in Germany that could provide voice and data transmission.

U.S.-based telecommunications firms are also entering the German market. Metropolitan Fiber System (MFS) has an agreement with the city of Frankfurt to install and operate a
telecommunications network for private corporate customers. MFS deal used a provision in a 1993 law legalizing a fiber optic ring network to challenge DT network monopoly before 1998.

The alliances between the different competitors to DT will still evolve in the next two years, and while the new entrants get ready to take on DT, the German operator has started to reorganize.

4.2.3. Deutsche Telekom: getting ready for the competition

4.2.3.1. Deutsche Telekom: the third largest operator in the world

Deutsche Telekom is the largest telecommunications operator in Europe and the third largest in the world with a turnover of DM 61.2 billion in 1994; Table 7 gives an overview of the DT’s financial result for the 1990-1994 period. DT serves 40 million customers in Germany and has a large base in many services for residential and business customers. Deutsche Telekom is also the world’s largest cable television operator with 22 million connections and 15 million subscribers.

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27 In 1994 DT was ranked in the 3rd position after NTT and AT&T and before France Telecom.
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<tr>
<td>Turnover (DM billion)</td>
<td>40.6</td>
<td>47.2</td>
<td>54</td>
<td>59</td>
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<td>Staff (000)</td>
<td>212</td>
<td>229</td>
<td>231</td>
<td>231</td>
<td>225</td>
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<td>Staff cost (DM mill.)</td>
<td>12.1</td>
<td>14.8</td>
<td>16.9</td>
<td>17.5</td>
<td>18</td>
</tr>
<tr>
<td>Balance sheet (DM billion.)</td>
<td>116.1</td>
<td>131.7</td>
<td>150.5</td>
<td>154.2</td>
<td>166.5</td>
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<tr>
<td>Capital and Reserves (DM billion.)</td>
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<td>35.6</td>
<td>36</td>
<td>33.9</td>
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<td>Fixed assets (DM billion)</td>
<td>108.8</td>
<td>121.2</td>
<td>133.4</td>
<td>139.9</td>
<td>138.9</td>
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<td>Gross investments (DM billion)</td>
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<td>24.4</td>
<td>28</td>
<td>25.5</td>
<td>22.8</td>
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<td>Depreciation (DM mill.)</td>
<td>12.1</td>
<td>14.4</td>
<td>14.8</td>
<td>19.1</td>
<td>17.4</td>
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<td>Operating results (DM billion)</td>
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<td>7.1</td>
<td>7</td>
<td>3.2</td>
<td>7.1</td>
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<td>Levy, taxes, Compensation</td>
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<td>7.2</td>
<td>7</td>
<td>6.1</td>
<td>5.9</td>
</tr>
<tr>
<td>profit/loss of the year</td>
<td>1.2</td>
<td>-0.1</td>
<td>0</td>
<td>-2.9</td>
<td>1.2</td>
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<tr>
<td>Net profit/loss for the financial year</td>
<td>0.5</td>
<td>0</td>
<td>0</td>
<td>-1.6</td>
<td>-0.3</td>
</tr>
</tbody>
</table>

Table 7 Deutsche Telekom’s financial results from 1990 to 1994\(^{28}\)

4.2.3.2. Telekom 2000: DT’s rapid evolution

Prior to the German unification in 1990, East Germany was served by one of the oldest telephone networks in Europe. The most recent technology changes to the network were made over 30 years ago. After the reunification, DT was under tremendous pressure to bring the Eastern state’s telecom network into the twentieth century as quickly as possible. A modern telecommunications infrastructure was seen as the way to make Eastern Germany a more attractive business location. Should DT prove unenthusiastic about assuming its “natural” role, there was a queue of private companies, including AT&T and Siemens, ready to step in. DT raised DM 60 billion through debt financing to provide 7.5 million East German homes and businesses with the most modern fiber optic network in the world. This chain of events illustrated the contradictory demands placed on DT, they

\(^{28}\) Source Annual report 1994; the 1990 numbers refer to Western Germany only; the 1994 numbers are obtained after all mobile communications activities have been spun off to DeTeMobil; the 1993 operating result number includes the effect of evaluation corrections amounting to DM -4.4 billion.
were required to be as efficient as a private company yet be denied access to funds and support for national infrastructure programs.

With purchases of DM 60 billion for the single new Landers project (former East Germany telecommunications equipment project), Deutsche Telekom reformed its purchasing policy. DT created a new purchasing unit in Berlin, far from the main office in Bonn. There had been a tendency for both Siemens and Alcatel to resist technological changes so they could maximize profit on existing product lines/technologies. In particular, DT was keen on fiber optic technology for residential access lines, especially for “green field” sites such as East Germany. DT took a 20% equity stake in the US company Raynet, one of the world leader in fiber-optic telecommunications technology. DT then invited proposals from around the world for a series of “OPAL” technology trials in 1992, and contracts were awarded to non-German firms: Raynet, and AT&T. A similar situation occurred in the mobile phone industry where the big equipment manufacturers winners were Nokia and Ericsson.

Telekom also realized it had enormous buying power. One simple example can illustrate the rapid change. Telekom uses tens of thousands of plastic trays\(^\text{29}\) each year to protect fiber optic cable joints. The historic price was DM 7, with the new system the price fell to DM 1. Similarly, the price of telephone exchanges, the life blood of telecom suppliers, fell 20% in 1994. These few examples illustrate how DT is adapting progressively to the changing environment. In the next section I will detail some of the most important structural changes that DT has undergone.

\(^{29}\) Personal experience in 1992 and 1993; the trays known as ANT splice cassettes after the company developed the original design, are injection molded ABS.
4.2.3.3. Internal changes at Deutsche Telekom

DT's greatest challenge will be to change its perspective from a "civil" service to a true "service" mentality and to increase its productivity dramatically. DT will be helped in that task by its new CEO, Ron Sommer, who previously worked for Sony and Nixdorf and had extensive experience in computer and consumer electronics. He replaced Helmut Ricke, who resigned out of frustration with the government's considerable influence in managerial decision making.\footnote{Financial Times 29 March 1995}

Before the nomination of Ron Sommer, in 1993 Deutsche Telekom initiated a fundamental restructuring initiative called Telekom Kontakt. The objective of this restructuring was to change the company's functional organization into customer-oriented divisions, establishing cost and profit centers with performance objectives for the branch managers. Table 8 summarizes this new organization. The organizational changes had the objectives of evolving towards a customer-oriented organization and adapting to the increasing competition from other companies. Recently, Mr. Sommer has been trimming staff and surrounding himself with managers loaded with private-sector experience from such firms as Volkswagen AG and Alcatel. He is also trying to convince employees that customers matter, a notion ignored during DT's days as a government agency.
Simultaneously Deutsche Telekom needs to leverage its capabilities to enter new business segments and foreign markets. In July 1993, Deutsche Telekom transferred its entire mobile communications business to an independent subsidiary, Deutsche Telekom Mobilfunk (DeTeMobil). This limited liability company is wholly-owned by Deutsche Telekom. Despite this ownership, the company is largely an independent entity competing with other companies and consortia in the mobile telecommunications market. Deutsche Telekom’s international strategy is focused on Eastern Europe; Germany’s new federal states are well positioned to serve as a gateways to Eastern Europe. DT invested in joint-ventures in fixed and mobile operations in Hungary, Russia, and Ukraine. To start global activities, DT entered into a joint venture with France telecom and Sprint.
4.3. An evolving market structure

In Chapter 2, I described the industry structure before the start of the liberalization process. In 6 years, this structure has radically changed. When I presented the industry structure in 1989, I emphasized that the telecommunications organization (a coalition of employees, suppliers, and the government) would not allow a rapid evolution of the industry. In 6 years, however, remarkable progress has been made, the legal framework is in place to allow full market liberalization and the privatization of DT. Competitors have entered the market and even if their market share is estimated at less than 5%, they have contributed to the structure change of the industry. The German equipment manufacturers have lost part of their control as new foreign manufacturers gained market share, and new DT procurement policies contributed to price decreases. The telecommunications equipment manufacturer, Alcatel SEL, which is struggling with huge losses in Germany illustrates how difficult will be the next years for the German suppliers. The customers have gained some relative power and DT is moving progressively to a customer-oriented organization. Finally, the role of EU has increased at the standards and regulation level. German telecommunications is still a quasi-monopoly industry, but the structure has radically changed in 6 years, Table 8 summarizes these changes.
Table 9 The telecommunications industry structure in 1996

Another important change in the German telecommunications field concerns DT itself. As I discussed earlier in this chapter, DT actively prepared the opening of the competition. In order to assess the strength of DT before the entire liberalization of the market, it is important to compare DT with other telecommunication carriers, and thus compare the German telecommunications market with the market of other countries. Table 10 gives the number of main lines per telecommunications employees. We can first observe that the productivity improvement is important for all the selected countries between 1984 and 1994. However caution should be used in interpreting the data, because this ratio does not take in account the differing degrees to which carriers outsource functions or trade off more capital investment for fewer staff.
<table>
<thead>
<tr>
<th></th>
<th>1984</th>
<th>1994</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>133</td>
<td>207</td>
</tr>
<tr>
<td>Germany</td>
<td>118</td>
<td>172</td>
</tr>
<tr>
<td>New Zealand</td>
<td>55</td>
<td>194</td>
</tr>
<tr>
<td>Sweden</td>
<td>127</td>
<td>174</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>85</td>
<td>149</td>
</tr>
<tr>
<td>United States</td>
<td>136</td>
<td>225</td>
</tr>
</tbody>
</table>

Table 10 Main lines per telecommunications employees\(^{31}\)

A simple alternative to the model above is to use price baskets and profit margins\(^{32}\). The unit cost is defined as the ratio of the average price charged by the carrier across its services and the carrier's profit margin plus 1. The results are shown in Figure 6.

![Figure 6 Variation in unit cost per country in 1994\(^{33}\)](image)

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\(^{31}\) ITU database 1995

\(^{32}\) This methodology has been developed by OVUM, a UK telecommunication consulting company.

\(^{33}\) OVUM database
This graph shows that there is an enormous variation in carrier efficiency across the countries measured. For example, carriers in the Nordic countries typically have unit costs that are less than 35% of those in Italy. In Germany, DT can still be underpriced if a new entrant in the German market achieve efficiency similar to the Sweden telecommunications market. In conclusion, and to continue the parallels between the British and the German telecommunication market, the power and efficiency of DT today are certainly greater than the power and efficiency of BT in 1984, but cost wise DT has still huge improvements to perform.

In Chapter 5, I will review the main uncertainties facing the German Telecommunications market: technology, regulation, and customer demand.
Chapter 5 - The main uncertainties

In the last 20 years, the telecommunications industry has changed dramatically with the emergence of innovative telecommunications technologies. This opened the way for service enhancements such as various messaging services, electronic mail, database services, toll free calls, local area voice, and data networks. More recently, the Internet services are growing worldwide quickly.

Unlike the basic telephone service, for which the demand was rather inelastic, demand for these new services is much more sensitive to price level and customized software features. The telecommunications industry has become demand driven rather than supply driven. Demands for increased choice and lower prices conflict with the Bundespost's goals of maximizing revenues and controlling entry into the industry.

The stability and efficiency of the old institution organization were based on a clear separation between public and private functions. Today, however, existing terrestrial networks have been supplemented by numerous special networks meeting specific user demands (for example, data transmission at various speeds). Satellite services and mobile communications have entered into competition with terrestrial switched networks. Integrated services networks (ISDN) are now feasible with digitization of switching and optical fibers.
As a consequence a multitude of new services have emerged, and the distinction between public and private telecommunications, between basic and enhanced telecommunication services has become vague. The progress of microelectronics allows more "intelligent" terminals. We saw in the previous chapter that the industry structure began to evolve with the beginning of market deregulation; as a consequence, most of the competitive forces are changing. The suppliers of the telecommunication industry are losing their important influence, while the customers are increasing their power. The changes in technology will play an important role in the creation of substitute to the traditional telecommunication technologies. Today 85% of the market is still basic telephony, but we are at the starting point of a radical change for which the most important unknown is the speed at which it will happen.

Finally, the content of the regulation will play an important role in shaping the future industry structure, as we have seen in the recent experience of the British market deregulation. Obviously, competitors’ behavior will influence the industry structure (what will be the Deutsche Telekom reaction? How quickly they will redeploy their work force? What will be the entry strategy of the new competitors? How many new entrants will face DT? What will be the size of the retail market?).

In the remainder of this thesis, I will first define typical potential scenarios and then define expected competitors’ behavior in the resulting industry structure. In this Chapter, we will review the main uncertainties which will affect the telecommunication industry in the following years. What will be the impact of the new technologies? How can regulation counterbalance the fundamental asymmetry between Deutsche Telekom and the new entrants? What will be the market growth and the customer demand role in shaping the telecom industry?
5.1. Technology: A complex evolution

5.1.2. Merging of technologies

In the last several years, there has been a rapid diversification in the field of telecommunications networks. Special networks have been built to meet specific customer demands (data transmissions at various speeds and with varying capacities). Satellite services and mobile communications have entered into competition with terrestrial switched networks. Telephone switching systems became very similar to large scale computers; as a result, the telecommunications operators had to master computer technology. The same is true for the computer manufacturers which had to provide networks of geographically separated but interconnected computers and to do so to master communications technology. More recently, software firms, computer manufacturers, and telecommunications operators began to compete to deliver electronic mail services, building on their respective different technological core competencies. As a consequence the distinction between:

- Public telecommunications and private data processing,
- Basic and enhanced services,
- Individual and mass communications/broadcasting,
became vague; today telecommunications and computing technologies can no longer be treated separately.
5.1.2. Technological trends

Two technological trends will shape the telecommunication industry in the next several years, the first one is the huge increase of the network capacity and the second which emerged recently is the creation of multiple networks superposed and connected.

- **Huge increase of the networks capacity.** The most important technological trends in telecommunications is the huge increase of the network capacity. I am not referring here to the added capacity built by the incumbent’s competitors but to the intrinsic capacity increase due to technological improvements. Table 11 details the bandwidth evolution between 1984 and today. From this table, we can notice the huge capacity evolution for all the network layers besides the access network. I will discuss the access network later in this Chapter.

<table>
<thead>
<tr>
<th></th>
<th>1984</th>
<th>1996</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Access Networks</strong></td>
<td>56 Kbit</td>
<td>56 Kbit</td>
</tr>
<tr>
<td></td>
<td>(144 Kbit)</td>
<td></td>
</tr>
<tr>
<td><strong>Regional Networks</strong></td>
<td>.45 Mbit</td>
<td>622 Mbit</td>
</tr>
<tr>
<td></td>
<td>(2.4 Gbit)</td>
<td></td>
</tr>
<tr>
<td><strong>Long distance Networks</strong></td>
<td>405 Mbit</td>
<td>2.4 Gbit</td>
</tr>
<tr>
<td></td>
<td>(10 Gbit)</td>
<td></td>
</tr>
<tr>
<td><strong>Submarine Networks</strong></td>
<td>280 Mbit</td>
<td>2.4 Gbit</td>
</tr>
<tr>
<td></td>
<td>(5 Gbit)</td>
<td></td>
</tr>
</tbody>
</table>

Table 11 Bandwidth evolution between 1984 and 1996

That capacity increase is essentially due to two technological changes, the extensive use of fiber optics in the network, and the increase in processing power of microelectronics circuitry.
1. The use of fiber optic allows the necessary transmission capacity for bandwidth-intensive services that combine voice, data, and video signals. The use of fiber optics permits continuous increase of capacity with the installed networks. The continuous progress of microelectronics and the introduction of multicolor technology permit to multiply the capacity of installed networks. Table 12 presents the typical bandwidth for commercially available systems and shows the potential improvement that can be achieved with fiber optic networks.

2. The microelectronics processing power increase allows the compression of information signals into smaller bandwidths and, a huge increase of the exchange capability of the telephone switches.

<table>
<thead>
<tr>
<th></th>
<th>Bandwidth</th>
<th>Length</th>
<th>Bandwidth*Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theoretical capacity for installed fiber-optics systems (1.2 - 1.6 μm)</td>
<td>24,000,000 MHz</td>
<td>100 kms</td>
<td>2,400,000,000</td>
</tr>
<tr>
<td><strong>Commercial fiber-optics systems</strong></td>
<td>5,000 MHz</td>
<td>120 kms</td>
<td>600,000</td>
</tr>
<tr>
<td><strong>Cellular radio</strong></td>
<td>4,000 MHz</td>
<td>20 kms</td>
<td>80,000</td>
</tr>
<tr>
<td><strong>Commercial microwave systems</strong></td>
<td>2,000 MHz</td>
<td>40 kms</td>
<td>80,000</td>
</tr>
<tr>
<td><strong>Commercial coaxial systems</strong></td>
<td>750 MHz</td>
<td>2 kms</td>
<td>1,500</td>
</tr>
<tr>
<td><strong>Commercial copper wire systems</strong></td>
<td>50 MHz</td>
<td>3 kms</td>
<td>150</td>
</tr>
</tbody>
</table>

Table 12 Bandwidth * Length for commercially available systems
This permanent increase of capacity associated with the digitalization of the network have offered new opportunities to integrate the variety of specific networks into integrated services networks (ISDN). The "intelligent network" is a natural extension of these advances. Computer processors and their associate data bases are located in the networks where they can be accessed from the signaling channels. A consequence of this accessing capability is that calls can be handled specifically according to customer request. Further more, two technological evolution are changing the way the networks can be operated. First, the separation of the switch control from the lower level switching functions allows networks to be programmable by a carrier or the customer/end-user. Second, an increasing proportion of the intelligence and functionality are located at the edge of the network rather than internal to it. Those two broad technological changes allow customers or service providers to deliver customized services more easily and will accelerate the pace of the introduction of new services. Traditionally the switches and associated software manufacturers had very long development cycles.

- **Decentralized and segmented networks.** The second major trend is the creation of decentralized and segmented population of networks. In fact, two basic forces are in opposition. The integration pushes towards ISDN, integrated broadband networks, and ATM which could provide a network capable of carrying any kind of information, keeping the former centralized network organization. The disintegration pushes to the constitution of different networks designed to serve specific needs. The most likely winner will be the disintegration which better fits the various needs of the current
customers, but which will create a huge task of defining interconnectivity requirements.

5.1.3. The access network

Local access is both a critical component and a potential barrier to achieving the kind of promises, functions, and applications that we spoke about for an information infrastructure. Until a few years ago, the only connection available was made with twisted pair of copper wires, a technology unchanged for many years. Recently the technological breakthrough, for the local access came from the use of wireless communications. Its flexibility and low cost has allowed the development of new kind of networks competing directly with the copper networks. Very soon, another possibility will be offered: to run telephone services over the same system as cable television.

In the next several years if the regulations allows it, there will be much more access to the home, which will allow competition. There is still, however, a fundamental question that must be answered: how will companies provide the critical bandwidth steps? There is some speculation that around three megabits per second could be the critical bandwidth step required. Since the required level of investment will be extremely high, this fundamental question must be answered among services providers, computer manufacturers, and networks operators. Ultimately, there is a trade-off between the customer premise equipment's processing power and the network bandwidth availability (see Figure 7).
5.1.4. Internet growth

The rapid growth of the Internet presents a few questions. Even if it represents a very small fraction of the telecommunications traffic today, it certainly shows potential technology trends for the short term future.

- The rapid growth of the Internet services is showing a world wide customers huge interest for a variety of data base accessible from home or businesses. The very local example of the Minitel in France was showing with a different scale and in a very different context the same trends.

- Most of the Internet users pay a flat subscription rate to cover unlimited use, plus the cost of the local call to get connected. As more and more people communicate by Internet across continent for next to nothing, they will wonder why telephone call
should have a different price structure. When many parts of the network are no longer constrained by capacity (as we have seen above) why not begin charging the subscribers a monthly fee.

- Recent demonstrations have been done using the Internet to place telephone calls. The early software versions do not yet have the flexibility of the traditional phone service, but ordinary two-way conversation will be possible soon.

The Internet started as an accident of history, it was free from any regulation rules, it was not precisely planned, and it can certainly be improved a lot. It is, however, pointing the way to a new kind of telecommunications system which can assimilate media, entertainment and communication.

5.1.5. Technology uncertainties: The main question

We are at the starting point of convergence between telecommunications, communications, computing and content. The fundamental question, as always in the transition between two eras is how fast the change will happen? Basic telephony represents still 80% of the market but for how long? What will be the trade-off?

- between intelligent high capacity networks and customer premise equipment’s power processing?

- Between centralized networks and decentralized and connected sub-networks?
5.2. Regulation policies

In Chapter 3, I discussed the EU role in deregulation of the telecommunications industry. For each of the European country, however, it will be a local agency which will define the new regulation rules. The example from the British telecommunications industry has shown the importance of regulations in allowing the start-up of competition and in defining at which speed the competitors will increase their market share. The power and the size of the incumbent, Deutsche Telekom, will not facilitate the entry of competitors. How will the regulatory authority define rules to create real competition when DT can use asymmetries to create mobility barriers, deter entry, and adopt pricing strategies to cut profit outlooks? We can define three basic reasons why regulation will play an essential role in the market liberalization and the beginning of competition.

• First, regulators need to ensure that a basic telephone service is available to all at a reasonable price (Universal Service Obligation).

• Second, regulators have to ensure that new competitors are able to interconnect their networks with that of DT at a reasonable cost. Effective market entry of new network operators and service suppliers depends, at least for some time, on the connection to and the use of the incumbent network.

• Third, regulators must prevent DT from killing the competition during the first several years. DT can accomplish this by using its control of the access to the residential or business end-users.
The practical approach of regulation is complex, but in the short term the intensification of the competition cannot serve as a substitute for the control of DT behavior. The British Telecom example has shown that regulation must be asymmetric between the incumbent and the new entrants. Sir Iain Vallance, the BT chairman was saying: "it is hard to imagine UK companies benefiting from such positive discrimination in any other country in the world"34. In the short term the regulation level (access to the incumbent network, price control) will be key to allow the competition to get a significant telecommunication market share. To simplify our analysis we will assume to potential outcomes for the regulatory content: a high level (everything is done to facilitate the start-up of the competition), a low level.

5.3. Customer demand - Market growth

For most of the last century, the public interest was defined by the providers of telecommunications. In the analysis presented in Chapter 3 of the evolving market structure, we have seen that the bargaining power of the residential or business subscribers was beginning to increase. In the short term, the public interest will be defined by the public itself. This trend has already begun for businesses, in which telecommunications is assuming an increasing proportion of corporate budgets, and is becoming source of competitive advantage. These firms are seeking more innovative and cost-effective options to satisfy their needs. The current trends for business end-users are detailed below:

34 Financial Times October 3 1995
Limited points of contact for the network

Having a limited number of players and even at the extreme the concept of “one stop shopping” becomes more and more important in characterizing the network product. This is especially true for multinationals, which would like to avoid the necessity of dealing with a large number of separate carriers and equipment vendors. An increasing number of large international companies are interested in finding a single vendor that will take complete responsibility for the implementation of their international network. This single vendor approach enables companies to concentrate their resources on their core business.

Performance

Performance is important in the sense that the network must respond to the requirements in term of speed, capacity, reconfiguration ability and routing capabilities. The gateways between public data networks of different countries very often provide poor performance; selecting one global provider can significantly increase throughput and configuration flexibility.

Reliability and security

Guarantees of implementation schedule, performance, or reliability are a major and growing concern for users, especially when telecommunications are totally part of their strategy. For some users, such as international banks, an international network is a vital facility that plays an active role in the ability of the company to compete and grow in the market. Reliability (downtime, redundancy, and alternate routing) is one of the most important factor to select a carrier.

Management contro!

Telecommunications have become more and more capable but also more and more complex. Multinationals are faced with the trade off between loosing part of the control or
managing complexity. Total control of the telecommunications network means having a significant telecommunications department which can stay at the leading edge of the technology.

**Cost**

Telecommunication costs, as a percentage of revenues, are significant and growing (40% to 70% of Fortune 200 corporate technology budgets). Major corporations have an incentive to try to reduce this significant expense by tailoring specific services to fit their needs.

**Supplier reputation**

Selecting a supplier to outsource a company’s networking is a long term commitment. A company cannot easily switch from one supplier to another. A networking choice means investment in equipment and software at least at the user premises.

The current trends for the residential customers are not so well defined. The success of mobile communications is showing that public needs can evolve very quickly, but the telecommunication market is still 80% basic telephony. There is no doubt that in 20 years that number will have dramatically decreased, but how quickly will it happen? This is one important question. The second important question about residential customers is: how loyal will they be to the DT brand name? Will the only new decision factor will be price? The speed at which the residential customers evolve will shape the new industry structure and determine the penetration of the new competitors to Deutsche Telekom.
All the analysts agree to forecast an important growth of the German telecommunication market (Table 13 presents one of these forecasts), but be the growth rate for the new services offered to the residential customers could fundamentally modify those numbers.

<table>
<thead>
<tr>
<th>Revenue in Bill. DM</th>
<th>1993</th>
<th>1998</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>local phone calls</td>
<td>12</td>
<td>15</td>
<td>17</td>
</tr>
<tr>
<td>long distance calls</td>
<td>18</td>
<td>21</td>
<td>24</td>
</tr>
<tr>
<td>international calls</td>
<td>10</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>mobile telecommunication</td>
<td>3</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>EDI</td>
<td>8</td>
<td>13</td>
<td>16</td>
</tr>
<tr>
<td>VAN</td>
<td>1</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>cable TV</td>
<td>2</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>total</td>
<td>54</td>
<td>77</td>
<td>94</td>
</tr>
</tbody>
</table>

Table 13 Revenue estimates in Billion DM\(^{35}\)

5.4. From uncertainties to industry scenarios

From the uncertainties discussed above, we could define a continuous range of scenarios. For the purpose of simplifying the discussion, we define three basic scenarios that group different hypothesis for the uncertainties presented in previous paragraphs. Table 14 summarizes the assumptions associated with the different scenarios and the resultant scenarios.

\(^{35}\) Source Vebacom 1995
Table 14 definition of the scenarios

These three different scenarios will be analyzed in the next chapter. Scenario I assumes a very small change with the current situation, DT keeps 90% of the market and the existing competitors struggle with 10% market share. Scenario II assumes a very different outcome, in which DT rapidly loses 30 to 40% of the market share. Scenario III assumes a complete shift of the entire market, in which the industry structure becomes completely open, with DT losing a very important share of the market.
Chapter 6 - Industry scenarios

In this Chapter, we will discuss each of the identified potential scenarios and determine the potential future industry structure under each scenario and the various outcomes for the different industry players. The description hereafter assumes very different outcomes for each of the identified scenarios; in reality, between each scenario a continuum of options can occur. However, by studying the impact of these distinct scenarios, we can better understand and plan for the future. The different scenarios identified can be combined in different sequences that will be discussed in this Chapter.

6.1. Scenario 1: Deutsche Telekom keeps over 90% of the market share

This scenario is characterized by the fact that DT’s competitors gain a very limited market share (below 10%). This situation is the direct result of the regulation framework that is extremely favorable to DT (high interconnection cost, very limited access points to the DT networks, no number portability, very limited control of the DT’s prices), and a very slow evolution of the customer demand (the overall market is still growing but no radical changes appears in the customers’ demand). The German government is indirectly involved in the setting of the regulation framework and trying to protect the market value
of DT. The second public offering of DT’s share has been delayed (DT is still 60% owned by the government).

Simultaneously, DT is extremely aggressive in keeping its market share (DT rebalances tariffs freely to fight competition and practices price discounts for specific groups of residential and business customers when under attack from a new entrant). The overall call prices decrease in Germany leads to profit decrease for Deutsche Telekom, but DT succeeds in maintaining their financial results by a very aggressive reorganization of the company and by high margins from their new divisions in Eastern Europe.

In this scenario, the competitor’s investments remain very limited (at the same time a cause and a consequence of scenario I). All the competitors rely almost exclusively on DT’s networks to deliver their services. The limited fixed networks of the new entrants are unbalanced leading to very low return on investments (in fact, most of them are still making losses five years after the full market liberalization). The main result of the liberalization is the dramatic improvement of DT which now has reached the efficiency level of British Telecom.

The industry structure is essentially unchanged when compared with the structure in 1996 (see Chapter 4). The barriers to entry are completely removed legally but remain high because DT controls the market with the access to its fixed network.

We can argue that this scenario is fundamentally unstable.

- The competition is maintained by the presence of regulation. Without the regulatory framework, DT could rapidly eliminate the competition and return to a monopolistic situation.
- This scenario does not solve the issue of building a European community with open telecommunications boundaries. In fact, that scenario is probably associated with a
very slow progress towards European construction (a centralized financial institution and a common currency). We could probably consider the very slow and difficult European construction advancement as a key indicator for this scenario.

- This scenario does not lead to radical improvements, and the call prices differential with competitive markets increases. New services introduction is very slow, and the German industry is suffering a major handicap with other countries.

6.2. Scenario II: Deutsche Telekom rapidly loses 40% of the market

Deutsche Telekom loses quickly more than 40% of its market share. In an effort to build a true competitive market, the regulators rapidly design a strong regulation framework (interconnection costs at the incremental cost, access to DT networks are provided as required by the new entrants, and technology is developed to allow immediate number portability, and DT tariffs are strictly controlled). The privatization of DT is completely accomplished before 1998, which gives the government complete freedom to achieve quick market liberalization.

But I think we need to distinguish two potential outcomes for scenario II, which are the results of identical hypothesis related to the main market uncertainties, but are caused by divergent policies at the EU and German government level. In the first case, which we will call scenario IIA, national, and European governments favor a pluralist approach, which open competition widely to foreign competitors (European and non-European operators). In the other case that we will call scenario IIB, national, and European governments favor
a mix of the German corporatist and the French statist solutions. European construction is dominated by the dipole Germany/France. This scenario IIB is associated with long and difficult negotiations at the World Trade Organization level. In both cases the scenarios are associated with a rapid European construction (common financial institutions, and common currency), but with divergent policies.

In scenario IIB, DT does not disappear, because at the same time it loses market share in Germany, it grows its operations in the rest of Western and Eastern Europe. In scenario IIA, the future of DT is more uncertain, because of the completely open competition at the European level and the entry of competitors (BT, US carriers) with years of experience in competitive markets.

For both scenarios, the industry structure in Germany would evolve dramatically when compared to the structure in 1996. The regulators which were very powerful during the establishment of the competitors have now defined a framework and focused their efforts on networks interconnectivity, anti-competitive behaviors, and content regulation. The telecommunications equipment’s suppliers have lost all their power, and the supply market is open with the emergence of new, small, and focused suppliers. The carriers have integrated most of the new technologies, such as the Internet telephony. As a result, substitution threats to the industry remain at relatively low level. Table 15 summarizes the main elements of the scenario II’s industry structure. The barrier to entry is low, especially in the very active field of service providers. The main difference between scenario IIA and Scenario IIB is related to the government influence (Germany and EU level). In scenario

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36 "La logique des grands projets" has not completely disappeared (Le Colbertisme “high tech” Economies des Telecoms et du grand projet - Elie Cohen - Les editions Hachettes), the objective is to create a very competitive telecom industry in Europe, by creating 3 or 4 main European carriers, which will compete with US and Japan main carriers.
IIA, the government’s influence is extremely limited, in scenario IIB the government’s influence is one of the main determinants of the industry structure.

At the European level, scenario IIB would lead to the establishment of three to four main carriers creating an oligopolistic European competitive environment. However, the continuous technology progress, the rapid evolution of the customers demand, and the overcapacity should permit to move from scenario IIB (that we could have called: “designed and organized competition”) to a more open field, which could look like scenario IIA or scenario III.

Table 15 Industry structure: Scenarios IIA and IIB
6.3. Scenario III: technology paradigm shift

This scenario corresponds to a rapid shift in technology and customer demand, allowing the emergence of new competition to the traditional carriers. The development of on-line services market and telephony based on the Internet technology rapidly threaten the traditional operators. Internet telephony allows competitors to come with offers of unlimited calling for fixed prices, and DT is unable to redesign its usage base pricing to keep their customers. All DT’s tentative to start as an Internet services provider has failed. DT internal structure and culture, its centralized organization focused on networks, and its lack of IT and marketing skills, make all DT’s efforts to integrate new technologies obsolete. Simultaneously, customer demand evolves very quickly from basic common services to very fragmented requirements; this is particularly true for the business customer segment, which in Germany represent more than 40% of the market. The result is the proliferation of service providers that are able to custom design specific services to meet their customer’s requirements. As a result of the shift in technology and customer demand, DT is left with a decreasing telephony business, for which it unsuccessfully tried to redesign the usage-based pricing to keep its customer base. DT quickly loses market share, and accumulates losses that impact its capacity to invest. In this scenario, the strength of the competitors make the role of regulation useless.

The shake-up of the industry leads to a fragmentation and a redistribution of the role, Table 16 gives the different layers of the industry. Deutsche Telekom traditionally covered all the segments except for the content creation, but with the industry shake-up, the different industry layers are disaggregating themselves, and separating into different industries. The new competitors are focusing their resources on one particular segment.
Table 16 Evolution of the industry structure

A new telecommunications era is emerging and except for a few developing markets still installing traditional telephony (mainly digital wireless), the market disappears for the former telecommunications carriers.

We can argue that scenario III is time dependent. If the shift in technology and customer demand happens more slowly, DT and the main carriers might be able to redesign their own structures and catch the wave.
6.4. Scenario sequences and strategy of the new entrants

In the previous paragraphs, I defined the main potential scenarios and the resulting industry structures. For scenario I, IIA and IIB, I identified critical indicators, which could announce one scenario or the other. Table 17 summarizes the main attributes associated with each scenario. The competition’s net revenues are given for the year 2003 and are obtained by subtracting from the competition’s turnover the interconnection payment made to other operators (DT and foreign operators for international calls).

<table>
<thead>
<tr>
<th>Scenario I</th>
<th>Scenario IIA</th>
<th>Scenario IIB</th>
<th>Scenario III</th>
</tr>
</thead>
<tbody>
<tr>
<td>DT market share</td>
<td>90+%</td>
<td>60%</td>
<td>60%</td>
</tr>
<tr>
<td>Competition net revenue</td>
<td>$3 billion</td>
<td>$20 billion</td>
<td>$20 billion</td>
</tr>
<tr>
<td>Investment Pace</td>
<td>Slow</td>
<td>Rapid</td>
<td>Rapid</td>
</tr>
<tr>
<td>Industry structure</td>
<td>Unchanged</td>
<td>Open competition worldwide carriers</td>
<td>Organized competition European carriers</td>
</tr>
</tbody>
</table>

Table 17 Summary of the main attributes for each of the scenario
The next step in our analysis consists of identifying the most likely scenario sequences that could occur. The analysis of scenario III indicates that the chances of facing that particular scenario in 1998 are extremely low (the market will have to open progressively and even, for example, the number of Internet subscribers is growing extremely rapidly world wide, the Internet still represents a very small percentage of the overall market.

The three scenarios that new entrants could face in the German market are scenario I, IIA, or IIB. Table 18 gives a description of the scenario sequences that could occur after the full market liberalization.

![Diagram showing scenario sequences]

Table 18 Scenario sequences after 1998

The probability of scenario III occurring immediately after scenario I is small, because the industry structure is still characterized by high entry barriers, so a transition with scenario IIA and/or IIB is likely to occur first.

If we try to affect a probability of occurrence for each of the potential starting scenarios, we must first consider the entry strategy of the new entrants. Their influence on the causal
factors behind the scenario variables can increase or decrease the probability of occurrence of each scenario. The influence of the new entrants on the regulatory content, the level of investment in networks and access to the customers (cable TV, wireless communications licenses, or fixed copper wire) will be key in increasing the scenario II’s (A or B) probability of occurrence. The evolution of the market to scenario IIA or Scenario IIB will depend on the outcome of the World Trade Organization’s negotiations and the resultant EU and German government’s policies. We can argue that a corporatist/statist environment, which would represent a mix of the German and French approach to refashion the European communications industry, will have more difficulties of succeeding, given the absence of such tradition in the United Kingdom.

From this scenario analysis of the German telecommunications industry, we can draw some fundamental conclusions and implications.

- First, one of the most important learning from this scenario analysis is that the new entrants’ strategies must remain flexible and must be revisited periodically. The net revenues are very different for scenario I and scenario II. As a consequence, the investment level cannot be similar. We can argue that Mercury, in UK, did a relatively good start in a scenario I environment (“cherry picking” of the most profitable market segments) but did not modify its initial strategy in 1989/1990 to enlarge its customer base and avoid its profits decrease. At the same time, at the regulatory level, Mercury focused their efforts on keeping the duopoly environment when it would have been more effective to influence the regulatory content (access, interconnection price, number portability), and allow more competitors to start competition against BT.
• Second, we think that scenario I and IIB are inherently unstable because technologies exist and will further develop, that enable entrepreneurs, attracted by high prices and profits, to break in regulations and organized competition. For example, with little more than a PC and $20,000 investment you can today start your own call back service. At a more complex level, companies can create virtual private networks, allowing you to call any company extension, anywhere in the world, as if it was in your own building, by-passing the traditional carriers. And finally, should you dislike your local telephone company, you can buy a satellite phone. Therefore, we argue that the combination of technology improvement and customers demand will make scenario I and scenario IIB unstable, and they will not last more than for a transition period.

• Third, scenario III is inevitable and the unique question is: how fast it will happen? We can argue that scenario IIA, which is associated with a more open competition environment, will lead to scenario III faster than scenario IIB. In fact, as we have discussed in the previous paragraph scenario IIB is fundamentally unstable and could be followed by scenario IIA in a transition to scenario III. The key factor which will contribute to accelerate the implementation of scenario III is the existence of alternative networks, which will not only drive lower interconnection price but will lead to faster deployment of new technologies in the infrastructure. We could argue that the higher service prices in scenario IIB could attract more quickly new competitors, but we think that the lack of infrastructure alternatives associated with this scenario will lead to high entry barriers for those new competitors.
Chapter 7 - Conclusions

In this study of more than 100 years of the German telecommunications history, I discussed how, before 1989, the liberalization of the market was thwarted by the corporatist institutions that mediated conflicting interests in the country. Major policy initiatives were shaped by consensual bargaining among highly centralized and cohesive groups (labor groups, management, and the government). Liberalization of entry barriers was unattractive to the social partners in these consensual decision-making institutions for a number of reasons:

- In the short term, liberalization policies represented an economic threat to the major interests. It was in the well understood interest of the telecommunications equipment suppliers to maintain the status-quo to protect their financial results.

- Liberalization represented a challenge to the political status-quo. Foreign competition could represent a major threat to the legitimacy of powerful institutions like the DPG, and labor opposed any effort that could reduce their job security.

I, then, analyzed the very progressive market liberalization which led to the modified industry structure of 1996. This slow liberalization was driven by essentially three forces that opposed the corporatist country structures:

- **Technological changes.** As reviewed in Chapter 5, in the last 10 years the emergence of innovative telecommunications technology has opened the way for service
enhancements such as various messaging services, electronic mail, database services, toll free calls, local area voice, and data networks. The stability of the old institution organization was based on a clear separation between public and private functions, but today a multitude of new services have emerged and the distinction between public and private telecommunications, and between basic and enhanced telecommunications services has become vague.

- **Customer demand.** Unlike the basic telephone service, for which the demand was rather inelastic, demand for these new services is much more sensitive to price level and customized software features. Telecommunications assume an increasing proportion of the corporate budgets and become a source of competitive advantage for many firms, which are seeking more innovative and cost-effective options to satisfy their needs.

- **The EU role.** EU has the mandate to achieve European construction and therefore unify telecommunications networks and systems across the countries. The different directives and the standardization organization described in Chapter 3 have been designed to achieve that objective.

In chapters 5 and 6, I presented a scenario analysis and the conclusions are summarized below.

- It is still unclear what the industry structure will be in 1998. The importance of the outcome differences between scenario I, IIA, and IIB implies very different strategies for the new entrants.
• The role of regulation will be key in shaping the new competitive environment, but new entrants can have an important influence on the regulatory content.

• Ultimately, scenario III will be the telecommunications environment, and the new entrants, while initially facing a very different environment, have to get ready for that new competitive environment.

We will detail our conclusions from the new entrants’ perspectives of seeking to refine their own strategy to become a competitor to Deutsche Telekom in Germany.

• First, it is important to review the outcomes of market liberalization from the customer and the industry perspective, using past experiences in other countries. What are the main arguments in favor of a full market liberalization?

• Second, the new entrants will be involved in the negotiations to define the regulatory framework. I will discuss what their objectives should be.

• The new entrants will face their main competition from Deutsche Telekom. I will summarize DT’s main strengths and weaknesses.

• What should be the new entrants’ strategy for the infrastructure? This question will be one addressed in our conclusion.

• Finally, we will discuss how the new entrants’ could deal with the market uncertainties. How can they define a strategy when the potential scenarios are so different?
7.1. The competitive market outcomes

7.1.1. Deregulation: A driving force to market growth and price decreases

For telecommunications development, the best measure of success is network development. Among the 25 relatively homogeneous countries of OCDE, the number of new lines added each year in competitive networks grew by 21% per year between 1990 and 1994. In non-competitive networks, the number fell by 28% during the same time (figure 8)

![Graph showing new lines added per year in OECD countries from 1990 to 1994](image)

Figure 8 Main lines added per year in OECD countries from 1990 to 1994

This growth in main lines was achieved despite the fact that fixed networks are under more pressures from radio-based technologies in competitive economies than in non-competitive ones. Equally important to networks development are the effects of

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37 Source ITU World Telecommunications Indicators Database 1995 (1990=100)
competition on price reduction for both residential and business end users. Figures 9 and 10 show the price trends in competitive and non-competitive markets for residential and business end users. As seen in these figures, in non-competitive markets, the clear trend of prices decrease in the business segment, while prices are increasing for the residential segment. This is due to the tariffs changes practiced by the incumbent who starts to feel the effect of competition in the business segment and have to readjust their residential tariffs to maintain their financial results. In opposition, for the competitive markets, after an initial prices increase in the residential segment, both segments see their prices decreasing.

![Figure 9 Business tariff basket for competitive and non-competitive markets](https://example.com/figure9)

Figure 9 Business tariff basket for competitive and non-competitive markets

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38 Source ITU World Telecommunications Indicators Database 1955 (1990=100)
Figure 10 Residential tariff basket for competitive and non-competitive markets

Competition also promotes network usage. While Japan and the United States allowed more than two international carriers and had a growth rate of 17% between 1988 and 1993, countries with a monopoly had a growth rate of 7%. The countries that allowed two competitive international carriers experienced a growth of 8 to 9%. This seems to suggest that the more operators are allowed to supply a market, the faster the rate of traffic grows. In 1984 Germany had an international traffic of 1.66 billion of minutes and USA 1.88 billions of minutes, in 1994 Germany had 4.9 billion of minutes and USA 13.1 billion of minutes.

All the indicators show that liberalization greatly improves the industry and drives important market growth. At the customer level, prices decrease and increased of the rate of new services introduction are the most important benefits associated with industry deregulation.

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39 Source ITU World Telecommunications Indicators Database 1995 (1990=100)
7.1.2. Telecommunications deregulation and National Advantage

On a global level, the telecommunications market liberalization is key to improving what M. E. Porter calls the factor conditions and supporting industry, two of the determinants of National Advantage\(^{40}\). Globalization is an important emerging trend relevant for almost all businesses\(^{41}\). As companies become more global, and especially when a transnational strategy is attempted, a great demand for improved communications (both in capacity and sophistication) develops. A non-competitive telecommunications industry (very limited specific services, high prices) would create an important handicap for most of the German industries. Over time, German companies would lose (or would have to operate at higher cost) one of the most important benefit of transnational companies which need very efficient telecommunications networks to make global economies of scale and scope while being locally responsive in countries in which they operate\(^{42}\).

With the fusion of communications and telecommunications, the industry becomes an important vector for education, and therefore the services proliferation and sophistication brought by market deregulation will improve one of the factor conditions key in the determinants of National Advantage.


\(^{42}\) Christopher A. Barlett and Sumantra Ghoshal, Managing across borders Harvard Business School press, 1989
7.1.3. The telecommunications industry suppliers will have to readapt to the new demand conditions

We have discussed the specific status of the telecommunications equipment suppliers in Germany, which recently began to lose their power. The deregulation accelerates the telecommunications market growth, which implies that the market for telecommunications equipment will grow. At the same time, however, the procurement policies are redesigned leading to more open competition and price decreases. The result is a market redistribution with some suppliers suffering deep loses (SEL Alcatel is a good example of this group of suppliers), and some suppliers experiencing rapid growth (Nokia and Ericson were able to exploit the window of opportunity created by the liberalization of mobile communications in Germany\textsuperscript{43}). Like the incumbent operator, the equipment's manufacturers will have to increase their productivity and focus their operation, if they want to benefit from the overall market growth driven by the deregulation.

7.1.4. Deregulation: what are the negative aspects?

The first and key question is: what will be the future of the Universal Service Obligation? Nobody can deny that this is a very noble idea, but it is very difficult to uphold, as it is in a free market environment. The content will have to be clearly redefined (basic telephony services, enhanced services, or Internet access), and new rules that could coexist within the free market will have to be designed.

\textsuperscript{43} interview of Mr. Khalisa Marketing Director of Nokia March 1996
Second, the market deregulation is synonymous with downsizing of the incumbent operator, Table 19 compares the number of telecommunications employees between competitive and non-competitive markets from 1984 to 1994.

<table>
<thead>
<tr>
<th></th>
<th>1984</th>
<th>1994</th>
</tr>
</thead>
<tbody>
<tr>
<td>United Kingdom</td>
<td>241.8</td>
<td>183.2</td>
</tr>
<tr>
<td>United States</td>
<td>841</td>
<td>663</td>
</tr>
<tr>
<td>New Zealand</td>
<td>23.1</td>
<td>8.6</td>
</tr>
<tr>
<td>France</td>
<td>166.2</td>
<td>152.6</td>
</tr>
<tr>
<td>Germany</td>
<td>207.7</td>
<td>227.6</td>
</tr>
</tbody>
</table>

Table 19 The number of telecommunications employees in thousands

It is true that deregulation implies employees lay-offs for the incumbent operators and it is often a very sensitive political issue, but if we could compare the benefit (in term of employment) for the rest of the industry, the number of lay-offs of telecommunications employees would probably appear very small.

7.2. The regulatory framework

In the British example, we have discussed the importance of OFTEL successive decisions, in shaping the new competitive industry. Most of the strategic vulnerabilities of Mercury were the direct result of the regulatory content. We have defined regulation content as one of the main uncertainties in the German market that could lead to very different scenarios. The question we want to address in this conclusion is: what should the objectives of the new entrants be when negotiating the regulatory framework in Germany? All the new
entrants, using the experience in the UK, the US, and other liberalized markets, have identified regulation as one of the key parameters that will shape the industry, and therefore, participate actively in the regulatory framework negotiations\textsuperscript{44}.

To answer this question, we need to consider two distinct periods in the liberalization process (Table 20).

- A first period, in which the asymmetry between the incumbent and the competitors, and the existing Universal Service Obligation rules defined under the monopolistic environment, imply the need for a strong regulation content.

- A following period, where the new competitive situation, and the practical convergence between the different constituents of the multimedia world should limit the role of the regulatory organization to a technical role (networks interconnectivity or interoperability) and probably a content policy role.

\begin{center}
\begin{tikzpicture}
\begin{axis}[
    xtick={5,10},
    xticklabels={5 to 10 years, Time},
    ytick={1},
    yticklabels={Regulation content},
    ylabel={Regulation content},
    xtick pos=left,
    ytick pos=left,
]
\addplot[\red,mark=none,mark=none] coordinates {
    (5,1)
    (10,1)
};
\end{axis}
\end{tikzpicture}
\end{center}

Table 20 The two distinct periods associated with the regulatory framework

\textsuperscript{44} Vebacom interviews, March 6 1996.
A first period in which the regulatory framework is critical to developing the competition

During the first period, the asymmetry between the competitors and the regulatory framework heritage from the monopoly period is driving the needs for the regulation. The most important need is the definition of the interconnect rules, the commercial terms under which competing operators work together. Because interconnection cost accounts roughly for half of the new operators costs, it is critical to define the interconnection rules to ensure fair competition between operators. Figure 11 summarizes the interconnection problem. The incumbent operator will try to get from the competition the so called fully-allocated costs, while the new entrants will try to negotiate for a price equivalent to the incremental costs.

Figure 11 Interconnection costs: The trade-off between fully allocated costs and incremental costs
The role of the regulators will consist of finding a trade-off between the competing interest of the incumbent and new entrants, and between the potentially conflicting interest of the telco’s shareholders (the government itself) and the interest of the consumers.

The notion of fully allocated cost always includes the notion of Universal Service Obligation, which means that the interconnection cost includes the cost associated with the non-profitable market segments of the incumbent operator. Therefore, the incumbent is very often using the Universal Service Obligation as a barrier to entry for new competitors. Universal Service has been very often used in the past to set prices. Instead of starting from costs, Universal Service starts from a calculation of how much a customer should ideally pay (‘affordability’ in the legislative jargon). If the cost of service was higher than the “affordable” price, then the deficit is made up by charging higher prices on some other, less worthy services. While nobody can deny that this is a very noble idea, the application of the Universal Service Obligation was easier under a monopolistic organization than in a liberalized market. Today, the introduction of competition blows apart the system of cross subsidies, and new systems have to be invented to maintain the principle of Universal Services for basic services. Open access could be one of the solution offered by new technologies\textsuperscript{45}. One of the main difficulties here is that the Universal Service is a politically sensitive issue and the government still owns the totality of Deutsche Telekom. Change in the cross-subsidies repartition is very often used to delay the introduction of new services, Jerry Hausman\textsuperscript{46} argues that it seems poor economics policy to delay the introduction of new services that can lead to billion of dollars in increased consumer welfare to protect a poorly designed subsidy framework, which

\textsuperscript{45} John Browning The problem is an excess (not a shortage) of bandwidth, and the solution is called open access-Universal Service (an idea whose time is past) Wired September 1994

\textsuperscript{46} Jerry Hausman and Timothy Tardiff valuation and regulation of new services in telecommunications.
subsidizes residential telephone use for all customers, no matter what the customer level of income or economic might be.

A following period in which the regulator should reduce and transform its role

As competitive markets will develop and as market power begins to spread more evenly among the competitors the regulators should gradually move from issuing determinations to offering guidelines for the interconnecting parties. At this point, the regulation should become more general, with the task being handled by general consumer law, competition policy and environmental protection legislation.

In summary, the regulation content should be negotiated as a required short term catalyst, in order to reach as quickly and efficiently as possible the point at which regulations could give way to the free market competition. In the current stage of strong asymmetry between the incumbent and the new entrants, fair and efficient interconnection will only occur through initial strong regulatory intervention. But ultimately, when the new entrants have obtained a sufficient market share (30 to 40%), the regulatory framework should evolve to a set of guidance to avoid anti-competitive behavior. “Effective, aggressive competition and regulation and control are inconsistent with each other, and cannot be had at the same time”⁴⁷. In practice, most regulatory regimes are a long way from this ideal. Rather than starting out with a strong regulation and then gradually diminishing controls when competition develops, in most countries the regulator has begun tentatively and then progressively increases its control over time. For example, most countries have started

⁴⁷ Theodore Vail, 1910. AT&T CEO
with fully allocated interconnection costs, the option that is the least favorable to the new entrants and thus limit the establishment of the competition.

In conclusion, I think that the interconnection is the key regulatory issue which will shape the competitive environment. I think that the initial pricing should be set at the marginal cost to balance the fundamental asymmetry between the incumbent and the new entrants. The risk at that stage is to develop an inefficient competition and to suppress any incentive for the new entrants to develop an alternative infrastructure which I think is required, long-term, to develop a true competitive market (see paragraph: new entrants strategy for the infrastructure). To minimize these risks, the interconnection prices should evolve progressively (as the new entrants are gaining market share) from the marginal cost to the full cost pricing. 30% market share for the new entrants could be set initially as the point at which the interconnection prices would be equivalent to the full cost. At this point and beyond, the price will be set by the wholesale market, this point correspond on Figure 11 to the point of redefinition of the regulation role.

7.3. Strengths and weaknesses of Deutsche Telekom

In trying to define a winning strategy, the new entrants have to understand what are the main strengths and weaknesses of their main competitor, Deutsche Telekom. I will now summarize the strengths and weaknesses of the German incumbent.
What are the strengths of Deutsche Telekom?

- Through its access network, DT has access to an impressive number of customers, for telephony, data transmission, and cable television. Through its billing, maintenance, and customer service, DT has direct access to the subscribers. This direct access gives DT, economies of scope and scale when launching new services in Germany. Figure 12 presents DT customer’s base for the main services.

![Bar chart showing number of subscribers for different services provided by Deutsche Telekom.

Figure 12 Deutsche Telekom’s customer base

- Most of the investment in the main network has been depreciated, and DT can employ new investment to upgrade their networks and develop new services. Within a few years, the network should be fully digital, both at the inter-exchange level and the subscriber loop. This should facilitate the development of new media services.
• Advances in data compression and data coding technologies mean that a much higher performance can be achieved from the existing copper/fiber networks. This should permit DT to use their copper access network for the next several years; without huge new investments, they should be able to adapt to the bandwidth increased needs.

What are the weaknesses of Deutsche Telekom?

• DT productivity in 1996 is still very low when compared to more efficient carriers (see the unit cost comparison between carriers in Chapter 4). The consequence is that DT will need to downsize its organization by 30% in the next few years. DT fundamentally lacks marketing skills and does not have the organization flexibility to cope with a rapid evolution of the industry and the convergence between media and communications. The need to downsize, to change the focus of the entire organization on the customers, and to create a flexible organization will lead to internal instability and a potential crisis that will affect the overall quality of DT’s services.

• The tariff structures are tied to usage-based pricing that does not facilitate customer services experimentation and is inappropriate for the development of entertainment-based services. Usage-based pricing may need to be abandoned, or dependence on it may need to be reduced. In the near future, DT must be prepared to charge customers for the value rather than the amount of what they send and receive, and for the access to networks rather than their level of usage. This tariff structure redesign, in a period where DT will more or less rapidly lose customers to the competition, can lead to financial losses that will amplify DT’s instability.
From this analysis of the strengths and weaknesses of Deutsche Telekom, the new entrants have to design a strategy taking into account the different potential scenarios that were discussed in Chapter 6. But, the first question (quasi independent of the occurring scenario) that should be answered is: do the new entrants need to build a network? or can their strategy rely on the existing incumbent networks?

7.4. New entrants’ strategy for the infrastructure

It is important to differentiate between competition in services and competition in infrastructure provision in the telecommunications sector. The new entrants in Germany will have the choice to build or to buy particular components of network capacity. For new entrants who build their own infrastructure, they can use it as a substitute for, or for interconnection with, the DT telecommunication network. For the second group of new entrants, they will operate other lines leased from DT and will resale that capacity or the additional value through software and additional management facility. Both types of competition will certainly coexist in Germany, but I think that the infrastructure provision can’t remain a de-facto monopoly. The networks belong to DT and even in the most closely regulated environment, it is almost impossible to prevent DT from having privileged access to the network and to subscribers’ information that is not available to competitive service providers. It will remain extremely difficult to negotiate service provision from a supplier who is also a competitor. DT can always play on prices charged to the service provider, waiting times, and available technology. It will be difficult for the regulator to control the regulation details and the technical relevance of DT arguments. This requirement to build at least a second network seems to be in phase with the strategy
announced by the current competitors of Deutsche Telekom. Most of the alliances are between carriers (BT, C&W, AT&T), and the German utility companies that can use their existing utility networks as a base to deploy a telecommunication network. One of the risks of this required phase is to build a competition to DT that shows the same weaknesses as the dominant incumbent: centralized, and relatively inflexible organizations.

7.5. New entrants strategy to cope with market uncertainties

How do the new entrants cope with market uncertainties and ultimately dislodge the incumbent DT? will be the last question I will try to answer. The answer to this question will certainly differ from one DT competitor to another. We saw that the competition to DT will come from very different players who will certainly deploy very different strategies. In this conclusion, we will consider the answer for a carrier like British Telecom; most of the answer is certainly true for other announced new entrants like Cable & Wireless or AT&T. The strategy should be designed to achieve three different objectives: influence the short term scenario outcome after the full market liberalization in 1998, plan for the most probable scenario (a very slow market evolution), and, finally, get ready for the future (scenario III environment). I will review successively the most important elements of the strategy for each of the listed objective.

Push for the best scenario.

One hundred years of corporatist organization in Germany will not disappear rapidly, and even if the most important actors (suppliers, DT, labor unions) have lost part of their power in recent years, in the short term, scenario I will be the most probable scenario.
This scenario environment fits the German culture and the industry pattern. In addition, the recent negotiation failure at the World Trade organization level, implies that each country will probably delay any major decision. DT is still own by the German state, a consequence is that scenario I is the best environment to protect DT market value. Scenario I will give time to DT to improve its efficiency and to increase its strength abroad (particularly in Eastern Europe). Strategically, however, BT needs to enter the German market (the largest in Europe) to compensate for its market share decrease in UK, and to avoid to leave time to DT to reorganize without strong competition in its home base.

For British Telecom, the ideal scenario is scenario IIA. BT has the experience of a few years of very aggressive competition in the UK which represent a important competitive advantage to exploit rapidly. This is not the case for DT, which needs time to improve its efficiency. A very active competition in Germany (several aggressive new entrants) will help BT in its objective to destabilize DT, and to build rapidly an alternative network (an alternative route to the DT networks could be obtained rapidly by assembling different new entrants’ infrastructure). Scenarios I and IIB could lead to an alliance (which can take many shapes) between France Telecom and Deutsche Telekom, in an effort to organize the European telecommunications environment, and delay the competition’s threat in their respective home markets (similar to the current merger trend in US between the Bell Operating Companies). We can also argue that the next years represent a perfect opportunity window for BT because its main competitors, the US carriers, are currently focused on their domestic market.

BT needs to try to influence the causal factors behind the scenario variables (regulation content and customer demand). To push in the direction of scenario IIA, BT needs
efficient(s) German partner(s) that can be directly involved in regulation negotiation at the German level, and can represent a credible bargaining power at the labor union level. At the EU level, BT, through UK representation, needs to influence the overall European telecommunications liberalization to maintain the initial pluralist objective, and exert powerful influence on the German regulation content. Simultaneously, BT and its German partner(s) need to develop very active marketing plans in Germany (BT can build on its global operator capabilities) to develop brand recognition and compete against the current very aggressive DT campaign. As discussed in our scenario analysis, the customer demand will be an important driving force leading to scenario I or scenario II.

**Plan for the most probable scenario.**

BT can’t bet on the best scenario, so, while developing a strategy to influence the future scenario outcome, BT needs to plan for the most probable scenario (scenario I), and develop a flexible approach which can deal with uncertain scenarios, until it becomes more apparent which scenario will really occur. BT needs to manage the trade-off between the requirement to build an alternative network (discussed in the previous paragraph) and the result of tentative modelization\(^{48}\), which show that an “asset lean” strategy is generally more successful in a scenario I type of environment.

First, BT needs to share the investment risk with German partners. We have previously seen the important net revenues’ difference between scenario I and Scenario II. Second, BT must certainly avoid an attack head-on with an imitative strategy, regardless of its resources or staying power. The built-in advantage inherent to Deutsche Telekom will

\(^{48}\) A simple System Dynamics model has been used (the seminar: 'The Dynamics of Global Competition - Henry Birdseye Weil) which show that with variations on the market growth and pricing schemes an “asset lean” strategy is generally more successful in a scenario I environment.
certainly overcome such a challenge. Germany is organized in very powerful regions with their own "government". A potential strategy could consist to focus on one specific region where BT could use its partner influence (Viag in Bavaria for example). In that region, BT and its partner could develop a competing modern infrastructure and build a business and residential customer base (avoiding the unbalanced infrastructure problem of Mercury in the UK). For the rest of Germany, customers would be served initially by competing on services using the existing DT infrastructure. This approach would permit BT to minimize the investment, build a brand image, and, from an initial platform be in position to react rapidly to new scenario developments.

Get ready for the future.

In Chapter 6, we discussed the fact that sooner or later scenario III environment will characterize the telecommunications environment. This scenario will represent a complete rupture with the current telecommunications industry structure. The new entrants and BT in particular have to get ready for that dramatic environment change. The challenge for the largest carriers will be to pursue their globalization objectives and mergers or partnerships with other large companies, while keeping the flexibility to be receptive to the numerous technological changes offered by the micro-electronics, the wireless communications, and the optical fibers dramatic improvements. As discussed in our scenario III analysis, the convergence between media, computer and telecommunications will lead to a very different industry structure with a desaggregation of the different industry layers. The telecommunications players should define today at which level of the entire value chain they plan to focus their effort. This decision will define in consequence their future strategy in term of alliances. The competition will no longer be, to be the most efficient
“bit carrier” focused on its own networks management, but the most efficient “bit packadger” focused on very different and diversified customers needs. One potential approach for BT could consist in separating its networks management and its services management. A wholesale market will develop in the next several years and the service divisions of the company could progressively negotiate the best networks deals inside or outside the company. This organizational split would also permit to develop around the networks divisions small entrepreneurial divisions better organized to track and use rapidly changing technologies. These small divisions would be better positioned to develop agreement with the growing new players in the communications industry.