Chapter 4
Policy Networks in the German Telecommunications Domain

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1 Telecommunications as a Domain of Public Policy

State control of technology is a topic receiving increasing academic attention. The interest of social science in the role of the state in technology development is rather new, although public policy related to technology can be traced back to the industrial take-off. Especially in all European countries the provision of a telecommunications infrastructure with technologies such as the telegraph, the telephone and also new communications systems such as computer networks, facsimile transmission and interactive videotex has been an undisputed state function and a governmental prerogative that only recently was challenged by a new technological revolution.

The telecommunications domain that has emerged since can be related to a network of technological components enabling communication over distance. However, such a purely technical perspective would overlook the network of actors and the configuration of social forces which are linked by vested interests and various concerns to the purely technical configuration. The telecommunications sector is therefore also a system of actors - an action domain - where specific economic, technical and political interests are at stake, where resources are mobilized and exchanged and where individual and collective strategies are pursued. In addition, telecommunications also provides political and economic arenas

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structured by established institutions which define "the rules of the game" that shape the actors' interaction, confrontation and cooperation.[1]

The aim of this chapter is primarily to contribute to the analysis of public policy and not to the study of a given technology. Therefore we are not interested in everyday activities in telecommunications such as the use of the telephone or the manufacturing of switching facilities. Our interest, instead, is focused on actor configurations and institutional arrangements shaping public policies in this technology domain. Telecommunications in this sense is not only seen as a general system of action but more specifically as a *domain of public policy* in which relevant actors engage in processes of decision making and resource mobilization which are oriented towards solving economic or social problems gaining political relevance. This may be the provision of a new infrastructure service by the state, but also the structural or institutional redefinition of public functions in this sector.

The entities making up a public policy domain's system of actors are those acting units which are "concerned with formulating, advocating and selecting courses of action that are intended to resolve the substantive problem in question".[2] In contemporary societies these are typically corporate actors - public and private organizations or associations. Since their "capacities to affect the collective outcomes of policy decisions must be taken into account by the other participants", the telecommunications domain must be conceived as a social action system[3] in which the units do not act in isolation but take their respective resources, interests and strategies into account. Such relations of mutual taking-into-acount and resource dependency lead to networks of routinized interaction. Policy domains are constituted therefore by one or more *policy networks*.

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1 Such rules may emerge out of social interactions, stabilizing and reinforcing the patterns of behaviour, or they may be enacted more or less intentionally and formally. For a discussion of these institutionalist concepts see Langlois (1986) and Scharpf (1989).

2 Cf. Knoke/ Laumann (1982: 256). This *policy* perspective assumes not only a common orientation among a set of actors but also their mutual relevance for each other (see also Wright 1988: 609-610). It contrasts the wider, less specific concept of "relevant social groups" which is employed by some scholars in order to explain the evolution and development of technological *artifacts*. These groups comprise institutions, organizations and all kinds of unorganized groups including consumers or users as long as they "share the same set of meanings attached to a specific artifact" (Pinch/ Bijker 1984: 414).

3 Laumann/ Knoke/ Kim (1985: 2). For a broad and detailed elaboration of the concept of corporate action see Coleman (1990, esp. chapters 16, 19 and 20). See also Mayntz (1986).

The topology and specific configuration of such networks has to be seen as an important structural property of the policy domain.

In the following sections, we will identify different policy networks making up the telecommunications domain. It will be shown that this is not a fluid or amorphous field of actors and events but is shaped by a long history of interaction. An introductory description of the historical emergence and transformation of institutional arrangements and governance structures in German telecommunications will help to understand the current topology of policy networks. We will show that due to technical, economic and political factors, highly differentiated, comparatively large and rather pluralistic policy networks evolved in this sector. This finding will be evidenced in the third and fourth section by two case studies illuminating the actual decision making and interaction structures in two recent "issue areas": Firstly, a policy network which was involved in the introduction of a new service, and secondly, a network which was generated by the recent institutional reform of the German telecom sector. By comparing both networks in the concluding section we will try to conceptionalize the telecommunications policy domain as a sector with differentiated but relatively stable and partly overlapping policy networks which are routinely involved in the processing of policy problems. These networks, however, are not sharply delineated sub-systems but often transcend the classical boundaries of the telecommunications policy domain and overlap with other domains of public policy - without impairing this domain's identity.

2 The History of German Telecommunications: Establishment and Transformation of an "Iron Triangle"

The history of German telecommunications begins with the introduction of telegraphy in the mid-1840s. The telephone emerged about 30 years later. The following major telecom inventions were radio and television in the 1920s and 1930s respectively. Computer-related transmission networks emerged in the 70s and 80s. All these technologies have a common specificity: they are based on network industries relying on the

highly coordinated cooperation of different technical and economic actors in the development and operation of the system.[4]

In the early years of telephony, the local systems in some countries were established by private firms, at times with several competing local networks. In most cases, however, early competition quickly turned into oligopolistic or monopolistic market structures.[5] The general trend was thus a horizontal integration of telecommunications networks and the emergence of territorial monopolies. In some countries associational or cooperative management structures were established (Scandinavia and the rural US) but typically telephony developed very early into a hierarchical model of governance, either by private firms or public administration.[6] The tendency toward monopoly pricing by private monopolists as well as the growing infrastructural significance of telecommunication services were the driving forces pushing telephony under governmental control in most countries. Even in a liberal state such as Britain, the state gained total control over this sector in 1911. Although different modes of political governance were employed, basically two dominant forms have emerged. States have either directly engaged in telecommunications creating a public monopoly or they have established specialized agencies and enacted regulations in order to control the behavior of the dominant firms in the sector.[7]

The *state monopoly* in Germany can be traced back to the postal monopolies (royal postal prerogatives: "Postregal") of the late Middle Ages. Although the first telegraph line in Germany was introduced by the military in 1846, telegraphy was soon opened for commercial use and its administration moved from the War Office to the Post Office. This shaped the first steps of German telephone development decisively, because immediately after its invention, the German Post Office (GPO)

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4 For a general discussion of the concept of "network industries" see Carlton/ Klamer (1983).

5 The most important examples for competitive market arrangements are the US in the period from 1895 to 1907 and Sweden from 1883 to 1918. Economists explain pressures toward monopolization of network industries mainly by the positive externalities of telecommunications networks (along with the number of subscribers, the utility of a network increases for each subscriber) and the related economies of scale; see Rohlfs (1974); Katz/ Shapiro (1985).

6 For the concept of governance that cannot be elaborated in this chapter see Williamson (1985) and Hollingsworth (1990).

7 For a comparative overview on different organizational forms in telecommunications see Pierce (1978) and Schneider (1991).

decided to use telephony as an extension of the telegraph network to rural areas. A few early applications by private businessmen for concessions to run telephone networks were rejected and telephony was declared a part of the official state monopoly. Hence from the very beginning, telecommunications in Germany was under "political control" and administrated by the PTT (post, telegraph and telephone administration).[8]

The status quo of the telephone system as a state monopoly was explicitly legalized in the Telegraph Act of 1892 and confirmed in the Telecommunications Installations Act of 1928. The PTT had the exclusive right to install, operate and maintain the telephone system which included transmission and exchange technology as well as the telephone handsets which were perceived as a constituent part of the technical network.

The PTT as a public administration only reluctantly expanded the system, although after a short time this business turned out to be rather profitable. Among the driving forces were the local and regional chambers of industry and commerce which soon discovered the usefulness of the telephone for business communication. They formed coalitions with the local public administrations to mobilize a minimum number of subscribers which the PTT had declared to be the necessary condition for the provision, construction and installation of a network. Organized business interests thus fulfilled an important function in the identification of demand and the minimization of allocational risks.[9]

The technical components of the telephone system were developed by the manufacturing industry in Germany. The PTT had only minimal technical competence and practically no R&D laboratories to engage in the process of the technical design and production of the system. The equipment was developed and produced by a small group of manufacturing firms in the field of electrical engineering ("the court suppliers").

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8 The head of the PTT was the Post Office and later the Post Ministry, a branch of the central government. For the early history of the telephone in Germany see Thomas (1988).

9 For this observation see Holcombe (1911: 37-64) who concludes, "... the German system of a special representation of economic interests, and their cooperation with the public authorities in the management of business undertakings, has worked well. ... Thus the organizations of economic interests have an educational as well as administrative value. To this agency the German public trusts not only to get what it wants, but also to learn what it ought to want" (Holcombe 1911: 64).

Their tendency toward cartelization was accepted if not supported by the PTT. The problems of compatibility and network management required the PTT to opt for strict uniformity of all technical components (Einheitstechnik).[10] Consequently, the procurement policy was directed toward purchasing a specific item from a dominant manufacturer holding patent or other proprietary rights for the blueprint of this product. In order to prevent dependency on a single manufacturer, the PTT obliged the respective producer to grant patent rights to at least one national "competitor". As compensation, the firm was guaranteed a relatively high proportion of orders by the PTT.

The *emerging network* of actors may be represented by a simple *triangle*. The PTT as an integrated part of the central government cooperated and bargained on the one side with the local Chambers of Industry and Commerce, but especially with their peak association, the German Chamber of Industry and Commerce (Deutscher Industrie- und Handelstag, DIHT). Dominant issues were the quality of the telephone service, tariffs and other problems typically related to the use of the system. On the other side, there were close contacts to the equipment producers, especially to the large companies like Siemens. Here, problems of investment policy and technical research and development were important topics. In this triangle, the PTT was the dominant actor. After the 1920s, the triad became slightly more differentiated but in principle remained stable during the decades that followed.

With the Reichspost Budget Law of 1924, the legal status of the PTT was transformed from a government department, fully integrated into the central treasury, to a corporate-like public administration with its own property and budget separate from the central budget. The PTT was allowed to retain its revenues and to borrow money from the general capital market. This led to greater organizational autonomy and a reorganization and formalization of political control. An *Administrative Council* with up to 41 members, conceived as a quasi-parliament, consisted of political representatives from the central parliament (Reichstag), the chamber of the *Länder* (Reichsrat) and one from the Finance Minister of the central government. But also the employees of the PTT and the associations of industry, trade, commerce and agriculture were invited to send delegates to this council, so functional as well as territorial politi-

10 Also financial constraints and a continuing lack of adequately qualified technical staff brought the PTT to favor this option.

cal interests were represented in this *corporatist body*. The main function of the administrative council was controlling financial affairs and economic activities of the PTT.

The minister of the PTT was the political head and the executive manager of the telecommunications administration. He was charged with regulatory and operational competence in telecommunications. Political control of the PTT by actors other than the minister in charge was not formalized with the exception that the Minister of Finance had the right to approve all relevant financial affairs.

The Administrative Council did not replace the more *clientelist networks* of direct interaction between the PTT and the private manufacturing firms. It rather allowed for an institutionalized mix of political and economic elements of control in telecommunications. *The overall policy network in this sector became slightly more differentiated* and intricate, although the central position of the PTT remained unchanged or was even strengthened. A number of political actors, the manufacturers and the commercial users of the telephone system, were interested in a greater formalization of the intermediation of interests in telecommunications policy making.

The situation rapidly changed in the period of Nazi rule when matters of economic performance of the telephone system were clearly subordinated to political and military priorities (Thomas 1988: 197-202). The general strategy of the dominating party, the NSDAP, pushing the "unity of party and state" resulted in cutting down informal political networks and liquidating intermediary organizations. Concerning telecommunications, the Administrative Council was abolished. This measure was intended to reduce the organizational autonomy of the PTT by producing a hierarchical command structure and decision making process, and setting the organization free from economic considerations. Paradoxically, however, this partly increased the autonomy. Correlating this development, the PTT drifted into a situation of *isolation* - deteriorating technical innovation and sophistication (except for military purposes) - and also economic inefficiency.

After the Second World War, with the foundation of the Federal Republic of Germany, a federal PTT Ministry was re-established and in the early 1950s a very moderate political discussion started about the institutional reconstruction of the telecommunications domain. The state monopoly was not challenged at all but was perpetuated on the basis of the Telecommunications Installations Act of 1928. The question of

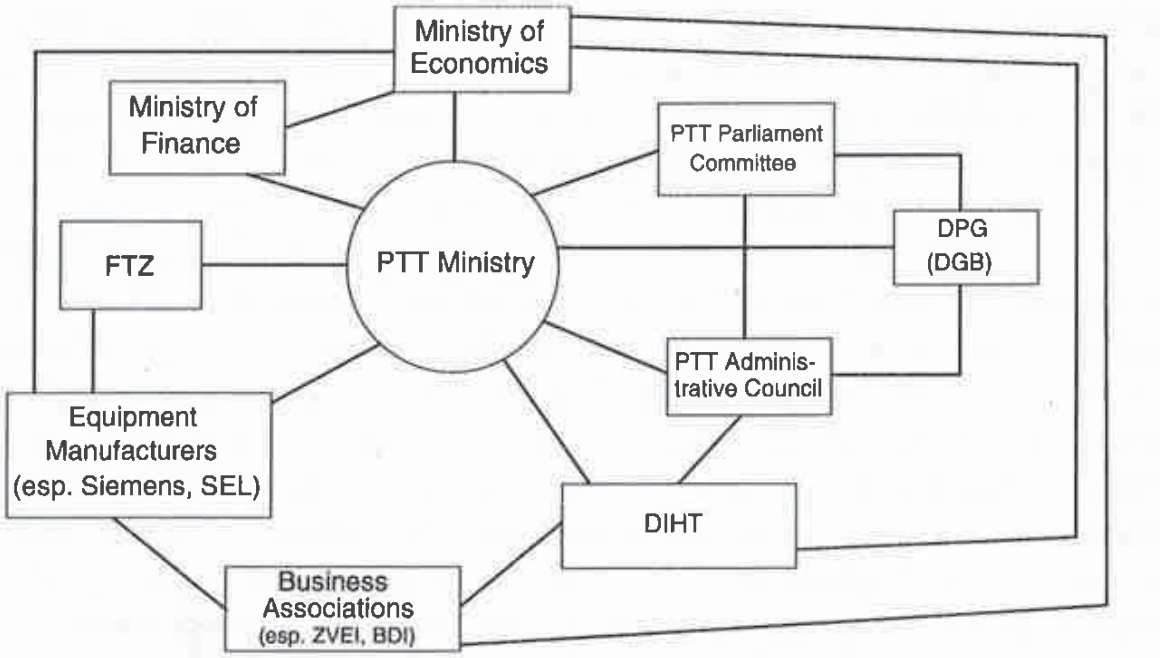
reorganizing the PTT was answered rather quickly. In 1953, the model of the Reichspost Budget Law was transformed into a slightly modified new version called the PTT Administration Act. The separation of the PTT budget from the federal finances was confirmed as was the Administrative Council and its central competence. Though the number of members was reduced to 24, the composition of the re-established corporatist body changed only slightly.[11]

It should be noted that the PTT Administration Act ensured more elaborated rights of intervention for other ministers in the PTT affairs than the old Budget Law had done. The Minister of Economics had to approve the charges and utilization conditions for the telecommunications services and the Minister of Finance had to approve the PTT's budget (including debts, plans for investments etc.). On the other hand, the more informal interdependence of the PTT and the manufacturing industry remained unchanged by the Act, although the formal model of the PTT Administration Act was based on a conception of rather tightly coupled political and economic activities in telecommunications. Figure 1 shows the structure of the political-economic network in telecommunications as it had evolved in the 1950s and 1960s before major technological and economic changes triggered a network expansion and an increased separation of the political and economic sphere (cf. Werle 1990: 143).

As a public monopoly, the management and operation of the telecommunications system was not only oriented towards economic goals but was clearly a product of political processes, too. The *policy network* engaged in the major political decisions shaping telecommunications policy *during the* more than 20-year *post-war period was rather small.* Besides the formally involved political actors like the federal cabinet, several ministries (first of all the PTT Ministry), the Federal Parliament (members of Parliament and certain committees) and the Federal Council, only the political parties (especially through their activities in parliamentary committees), the postal workers' unions and the DIHT continuously participated. The equipment manufacturing firms did not play a significant political role but restricted their direct participation to economic

11 The Federal Parliament (Bundestag) and the Federal Council (Bundesrat) could send 5 representatives each into that assembly. Another 5 delegates were recruited from industry, trade, commerce and agriculture. The council was completed by 7 members representing the staff of the PTT and two experts in telecommunications technology and finance respectively.

Figure 1: The Political-Economic Actor Network in the Early 1970s



BDI: National Association of German Industries
DGB: Association of German Trade Unions
DIHT: German Chamber of Industry and Commerce
DPG: PTT Workers' Union
FTZ: Central Office for Telecommunications Technology
SEL: Standard Elektrik Lorenz
ZVEI: Central Association of the Electrical Engineering Industry

activities. Here, they could rely on informal links among themselves and with the PTT Ministry and its engineering center, the Central Office for Telecommunications Technology (Fernmeldetechnisches Zentralamt, FTZ), which had been revitalized and stabilized after the war during the years of close cooperation when the future telecommunications system had to be designed.

In a first step the policy network grew moderately in the 1960s when telephony gradually expanded in residential areas, too. The PTT's problems in meeting the growing demand for telephones on the one hand, and the increasing political significance of the industrial activities in telecommunications on the other, triggered the engagement of additional actors. Especially the equipment-manufacturers in the electrical industry and its Central Association (Zentralverband der Elektrotechnischen Industrie, ZVEI) but also the peak association of industrial firms, the Federation of German Industry (Bundesverband der Deutschen Industrie, BDI) appeared on the stage although the DIHT remained the most visible representative of economic interests in telecommunications outside the PTT.

During the expansion process of the telephone system, it became more obvious that political and economic decision making processes intermeshed and overlapped but only few actors participated in all processes. Many actions had to be legitimized politically and economically and their effects were difficult to project. Raising telephone charges, for example, could either provoke political protest and a loss of votes or a decrease of usage and dissatisfaction with the service, or both.

An effort to reduce these problems by an institutional separation of regulatory and operational functions in telecommunications failed at the beginning of the 1970s. But it became obvious that with the increasing number of actors in telecommunications not every actor was able and willing to engage in all kinds of activities. At the beginning of the 1950s, only a handful of actors participated in the discussion of the PTT Administration Act; about 15 years later, the debate on the reform of this act activated approximately 10 associations (including two workers' unions) outside the official circle of political actors (government officials, political parties etc.) and almost a dozen experts. The equipment manufacturers and other economic actors remained in the background.

This suggests that - as a consequence or at least as a correlate of the process of expansion and differentiation in the area of telecommunications services and equipment - differently composed actor networks have evolved to deal with either more political or more economic problems in this sector. This differentiation does not necessarily imply total separation of networks and actors. But it clearly led to the emergence of relatively autonomous clusters of interaction based on the division of labor in complex societies.

As long as purely economic decisions affect public policies, governmental agencies will also try to influence, and participate in these decision making processes and not restrict themselves to politics. One therefore should expect that the PTT Ministry holds central positions in almost all of the co-existing networks. In the following sections we will look at two of these actor networks which evolved in the process of growth and differentiation in telecommunications.

3 Policy Networks in the Introduction of a New Telecommunications Service: The Case of Videotex (Bildschirmtext)

Bildschirmtext (Btx) is a new telecommunications service which combines the telephone, video and computer technology.[12] Its purpose is to make the exchange of visually displayed information between videotex terminals possible. The core of the system is an information data base and a number of text communication facilities (electronic mail). This idea of an easy-to-use electronic data service for the mass public emerged in the mid-70s and inspired politicians and businessmen to see this technology as the communications infrastructure of the future, giving everybody access to the world of computer information. However, in most countries, with the exception of France, these hopes did not come true and the use of videotex is still restricted to specialists.

The German Bildschirmtext system was introduced between 1975 and 1984 and this introduction was heavily promoted by the German PTT and a number of industrial actors.[13] The primary interest of the PTT was, firstly, to get a new, future market which could complement the almost saturated telephone business in the long run, and secondly, to increase the utilization of the existing telephone network especially outside peak hours. After the first official demonstration of the system (initiated by the PTT in 1977) restricted trials began in 1978 involving the PTT, certain equipment producers and about one hundred information providers. In these pilot experiments, field trials were conducted from 1981 to 1983 which aimed at anticipating possible social and economic consequences of the new service. Finally, the service was to be officially started in the autumn of 1983, but due to technical snags, implementation was delayed for almost one year.

In 1984, there still were great expectations: It was believed that at the end of the decade, several millions of subscribers would be connected to this service. Up to the end of 1990, however, Btx gained only about 250,000 users. Compared to the initial expectations and to the about 5

12 In other countries it is known by the names viewdata, videotext, Prestel, Teletel, and Telidon.

13 For a more detailed and comprehensive analysis of the introduction of videotex in Germany see Schneider (1989).

million participants in the French videotex system, this service introduction was certainly not a success.

Although there is clearly no single explanation of the fatal German situation, an important determinant of the different development in the two countries is undoubtedly related to the institutional structures by which these service introductions were governed. In both countries, the preexisting public telecommunications monopoly turned videotex introduction - despite its commercial character - into a matter of public policy, involving the general political decision making machineries. Due to the German federalist decision making structure and also to the fact that the participating industry in Germany was much more autonomous and fragmented than its French counterpart, Btx could not be implemented with the same decisiveness that the French have demonstrated with their Minitels.

An important factor in the politicisation of the introduction of Btx was the relation of this new communication service to media policy. Since Btx allows not only the transmission of messages, but essentially provides an electronic infrastructure for the distribution and communication of information, it was thought to affect a number of actors in the traditional media sector. In Germany, this was the press, the broadcasters, and especially the *Länder* (federal states) as the authorities responsible for the German radio and television system. Other actors appeared from outside the media policy domain advocating data protection and consumer protection with respect to concerns of social groups which were anxious about negative impacts of the videotex technology on their life style and social situation.

During the Btx introduction in Germany, the PTT played a dominant role as coordinator and "system leader": It initiated the undertaking, shaped the core decisions of systems architecture, coordinated the establishment of the central computer network, controlled the installation of specialized telecommunications connections and led and coordinated to a large extent the public relations activities.

Despite this central position, the German PTT was far from achieving hierarchical control over the overall actor set. Btx not only interfered with other public policy domains but also in its indigenous field the PTT had to rely more and more on the cooperation of private firms competing under market conditions. The procurement of Btx terminal equipment was completely liberalized. In the first years of Btx development, the PTT was not even allowed to provide any terminals. This was not only

due to its technical concept of Bildschirmtext relying on the normal TV set[14] but also to the growing demand for deregulation and liberalization (see next section). During the early 1980s, it became very difficult for the PTT to continue its traditional terminal procurement for new services. Since the "French strategy" of a completely state-led terminal diffusion[15] was "politically not feasible" in Germany,[16] the Bundespost had to use an indirect approach which was not entirely unsuccessful. Despite a lack of traditional ties to private TV set manufacturers or to the press, the German PTT was able to motivate a larger number of actors for cooperation by a series of financial incentives, organizational and informational support (e.g. research funding, coordination of trials and presentations, support by extensive marketing activities, etc.).

Similar problems arose in the information business since the PTT as a "common carrier" could not offer information services itself. The growth of an information market within the videotex system thus depended on the successful motivation and stimulation of private firms, primarily from the print media sector, to engage in this new market.

Seen from the perspective of governance, the German Btx was introduced within a mixture of market arrangements, hierarchical coordination by the PTT and associational coordination through business associations in consumer electronics and the new information provider domain. In this situation, the traditional, only slightly extended triangle in German telecommunications began to expand into a complex network of heterogenous actors.

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14 When the German Bundespost initiated videotex introduction in the mid-1970s, it was believed that the use of the home TV set with an adapter would be the most economic solution and the Bundespost had therefore to cooperate with the German TV industry. Since this sector is organized as a private and highly competitive market, a liberal terminal policy was the logical consequence.

15 In France, the PTT bought several million videotex terminals from its telecom industry and distributed the terminals for free (Mayntz/ Schneider 1988).

16 This is indicated by a statement of officials of the PTT Ministry in an interview: "We could do it, for instance, like the French: We commission one million terminals and give them away for free. Then we would have 1 million subscribers in a short time. This would be nice - but this is not feasible in the Federal Republic. We expect that the terminals will be provided by industry and bought by the users. ... We also discussed these problems with our French colleagues. They think that one has to give the industry a fixed order - otherwise this will not work. If we would have taken up their proposal and have ordered, say, 500,000 decoders, we would have been swamped with reproaches. We would not have survived the subsequent political discussion" (Diebold Management Report Nr. 6/7-1985, 12. Translation by author).

The structure of the Btx network was shaped by the existing institutions, some key decisions in the technical area, and the actors' perceptions. The legally relevant definitions of the new medium played an important role for the inclusion in or exclusion from the policy network. At the end of the 1970s, it was not clear whether Btx should be considered as a form of *broadcast communication* or as an *individual telecommunication* like the telephone or data transmission. Such a distinction had important consequences in Germany because quite different regulatory structures in telecommunications, broadcasting and the press exist. Whereas telecommunications is a state monopoly run at the federal administrative level, the broadcasting system is controlled by the German *Länder*.[17] In the press sector, finally, governmental regulation (by *Länder* legislation and by a "regulatory framework" at the federal level) is very limited.

In this context, the *Länder* saw Bildschirmtext mainly as an *electronic mass medium* and feared that it could introduce market forces in their traditional domain. The press, in contrast, perceived the intervention of the broadcasting authorities as intended to extend their regulatory powers into the area of new electronic media.

The fact that the provision of terminals was liberalized, that media policy became involved and that Btx created other social issues (rationalization, data and consumer protection) triggered the engagement of a rather inclusive set of actors. The *technical and organizational built-in requirements* for system development (resource mobilization, systems operation, administration, standardization, guarantee of access, content regulation, information provision) thus activated many more actors than traditional telecommunications policies. In addition, a number of actors got involved by anticipating certain "external" effects or social impacts[18] of the Btx technology. Thus, the *perceived technical and organizational functions and anticipated externalities* "generated" a network of actors who considered each other directly or indirectly relevant for the system. Although this structure was not the result of a common and homogenous perception of the technological system (competing purposes, competing

17 In the 1980s the German Broadcasting System was partially opened to private radio and TV stations which are also generally regulated by the states' governments.

18 Examples are: privacy and security, consumer protection and effects on employment and industry structure.

usage perceptions), the different visions, nevertheless, converged into a single structure of mutual relevance on the actors' level.[19]

Besides an intuitive and qualitative account of this interaction system, the network of mutually relevant Btx actors can be identified and analyzed more systematically by network analytical methods.[20] For this purpose we applied a research strategy similar to that of Laumann/ Knoke (1987). In the first step we identified about 140 organizations which had been considered relevant for the introduction of Btx by a group of experts. Then, from this large set we selected the subset of the 40 most influential organizations and this subset was interviewed with a standardized questionnaire.[21]

From the pre-selected subset each respondent was asked to mark organizations listed in the questionnaire which had particular influence in the technical and institutional "shaping process" of Bildschirmtext. The respondents also reported, using a standardized form, whether they cooperated and exchanged information with the other actors on the list.

Influence reputation, cooperation and information exchange can be interpreted as the major facets of a structure of mutual relevance. An impression of this structure is given in Table 1. For the sake of simplicity of presentation, we only display the average value each actor received concerning influence, exchange of information and cooperation. In order to make comparisons easier, the indices have been rescaled to give the actor with the highest score the maximum value 1.00.[22]

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19 "Mutual relevance" implies that actors take each other into account in their actions. They have to have a certain degree of power to influence the policy making process. Mere inaction does not necessarily indicate irrelevance or marginality, since others may take the interest of one "passive" actor into account (Knoke/ Laumann 1982: 257).

20 For an overview of network analytical methods see Knoke/ Kuklinsky (1982) and Pappi (1987).

21 The list of these 40 actors was presented to the interviewees. They could add relevant actors not included in the list and eliminate those they considered irrelevant. The resulting population to be analyzed in this section comprises 42 actors.

22 The influence reputation scores are slightly different from those reported in an earlier version of this chapter and in Schneider (1989: 205). This is a result of different recoding procedures, which were employed in the two analyses. This fact should prevent us from overinterpreting the influence positions. The formal precision of the computation clearly suggests a greater validity of the measurement than one can really achieve by means of a questionnaire.

Table 1: Influence Reputation, Cooperation and Information Exchange in the Videotex (Btx) Introduction

Name of Actor	Category	Influence Reputation	Cooperation	Information Exchange
PTT Ministry (BMP)	PTT	1.00	1.00	1.00
FTZ	PTT	0.96	0.92	0.74
Btx-AV	Assn. of IPs	0.93	0.87	0.85
IBM	Producer	0.93	0.87	0.35
Loewe Opta	Producer	0.88	0.76	0.35
Siemens	Producer	0.83	0.68	0.38
Press	IP	0.80	0.63	0.29
Dornier	Producer	0.76	0.58	0.29
DIHT	IP/Users/Pol.	0.76	0.55	0.38
Bosch (Blaupunkt)	Producer	0.72	0.45	0.29
ZVEI	Prod./Pol.	0.71	0.50	0.35
Länder	Politics	0.68	0.53	0.18
Mupid	Producer	0.67	0.37	0.18
SEL	Producer	0.67	0.37	0.35
RAFI	Producer	0.66	0.42	0.24
HHI	Science	0.65	0.42	0.24
Philips (PKI)	Producer	0.65	0.32	0.27
HDE	IP/Users	0.62	0.34	0.18
Mail Order Firms	IP/Users	0.62	0.34	0.18
Banks	IP/Users	0.62	0.34	0.24
Nixdorf	Producer	0.61	0.32	0.27
Danet	Producer	0.57	0.29	0.27
BIFOA	Science	0.57	0.34	0.29
BDI	Prod./Pol.	0.51	0.21	0.12
GDD	Data Protect.	0.51	0.21	0.03
ZDH	IP	0.49	0.16	0.12
VDMA	Prod./Pol.	0.49	0.18	0.09
Grundig	Producer	0.46	0.13	0.18
Forschungsmin. (BMFT)	Politics	0.46	0.11	0.12
Münchner Kreis	Science	0.45	0.18	0.21
Bundestag	Politics	0.45	0.13	0.12
Insurances	IP/Users	0.45	0.18	0.06
SONY	Producer	0.43	0.13	0.18
Computer Centers	IP	0.41	0.11	0.06
Wirtschaftsmin. (BMWi)	Politics	0.41	0.13	0.09
Telefunken	Producer	0.40	0.11	0.21
DGB/DPG	Trade Unions	0.37	0.11	0.03
SPD	Politics	0.25	0.08	0.03

Note: The table contains only actors with an influence reputation score of at least 0.25. All indices were rescaled to the maximum 1.00. IP = Information or service provider.

As it is shown in Table 1, the actors with the greatest *influence reputation* were the German PTT Ministry and its technical agency (FTZ). Among the producers, IBM was considered most influential since it designed and established the network of computer databases. Also the small and innovative TV set producer Loewe Opta was considered to be very influential. This firm strongly stimulated the development of the terminal market by its innovative capabilities. That Siemens - the largest telecommunications producer in Germany - also held a strong "reputational position" was expected. On the user and application side, the information providers' association Btx-AV (Btx-Anbieter Vereinigung), ranking as high as IBM, the press and the DIHT have been considered to have the highest influence reputation.

It is interesting that purely "political actors" such as the party with the highest influence scores (the SPD), the Federal Ministry of Research and Technology (Bundesministerium für Forschung und Technologie, BMFT), the Bundestag, those responsible for data protection at the federal and the *Länder*[23] level etc. received relatively low rankings, whereas producers and the major information providers were positioned more at the upper end of the influence reputation scale.

The PTT Ministry was not only the most influential actor but also the most frequently nominated partner of *cooperation* in Btx. All in all, Table 1 shows that the rank order of cooperation is very similar to that of influence.

Considerable similarity between the actor's positions also exists with regard to *information exchange*. The PTT Ministry ranked highest and the FTZ and the Btx-AV were very frequently mentioned partners in information exchange processes, too. All the other actors have significantly lower scores. But this does not mean that there was no clearly structured network of information exchange. This can be demonstrated by a block model procedure,[24] a network analytical tool in the narrower sense. Using this procedure, the whole network of information exchange can

23 Their relatively highest (twelfth) position is due to the fact that for a longer period, Btx was also perceived as an electronic mass medium.

24 The block model was produced by the COBLOC-procedure (Carrington/ Heil 1981) with the program system SONIS (Pappi/ Stelck 1987).

be reduced to the essential "strings" and "nodes"[25] where the actors with highly similar communication profiles are condensed into single actor blocks.

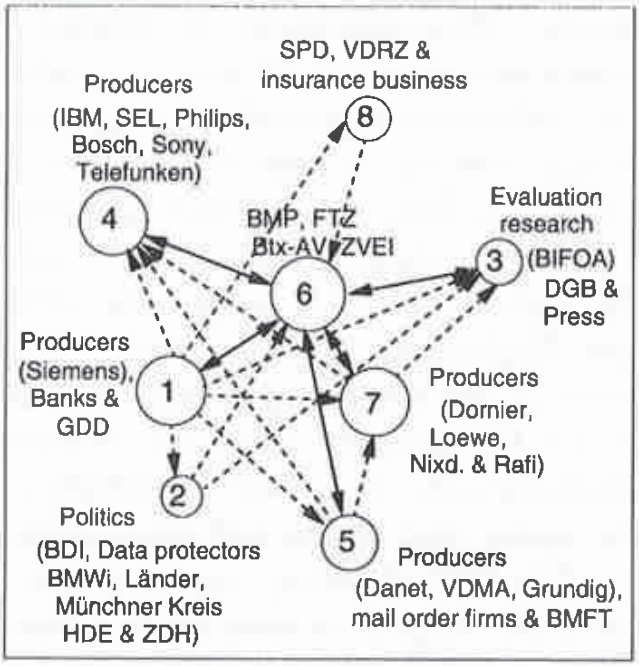
Figure 2: The Policy Network in Videotex (Btx)

Blocks	1	2	3	4	5	6	7	8
1	(83)	(48)	(44)	(100)	(53)	(91)	(100)	(44)
2	23	(38)	(40)	7	11	(64)	0	0
3	0	4	0	0	0	(46)	0	0
4	6	2	11	3	23	(67)	8	0
5	20	0	0	(40)	0	(70)	(45)	0
6	(42)	21	(42)	(71)	(35)	(91)	(100)	0
7	25	14	(42)	(46)	15	(100)	(41)	0
8	0	14	11	0	0	(58)	0	0

Note: Each matrix entry reports the degree (in percent) of information exchange from the perspective of the row-block actors.

The theoretical maximum is 100%.

◯ Density > 30%



asym. information exch. (>30%)

sym. information exch. (>30%)

Size of circles indicates aggregate influence reputation

Figure 2 represents such a compressed communication structure with eight actor blocks. Here, the three most frequently mentioned partners of information exchange, together with the association of the telecommunications equipment manufacturers (ZVEI), occupy the most central position in the network. The role of this group can therefore be labeled as the "coordinator and system leader". This central group has direct ties to four blocks of producers and main information providers. The group of "political actors" which were mainly responsible for the media, con-

25 Because every actor was asked to specify the actors with whom he had an especially extensive information exchange during the Btx introduction, we received an asymmetrical matrix representing the communication linkages in our population. This matrix is the basis (input) of the block model procedure.

sumer and privacy regulations occupies a rather peripheral position in the network. This structure suggests that *technical and economic problem perceptions clearly dominated political considerations.*

The "infrastructure" of this information and coordination network consisted, on the one hand, of direct informational and cooperative relations in the field trials and of promotional alliances for public relations activities and, on the other hand, also of the membership and participation in a series of formal committees within the PTT and the information providers association (Btx-AV). The latter was very influential because it accomplished an organizational framework for the cooperation between the PTT and the most important information providers. Beyond this economic organization of Btx development, a number of formal political institutions organized and channelled the influence of the *Länder*, the intervention of data protection authorities, and the voice of the consumers and other affected groups in the regulation of this new electronic medium.

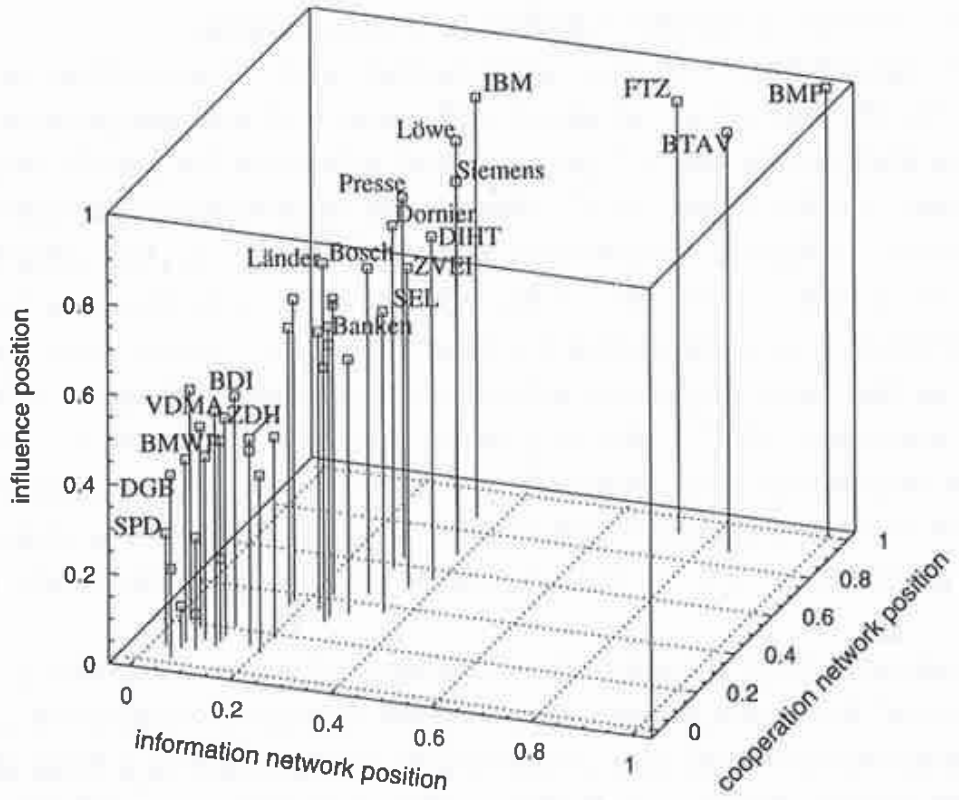
To summarize and visualize the structure of mutual relevance in the introduction of Btx each actor position with respect to influence reputation, information exchange and cooperation is displayed in a three dimensional scattergram (Figure 3). It shows the outstanding positions of the PTT, its technical agency (FTZ) and the Btx-AV. Between these three actors and all the others there is a relatively large gap - especially with regard to information exchange and cooperation.

At the beginning of this section, we pointed to the failure of the Btx diffusion and indicated that these development problems have to be related to the structure of the Btx policy network during its introduction. A comparative examination of the introduction of videotex in France and the UK[26] indicates that such a relationship clearly exists. In the three countries, governance structures of videotex introduction differ in three respects:

1. the weight of political actors representing "regulatory policy issues" in the media policy domain and in consumer protection;
2. the degree of vertical control the PTT had in each system (from equipment and terminal production to systems operation and information provision);

26 For a comparison of different videotex introduction strategies see Mayntz/ Schneider (1988) and Vedel (1989).

Figure 3: The Structure of Mutual Relevance in Videotex (Btx)



3. the degree to which the systems provider had a monopoly in the service provision or was submitted to market competition (horizontal control).

In Britain, the "political actors" had the lowest weight because political regulation never became an issue there. An important reason was that the old British Post Office had been able to "buy off" potential opposition from the press by giving up its claims on information provision and by incorporating press organizations into the videotex project. This meant, on the other hand, that the Post Office's direct "vertical" control of Prestel, the British videotex system, was rather low because it was not only dependent on the cooperation of terminal producers but also on the information providers. In addition, when British telecommunications became completely liberalized in the early 1980s, the new British Telecom also lost the "horizontal" control and Prestel had to fight with new competing services.

The French videotex introduction, in contrast, was under almost complete horizontal and vertical control of the French PTT. The French

telephone authority Direction Générale des Télécommunications (DGT) provided the service, distributed the terminals (for free!) and controlled the most important information service, the electronic directory.

Similar to the British, the German terminal domain and the information sector were market controlled but Btx never had to compete with other videotex services. On the other hand, it was shaped and partly restricted by the regulation of potentially negative externalities. Although the different actors demanding this kind of regulatory intervention had a rather low influence reputation, they managed to impose the (from their perspectives) necessary minimal regulations confining Btx, for example, to "interactive" usage between either terminals or terminals and a data base. However, the most important facet of Btx introduction was undoubtedly the low degree of vertical control, despite the PTT Ministry's central position in the Btx network. Aside from the PTT Ministry, there were other rather influential actors with different interests in the "coordinator and system leader" block. The same holds true for the blocks of dominantly economically oriented producers. The group of political actors, although not very influential after a restrictive political definition of Btx had been reached, "remained" in the network - ready to keep watch that the definition was not violated by the PTT Ministry.

The German videotex development became locked into a kind of chicken-egg dilemma. Potential users waited for cheap terminals and attractive services but terminal prices and the utility of information services depended to a large degree on the investments of private business firms. These actors, however, were only willing to invest when there was already a critical mass of users. The PTT, which might have financially been able to cut the vicious circle by subsidizing terminals, telecommunications tariffs and perhaps even the provision of information services during the early years of Btx introduction, could not manage it.

Obviously, the direct approach used by the French to establish a system from scratch over night was not feasible in the German context. But institutional constraints and the concrete structure of the actor network were not deterministic causes of the relative failure. The strategy of the PTT to introduce Btx in a cooperative mode together with autonomous actors, respecting the given institutional boundaries and the delimited economic domains, was not bound to fail automatically. If the accumulation of technical coordination and timing problems had not created serious technical snags, the strong expectations which almost everybody had during 1982 and 1984 could have pushed the growth of the user

community beyond the necessary critical mass within a short period. Complications produced by international standardization processes and the tendency to over-engineering in German telecommunications made the whole undertaking very time-consuming and resulted, among other things, in too expensive Btx terminals. When the expected "take-off" of the system did not take place, Btx's reputation was further damaged. All in all, this finally led to the failure of the PTT's introduction strategy, recovery from which will be very difficult.[27]

4 The Policy Network of the Institutional Reform in Telecommunications

In contrast to the case of videotex policy making which demonstrated the impact of the institutional setting on the economic prospects of the service, the policy process of institutional reform was driven by the goal to change and restructure this setting. Success or failure of such a process can be assessed on a long-term or a short-term basis.[28] A short-term indicator could be the mere capacity for collective action, i.e. whether the initiators and proponents of the reform succeeded in mobilizing support to transform the proposals for institutional change into an enacted law. "Objective problem pressure" alone does not trigger reform initiatives, nor is there only one way out of the problematic situation. "Change agents" with convincing arguments and sufficient formal political power as well as informational and reputational resources to form coalitions to overcome institutional inertia are always needed.

After the failure of a first reform initiative in the early 1970s, it took about 8 years until the dissatisfaction with the status quo led a few actors to call for a liberalization of the telecommunications market. Computer manufacturers like IBM and Nixdorf, a dynamic German company which later was sold to Siemens, demanded free entry into the terminal equipment market which through the PTT's restrictive approval practice

27 After this failure was acknowledged in 1987, the PTT was allowed to enter the terminal market.

28 Medium- or long-term success of the structural changes in telecommunications would be indicated by better performance, higher efficiency and innovativeness which was explicitly intended by the reform.

was a well protected domain of the traditional suppliers of the German PTT. But also liberal CDU ministers of economics in the *Länder*, especially Lower Saxony, began to criticize the growing monopoly power of the PTT which, as a consequence of the confluence of computers and telecommunications, at least indirectly interfered in the traditionally unregulated market for computer equipment.

In a first spectacular step in 1980, the German Monopolkommission (antitrust commission) analyzed the procurement policy of the PTT and the structure of the telecommunications equipment market which in many segments was dominated by the purchasing power of the PTT. In its report, the commission questioned the PTT's double role as player and umpire in the market (Monopolkommission 1981: 91-110). The commission demanded far-reaching liberalization measures in the terminal market and a certain degree of service competition within the public telecommunications network. The PTT successfully rejected the proposals, but its position had already become weakened because of some strategic errors made in previous years (Dang Nguyen 1985: 112-114). Especially the fact that the PTT still supported the development of an obsolete analogue electronic switching system while the world was going digital had provoked severe criticism. This case was seen as evidence of bureaucratic and monopolistic inertia.[29]

As these problems did not directly or visibly affect the quality or availability of telephone service, the general public did not challenge the PTT's monopolistic position which seemed to guarantee universal service at reasonable costs. In addition, radical reforms like privatization of the telecommunications branch of the PTT were practically excluded by the Basic Law postulating the PTT to be state-owned. The new federal government - a coalition of the Christian Democrats (CDU/CSU) and the Liberals - coming into office in 1982, had to take this into consideration. The new PTT minister, who had formerly criticized the PTT monopoly frequently, was willing to initiate a reform at all costs. In this respect, he could count on the liberals, who demanded far-reaching changes in

29 The decision was not cancelled until 1979 when it had become obvious that fully digitized systems were technically and economically superior to analogue technology (Werle 1990: 249-263).

telecommunications, whereas his own party, especially the Bavarian wing (CSU), was not so enthusiastic.[30]

Although technical changes - digitization, satellite and mobile communication - and an international trend toward liberalization and deregulation exerted pressures for reforms,[31] a series of legal and political complications in Germany favoring veto coalitions against any kind of transformation of the status quo demanded a well prepared concept. The government therefore established an independent commission which was composed of almost all relevant social groups, i.e. trade and industry, science and politics.

In 1987, the Commission of the European Communities (CEC) issued a "Green Paper on the Development of the Common Market for Telecommunications Services and Equipment" demanding a "restructuring of national markets" to permit competition in the market for terminal equipment and for value added services.[32] Only a few months later, the German government commission published its report on the possibilities of "improving the fulfillment of tasks in telecommunications".[33] A 9:2 majority of the commission proposed a "Restructuration of the Telecommunications System" strikingly similar to the EC proposals. Major points were organizational separations of

- the telecommunications branch from the other branches of the PTT,
- the regulatory (sovereign) functions from the operational (entrepreneurial) tasks.

The PTT TELEKOM was to keep its network monopoly and also the monopoly of the telephone service, but all other services would be offered in competition with other providers. The market for terminal equipment would be completely liberalized.

The reform act, drafted by the government a short time later, was based on the commission's report. But the government not only intended

30 For a comparative study of institutional reform in telecommunications, emphasizing political aspects see Grande (1989).

31 Especially the US administration - after the divestiture of AT&T - attacked the German "protectionist" policy in telecommunications.

32 For the strategic role of the CEC in the European process of telecommunications liberalization see Schneider/ Werle (1990).

33 That is: "The most effective promotion of technical innovation, the development and observance of international communication standards and the safeguarding of competition on the telecommunications market" (Witte 1988: 9).

to organizationally separate TELEKOM, it explicitly wanted to split the PTT into three public corporations (TELEKOM, Banking, Postal Services) under the roof of a directorate (Direktorium) with mainly coordinating competence. The reform was declared a necessary adaptation to international and technological developments contributing to more efficiency and variety within the telecommunications infrastructure and to a strengthening of the German industry in the world market.

The parliament's committee on post and telecommunications organized two hearings, the first dealing with the EC's Green Paper and the second with the reform act. A wide range of political and economic actors and many experts were invited to give statements and to answer a series of questions formulated by the committee. More than fifty individuals or organizations participated. Compared to earlier legislative and administrative processes in telecommunications, the mere number of interested or affected actors had grown considerably.

After the reform law had passed the legislative bodies in summer 1989, we carried out a survey among all these actors but excluded scientists and other experts not directly affected by the reform.[34] Once again, standardized questionnaires were used, and the general data collection procedure was similar to that of the videotex network.

The first step of the data analysis concentrates on the structure of mutual relevance as it was perceived by the actors in the process of institutional reform. We saw, in the previous section, that the PTT Ministry held a central position in the process of introducing Btx. One might argue that this was typical for a technical innovation process in which economic considerations predominated. Service providers and producers of terminal equipment and network technology were more relevant than, for example, political actors, and the PTT Ministry as the central financier of the technical infrastructure of the new service had to carry a high risk. Compared to Btx, the telecommunications reform was much more political in the sense that parts of the institutional basis of this sector were to be redesigned and restructured. This was far more dangerous for the PTT because the organization was directly and fundamentally

34 Because of the higher degree of formalization of this reform process compared to the introduction of Btx, the identification of the relevant actors was less complicated. In addition to the actors who participated in the hearings, the relevant political parties and ministries were included in the survey. The number of actors analyzed in the following amounts to 38.

affected by every detail of the reform. Obtaining control over this process was a vital question for the PTT. Table 2 shows that the PTT Ministry indeed succeeded in getting such a central position in the reform network.

As in the case of Btx, all respondents were asked to give an estimation of the *influence* of every organization included in a list we presented. All but one respondent rated the influence of the PTT Ministry as "very strong" or "strong". After rescaling the influence reputation, the PTT Ministry displays the maximum value of 1.00.[35] The PTT Ministry also was most frequently mentioned as a partner in *information exchange and cooperation* by the other actors. Its relative dominance becomes evident when we, as in the case of Btx, display the position of each actor in the "three dimensional" space of influence reputation, information exchange and cooperation in Figure 4.

Table 2 and Figure 4 also show, as could be expected, that the most influential actors in the reform process were political organizations such as parties, other ministries, workers' unions and manufacturers' (producers') associations. The largest and most important German equipment manufacturer, Siemens, only ranked fifteenth in the influence-reputation scale.

Although in the beginning a general consensus seemed to exist that the German telecommunications sector had to be restructured, neither the government commission nor the PTT Ministry managed to reach an agreement among all relevant actors when the concrete details of the reform had to be designed. The liberal party (FDP), the BDI (Federation of German Industry) and the computer manufacturers represented by the Association of German Machinery Manufacturers (Verband Deutscher Maschinen- und Anlagenbau, VDMA), but partly also the Ministry of Economics and the DIHT demanded further liberalization, in particular the elimination of the PTT's network monopoly.

The postal workers' unions (especially the Deutsche Postgewerkschaft, DPG), the SPD and also the majority of the (smaller) telecommunications equipment manufacturers in the Central Association of the Electrical Industry (ZVEI) considered the liberalization as too far-reaching or the speed of the restructuring process to be too fast. The most prominent

35 In an earlier presented version of this chapter, the rescaling procedure was not employed and a couple of questionnaires had not been returned at that time, so the figures are slightly different.

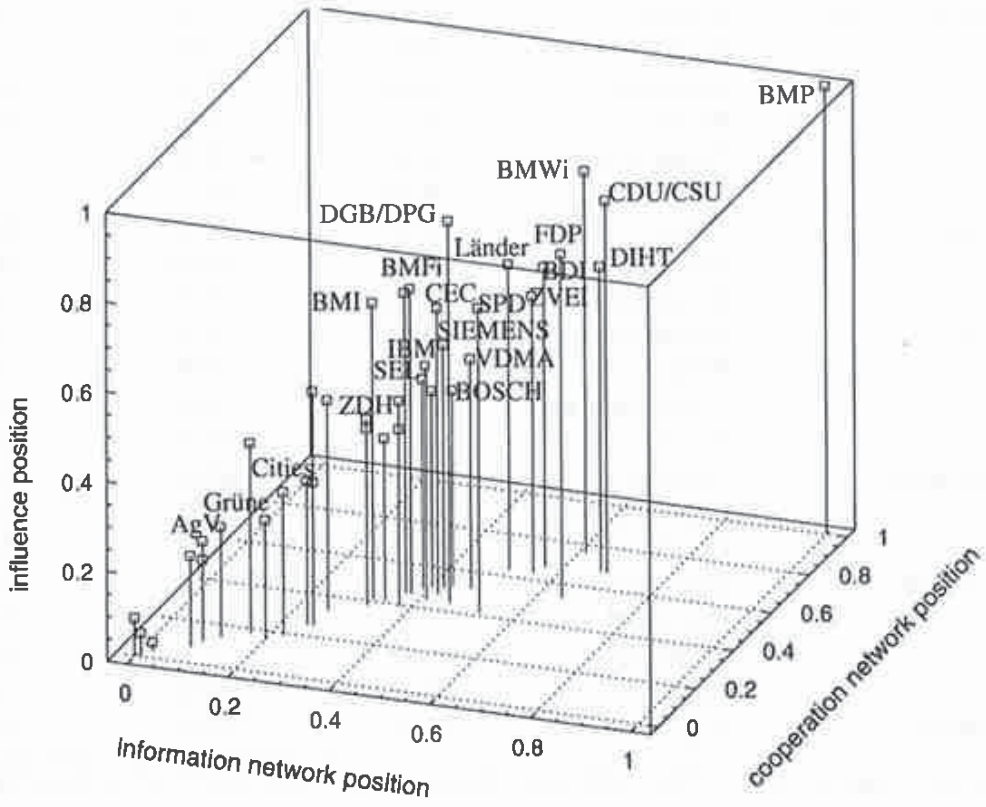
Table 2: Influence Reputation, Cooperation and Information Exchange in the Telecommunications Reform

Name of Actor	Category	Influence Reputation	Cooperation	Information Exchange
PTT Ministry (BMP)	PTT	1.00	1.00	1.00
Wirtschaftsmin. (BMWi)	Politics	0.85	0.76	0.61
DGB/DPG	Trade Unions	0.85	0.44	0.46
CDU/CSU	Politics	0.83	0.68	0.68
FDP	Politics	0.77	0.54	0.65
Finanzministerium (BMF)	Politics	0.68	0.46	0.38
SPD	Politics	0.68	0.41	0.53
Länder	Politics	0.68	0.64	0.51
DIHT	IP/Users/Pol.	0.68	0.68	0.67
Bundeskanzleramt	Politics	0.67	0.46	0.37
BDI	Prod./Pol.	0.67	0.67	0.57
Innenministerium (BMI)	Politics	0.66	0.41	0.32
EG-Kommission (CEC)	Politics	0.64	0.48	0.42
ZVEI	Prod./Pol.	0.62	0.64	0.55
Siemens	Producer	0.54	0.51	0.42
IBM	Producer	0.52	0.44	0.41
DPV/DBB	Trade Unions	0.52	0.25	0.26
VDMA	Prod./Pol.	0.51	0.52	0.47
Data Protectors	Politics	0.47	0.33	0.26
SEL	Producer	0.47	0.49	0.39
ZDH	Producer/Pol.	0.46	0.40	0.38
Philips (PKI)	Producer	0.44	0.52	0.44
Nixdorf	Producer	0.44	0.51	0.40
CPG/CGB	Trade Unions	0.43	0.18	0.17
Banks	Users	0.42	0.38	0.32
Bosch (Blaupunkt)	Producer	0.39	0.40	0.38
VAF	Producer/Pol.	0.39	0.38	0.32
Krone	Producer	0.36	0.41	0.34
Cities Association	Users/Pol.	0.32	0.25	0.25
VdP	Users/Pol.	0.32	0.19	0.22
DeTelecom	Users/Pol.	0.32	0.25	0.26
Grüne	Politics	0.27	0.16	0.20
AgV (Consumers)	Users/Pol.	0.25	0.14	0.12

Note: The table contains only actors with an influence reputation score of at least 0.25. All indices were rescaled to the maximum 1.00.

opponent was the DPG, a union organizing more than 80% of the PTT employees. The DPG attacked the reform as a first step towards privatization and criticized the organizational division of the PTT as a measure to impede cross-subsidization. According to the DPG this would result in increased rationalization pressure and layoffs in the postal branch. Another important concern was the presumed weakening of its organizational integration, although the workers' unions were conceded one third of the seats on the boards of the three corporations.

Figure 4: The Structure of Mutual Relevance in the Telecommunications Reform



The *Länder* also criticized the reform draft. Those governed by SPD majorities tended to reject any reform initiative launched by the federal

"Wende"[36] administration. This brought Bavaria, governed by an absolute majority of the CSU (the Bavarian "sister" of the CDU), into a strategically strong position. Its votes in the Bundesrat (Federal Council) were needed to secure a majority over the SPD *Länder*. Bavaria, a state with industrial conglomerates but also large peripheral rural areas, traditionally stressed the infrastructural significance of the PTT complex and demanded more political control of this sector. Most of the other *Länder* wanted to keep a position of minimum influence which was in danger of diminishing because the reform draft contained no substitution for the eliminated Administrative Council.[37]

The short description of the position of several relevant actors may create the impression that their attitudes and interests varied considerably. Their image of the reform process, however, was not very divergent. The three issues of liberalization (of the markets for terminals, services and networks) and the issue of organizational division of the three old PTT branches were perceived to be closely linked. The complex reform problem has only one underlying issue dimension. This can be demonstrated by a principal component factor analysis which shows high loadings of all four items on one single factor (see Table 3). This factor, comprising 75% of the total variance of the four input variables,[38] represents a latent variable measuring the actors' attitudes toward the global *"liberal reorganization issue"* in telecommunications.

To identify *similarities and differences of interest positions* toward the liberal reorganization of telecommunications in Germany, we also applied network analytical methods. We asked the actors to give a global statement relating their own stance to those of the other actors. The resulting matrix was examined by means of a block model procedure (COBLOC)[39] in order to extract sets of actors with relatively similar interest positions. At least four groups of actors perceiving each other's positions as similar could be identified. The largest group comprises "supporters" of a definite but, at least in the first step, rather moderate

36 The change in government from the 13-year SPD/FDP coalition to the CDU-CSU/FDP coalition in 1982, which was considered a fundamental change in West German politics, has become known as "Die Wende".

37 According to the old PTT Administration Act, the states delegated five representatives into the Administrative Council.

38 Perception of the liberalization of the markets for (1) terminals, (2) services, (3) networks and of (4) the organizational division.

39 For a short description of this procedure see previous section.

Table 3: A Factor Analysis of the Actors' Attitudes toward the Telecommunications Reform

	Factor Loadings
Liberalization of Terminal Equipment	.81
Liberalization of Services	.91
Liberalization of Networks	.88
Organizational Separation	.87
Variance 75.2% (N=30)	

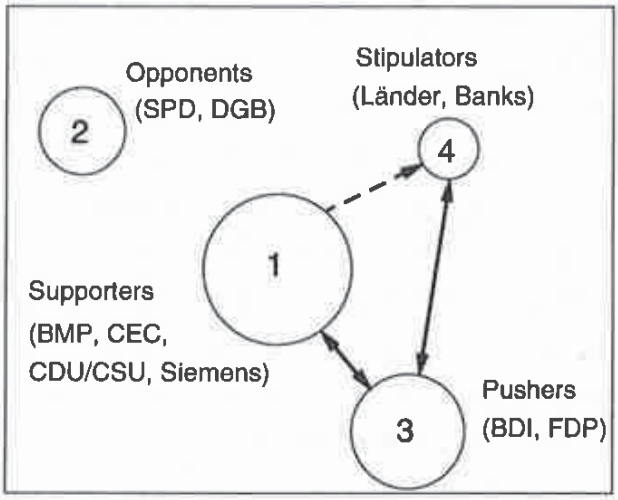
(Scale: 1 = Reform is much too radical, 2 = is too radical, 3 = ok, 4 = should have been more radical, 5 = should have been much more radical)

reform. They concentrated their efforts on what appeared to be feasible. To this group belonged, among others, the PTT Ministry, the Ministry of Economics, the CDU/CSU and the EC Commission. Another larger cluster is that of "opponents" who criticized the reform as a whole or central elements of it. Their dominant perspective was that of the affected PTT workers and the individual non-commercial users of telecommunications services. The DPG, the SPD and also the Green Party belonged to this group which at least wanted to retard the reform. A smaller group of actors, comprising the BDI and the FDP might be called the "pushing" coalition. They demanded far-reaching liberalization of the telecommunications sector. A fourth group, including rather heterogeneous actors, generally agreed with the reform but demanded a few specific changes with respect to very special interests. The *Länder* are, for instance, members of this fourth group of "stipulators". They tried to get more political control of the infrastructural component of the telecommunications sector. In this respect, they succeeded in imposing one of the few changes of the reform draft providing the establishment of an "infrastructural council" (Infrastrukturrat) with representatives of each of the *Länder* and an equal number of delegates from the Federal Parliament. This council can decide (or make proposals) whether the three PTT corporations should

be obliged to provide certain services with a high infrastructural significance regardless of the market situation.

Figure 5: The Policy Network in the Telecommunications Reform

Blocks	1	2	3	4
1	66 *43*	14 *19*	88 *70*	68 *32*
2	12 *22*	86 *40*	5 *10*	29 *29*
3	74 *63*	5 *14*	100 *100*	50 *67*
4	18 *13*	0 *0*	83 *83*	0 *0*



Note: Each matrix entry reports the degree (in percent) of interest similarity (resp. information exchange) from the perspective of the row-block actors.
The theoretical maximum is 100%.
◯ Density > 30%
Row 1 = Interest Similarity
Row 2 = Information Exchange

asym. interest similarity and inform. exch. (>30%)
sym. interest similarity and inform. exch. (>30%)
Size of circles indicates aggregate influence reputation

Figure 5 gives an impression of the *actor network* in the process of the institutional reform with regard to interest similarity. The matrix on the left reports the information exchange relations within and between the groups.[40] The four groups differ with regard to the aggregate influence reputation, their internal homogeneity of interests and their relative similarity with the other groups. We can see that the "supporters" are

40 This time - in contrast to the last section, where we had no information about the similarity of interest positions - not the information exchange activities, but the perceived interest similarities were used as input variables for the COBLOC analysis. So the information exchange relations only provide an additional information of a structure which is constituted by interest positions.

very influential and internally rather homogeneous. They perceive the stance of the "pushers" as corresponding highly with their own position. The "pushers" do not see any similarity to the "opponents" and vice versa. This latter group is internally relatively homogeneous but there is only little affinity to the position of any other group. In addition, the "opponents" are not very well integrated into the information exchange network of the four actor groups.

The network of interest similarity suggests that the group of "opponents" was in conflict with all other actors and that there was almost no chance to join a coalition with one of the other groups. This impression is confirmed by multidimensional scaling[41] (see Figure 6). This procedure results in a two-dimensional solution with one dimension clearly dominating. In this "liberal reorganization issue" dimension - the horizontal axis of Figure 6 - the most prominent opposing actors are located far on the left-hand side whereas the pushers can be found on the other side, but they are more visibly intermeshed with the great group of supporting actors.[42]

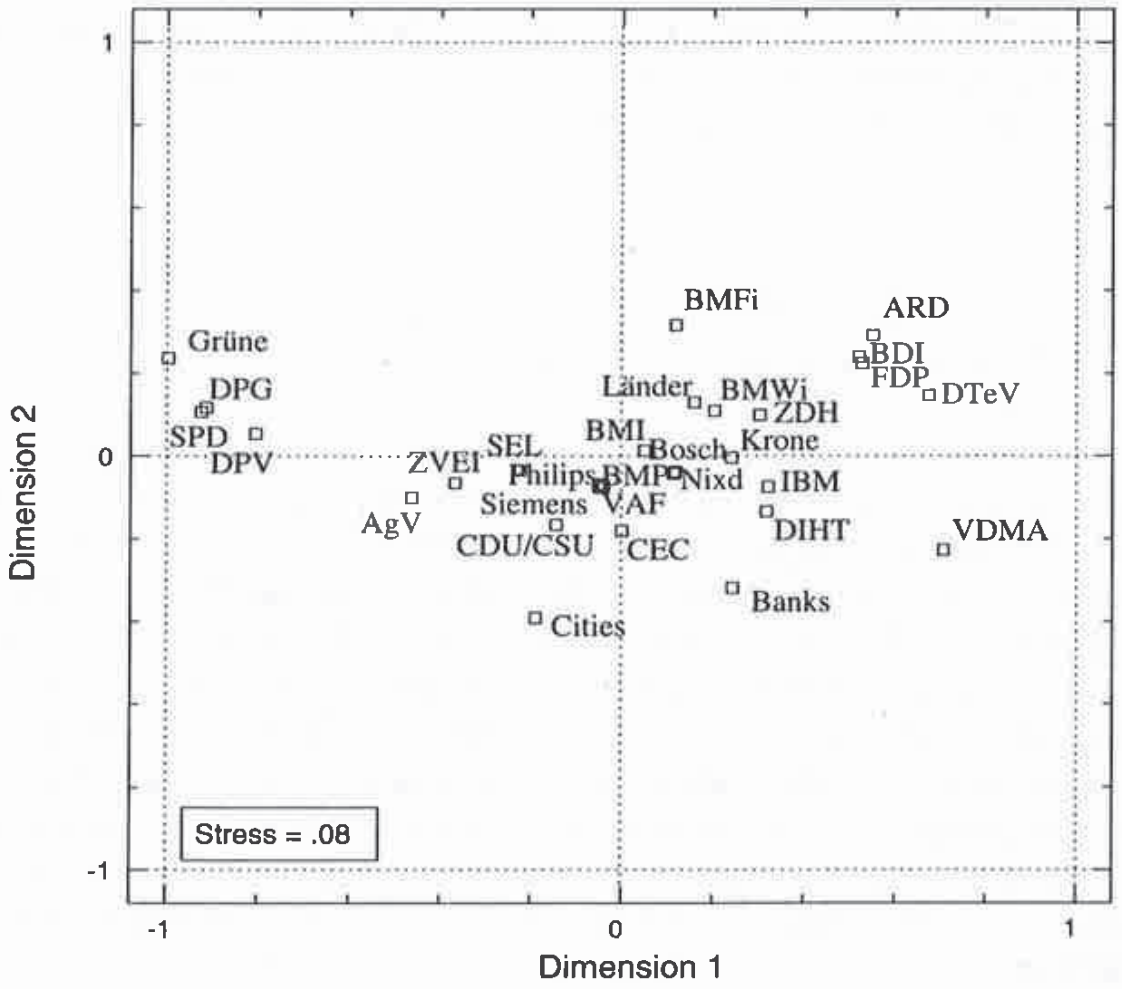
While most of the actors in the supporting group perfectly agreed with the results of the reform process, it is not surprising that the pushers and more so the opponents articulated discontent when asked for a summarizing statement. However, the deviation of the opponents and the pushers from the main stream was not radical enough to provide a basis for a veto-coalition. The pushers, who - as we could see in Figure 5 - were with regard to information exchange and interest similarity, not too strongly separated from the supporters, came to the conclusion that the reform could be interpreted as a small but not the final step in the right direction. So, eventually, they preferred this provisional solution to blocking the whole undertaking. The opponents, on the other hand, were rather isolated not only with respect to their interest positions but also to information exchange and their power resources were too small to impede the institutional change.

In this section, our interest was not only directed at the specific reform problem and the way it was handled but also at the type of actors playing the dominant roles. Although the changes were motivated by

41 The dissimilarity of actors with respect to their interest positions was computed as the Euclidian distance.

42 Input variables in this analysis are the atomistic interest positions and not the perceived interest interrelations.

Figure 6: The Actors' Postitions Toward the "Liberal Reorganization of Telecommunications" (Results of Multidimensional Scaling)



economic and industrial policy considerations and designed to improve the economic performance of this sector, they directly entailed a new definition of the role of the "state" and the respective political actors in this field. It turned out that *political and not economic issues dominated* and political actors constituted the most relevant actor networks in the reform. Within these networks, the PTT Ministry held the strongest position. It was perceived as the politically most powerful organization and was effectively integrated into the networks of cooperation and information exchange. The Ministry could present a well prepared draft of the reform act which preserved relevant parts of the old monopoly and, at the same time, opened the sector for more competition. The law appeared

to be a necessary adaptation to an international trend, not too liberal and not too restrictive. Although the pushers as well the opponents had considerable power resources, they neutralized each other or became so isolated that there remained only small chances for coalition formation. The PTT Ministry therefore could maintain a maximum of control and could mobilize the allies it needed to get the law passed.

5 Issue Networks and the Inner Circle in the Telecommunications Domain

The German telecommunications sector was run as a state monopoly for more than a century. Its governance structure in this period was rather simple: a stable triangle including the PTT as a public administration, a small family of equipment manufacturers and the German Chamber of Industry and Commerce cooperated in a clientelist and corporatist mode. Their common interest was to build up the telephone network respecting each others domains and interests. Economic and political interests appeared to be rather congruent, and when they conflicted, politics had primacy. After the war, this triangle remained the backbone of telecommunications policy but around this core a gradually more differentiated policy network containing more actors and divergent interests emerged.

Only at the beginning of the 70s with the expansion of telecommunications, with the proliferation of new services and the rapid technological change did the number of actors begin to explode. This development led to an enlargement of the "policy area" and the "policy community" in telecommunications.[43] At the same time, however, the domain was subjected to significant structural changes. As demonstrated in the two case studies in the previous sections, clearly differentiated actor networks emerge depending on the problem situation and problem perception.

Primarily economic problems like the introduction of the new telecommunications service videotex especially mobilize economic interests and the network of relevant actors predominantly contains private firms

43 The concept of policy domain implies these two elements which are distinguished by some scholars (esp. Wilks/ Wright 1987: 299-301). For a discussion of several concepts relating to that of policy networks see also Jordan (1990) and Rhodes (1990).

as manufacturers of equipment, information providers for the new service, specialists for technical development etc. Predominantly political problems like the institutional reform of the German telecommunications system towards more liberalization especially activate the general core of "high politics" like political parties, workers' unions, peak associations of business etc. Thus, political problems seem to create and activate other policy networks than economic problems would. The networks may even be issue-specific and issue-dependent.[44] It appears, however, that variation of networks between "classes or 'functional' types of problems" (i.e. economic vs. political) is greater than between issues within one class. Despite such variations and changes, it should be kept in mind that an important aspect of policy networks is their contribution to continuity and stability in political interactions.

Our two cases indicate that within a policy domain there is always a multiplicity of policy networks which partly overlap and partly diverge. When there is an "inner circle" of actors that are generally influential in the telecommunications policy domain, those actors would be present in all of the coexisting policy networks. In our case, they would form the intersection of both analyzed configurations. A plot of the actors' influence reputation scores in the two networks indeed shows that there was a core of actors having considerable influence in both policy networks (Figure 7).[45]

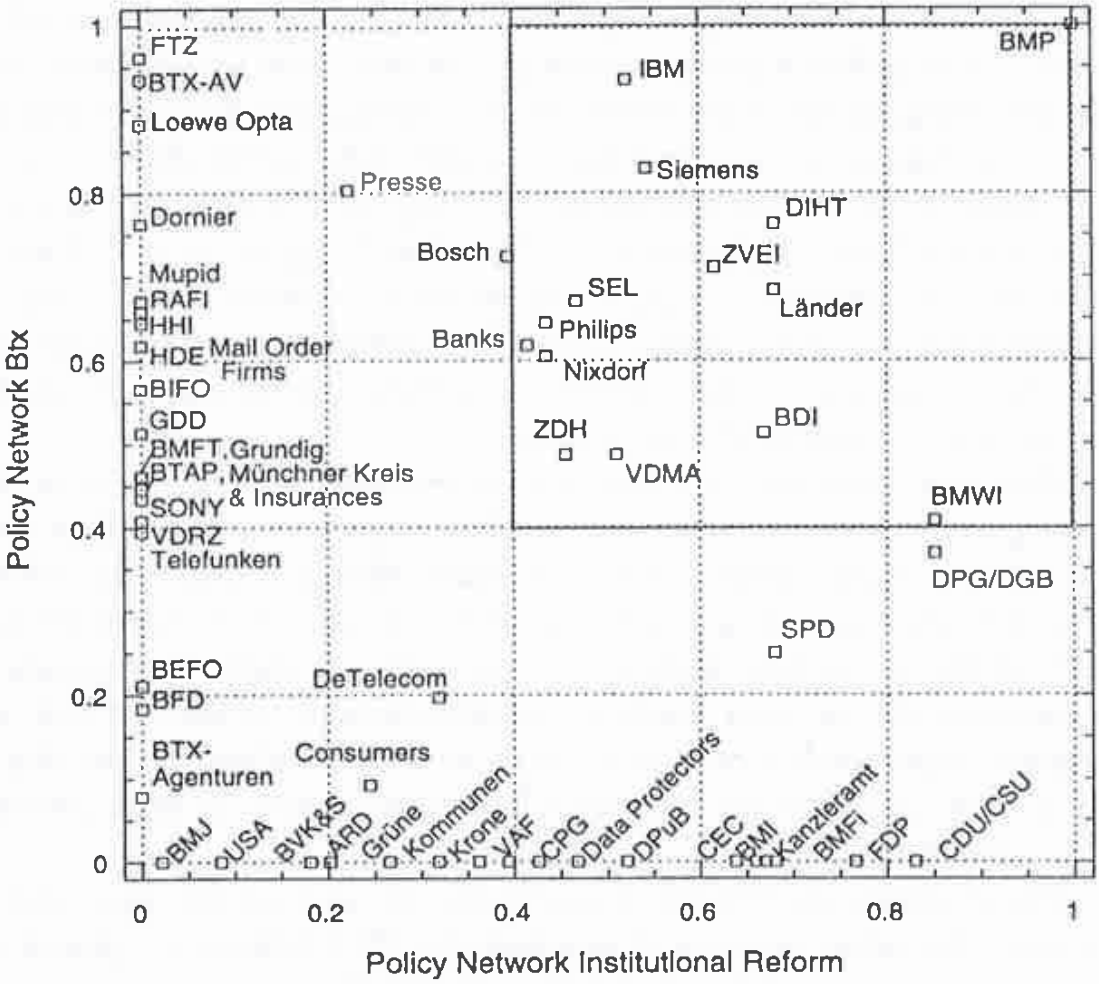
Those actors positioned respectively on one of the two axis were absent in the other network,[46] whereas the PTT Ministry - placed in the upper right corner of the diagram - played the most dominant role in both. But also the other actors in the upper right square, having an influence reputation of at least .40 in either case, can be considered "members" of the "inner circle" of the telecommunications domain. We see that almost all German manufacturers of telecommunications *and* computer equipment and also their associations belong to the core, although (or

44 For the concept of "issue networks" see Heclo (1978).

45 We confined this presentation to the indicator of influence because, on the one hand, not all informations are directly comparable in both cases (similarity of interests) and we wanted, on the other hand, to avoid redundancy. This procedure is confirmed by a computation of the correlation coefficients between influence reputation, information exchange and cooperation. In the case of videotex the *lowest* coefficient amounts to .78 (between influence and information), and in the telecommunications reform the *lowest* coefficient even reaches up to .89 (influence and cooperation).

46 A few of them "stem" from other policy domains and were only mobilized by the specific issues to be dealt with.

Figure 7: Influence Reputation, Cooperation and Information Exchange in Videotex (Btx)



because) they have diverging interests. Also the federal states (*Länder*) with - in contrast to other domains - a rather weak formal (legal) competence in telecommunications have a strong *de facto* position. The traditionally highly influential status of the DIHT has survived all economic and political changes as is reflected in the diagram. Other generally relevant actors are the Federation of German Industry (BDI), the Central Association of German Craft and Trade Enterprises (Zentralverband des Deutschen Handwerks, ZDH)[47] and the Ministry of Economics, the latter not only because it had the right to approve the charges and utilization conditions for the telecommunications services but also as a protector

47 Many of their member firms are charged by the PTT to install, maintain or repair cables, terminals etc.

of "free markets" and competition. The banking associations are relatively influential because the banking sector is not only a very important and extensive user of telecommunications services but also because banks compete with some of the financial services offered by the PTT.

The interpretation of Figure 7 should not be overstretched because it is only based on two case studies. However, it clearly shows that the "inner circle" of influential actors has become relatively large and rather "pluralist". We assume that this network also functions as a "translator" of technical into economic and economic into political problems. It is only through this ability that the technical, political or economic implications and consequences of institutional changes or the introduction of new services or other activities in the telecommunications domain can be adequately assessed.[48] Core actors are not always more influential than those who only appear on the stage when specific issues are to be handled. Moreover, as they have partly contradicting interests, the core actors may neutralize each other in conflict situations.

Although formal institutional changes cannot be expected to generate totally novel networks, the telecommunications reform will affect the future actor constellation and their influence positions. In this sense, Figure 7 displays the "old order" of this sector. This order will not become completely obsolete but the intended "depoliticization" of economic and technical issues and the clearer separation of the different "functions" in telecommunications assumingly will lead to a further specialization of actor networks and to new problems of coordination and "translation" between networks.

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48 See Heclo (1978). This does not necessarily generate a consensus but it may help to clarify positions and to figure out what is feasible and what is not feasible. Therefore, it improves calculability in complex environments.

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