CHAPTER VI

THE GERMAN CONSTRUCTION SECTOR A DECADE AFTER THE REUNIFICATION

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INTRODUCTION

After the German reunification in 1990, the eastern part of Germany (referred to as the New Länder in this context) has undergone a transition from a totalitarian command economy to a democratic market economy. The constitutional shift was associated with rapid and fundamental changes in the political, social, economic, and technological conditions. Consequently, the German construction industry experienced dramatically changed market conditions in the 1990s.

The German unification constituted an unprecedented strain on the West German (referred to as the Old Länder) economy and resulted in de-industrialisation in the East. Companies in the New Länder suddenly had to compete with western firms on both, price and quality, a problem that was reinforced by a clear preference of Old Länder consumers for western products. The public objective of improving eastern living standards to converge with the Old Länder subsequently necessitated real economic efforts by the state.

The German government provided generous state subsidies to the New Länder and decided to move the government from Bonn to Berlin. Tax benefits animated domestic and foreign companies to invest in the new Länder, where the market situation gave great opportunities for new investors. The housing standards and infrastructure conditions in the New Länder and the city of Berlin offered great opportunities for growth and expansion for the construction industry. In the 1990as, the construction project, “Potsdamer Platz”, in Berlin became the largest construction site in Europe and major infrastructure projects were initiated.

Consequently, the German construction industry faced a prosperous market in the early 1990s. The business upturn was based on the need for infrastructure improvements in the new Länder and the demand on residential and non-residential construction increased. Further, large numbers of workers in the neighbouring countries and regions in eastern and central Europe were suddenly available. After the fall of communism, entire industries in Eastern Europe were closed down with increased unemployment as a consequence. In addition, the simultaneous added impetus in the efforts to promote the European common market, with liberalisation and a free movement of capital, goods, labour, and the abolition of technical trade barriers, were important factors.

The result was immigration of foreign workers and firms to the German market. The increased competition and the effect of falling prices seriously affected German firms. Foreign firms were often in a position to submit more competitive bids on account of the lower costs of hiring foreign workers. Large German groups of companies tried to

cope with the new situation by assuming control of the entire building and construction process, while delegating the actual work to foreign sub-contractors. (Lubanski 1999)
In 1995, the boom began to subside. Major investments in the new Länder could not prevent economic stagnation in the country as a whole and in 1996 a decline in construction activity occurred for the first time since the reunification. Construction employment decreased by 300 000 jobs and 3 700 firms were declared bankrupt in 1995, mainly due to the delegation of work to foreign sub-contractors (Lubanski 1999).

Objectives

The objective of this study is to present a descriptive analysis of the German construction sector in perspective of the reunification of West and East Germany in 1990 and the introduction of the European single market in 1993. The paper describes the characteristics of the German construction sector, its segments, activities, and regulations, based on a meso-economic approach.

Information Sources
Statistical classifications belong to the basic instruments without which statistical data cannot be compiled. In order to produce internationally comparable statistics, it is necessary not only to use uniform statistical definitions but also to harmonize the classification used. Economic classification can be divided into the two categories of economic activities and products. Classifications of economic activities cover all economic activities, from agriculture to services, and form the basis for compiling statistics on output, the production factors entering into the production process, capital formation or financial transactions. The outputs of the economic entities are termed products and are generally divided into goods and services and are classified in product classifications.

ISIC Rev.3[15] is the hierarchically structured classification of economic activities drawn up by the United Nations. NACE Rev.1[16] is the classification of economic activities corresponding to ISIC Rev.3 at a European level, which consequently applies to the national classification systems of the member states of the European Union. The NACE Rev.1 regulation allows the member states to use a national version derived from NACE Rev.1 for national purposes. However, such national versions must fit into the structural and hierarchical framework laid down by NACE Rev.1. WZ93 (Wirtschaftszweige) is the German version of NACE Rev.1 and it presents a uniform coverage of the economic activities of enterprises, local units and other statistical units in all German official statistics. (Stat. BA 2001)

German national accounts are composed in accordance with the European System of Accounts, ESA95, valid since April 1999 in all member states of the European Union. ESA95 is a compatible accounting framework for systematic and detailed description of a total economy, its components and its relations with other economies. (Stat. BA 2001)
The central source of information in this study has been the German Federal Statistical Office (Statistisches Bundesamt) via the official homepage, www.destatis.de, from where the main parts of the data were collected. Additional data was gained by direct contact with staff members of the German Federal Statistical Office, either by e-mail or by telephone interviews.

The WZ93 has been used as the basis for the description of the German construction sector segments and its numbers of companies and employees in this context. Usually

[15] International standard classification of all economic activities
16 Statistical classification of economic activities in the European community

two categories of construction activities are used in German literature and statistical databases. Groups 45.1 and 45.2 cover the main trade category (Bauhauptgewerbe) while the finishing trade (Ausbaugewerbe) includes groups 45.3 through 45.5, seeTable 1.
Monetary values in the paper are stated in the European currency Euro, expressed with the currency code EUR. (1 EUR = 1.95583 DEM).

Table 1 Classification of Group 45 Construction, NACE Rev.1

45	Construction		
45.1	Site preparation	45.4	Building completion
45.11	Demolition and wrecking of buildings, earth moving	45.41	Plastering
45.12	Test drilling and boring	45.42	Joinery installation
45.2	Building of complete constructions or parts thereof, civil engineering	45.43	Floor and wall covering
45.21	General construction of buildings and civil engineering works	45.44	Painting and glazing
45.22	Erection of roof covering and frames	45.45	Other building completion
45.23	Construction of highways, roads, airfields and sport facilities	45.5	Renting of construction or demolition equipment with operator
45.24	Construction of water projects	45.50	Renting of construction or demolition equipment with operator
45.25	Other construction work involving special trades		
45.3	Building installation		
45.31	Installation of electrical wiring and fittings		
45.32	Insulation work activities		
45.33	Plumbing		
45.34	Other building installation		

(Stat. BA 2001)

THE WEIGHT OF THE MESO-SYSTEM IN THE GERMAN ECONOMY

German Economy in the 1990s
Like other EMU[17] countries, Germany ended the 1990s experiencing an economic upturn. In 2000, the German economy grew by the highest rate since the reunification. On basis of the favourable economic environment in the world economy, export became a driving force behind the German economic upturn. The market situation was supported by the powerful economic situation in the United States and expansion in Germany's trading countries. Additional instigator came from the reduction of the real exchange rate of the Euro. (IFW 2001)

The lowest German employment rate of the 1990s occurred in 1996. The employment rate recovered as from 1997 and the situation of the labour market became successively better by the end of the decade (see Table 2). Between 1999 and 2000 the total employment increased by 600 000 persons reaching a total of 38.5 million people engaged in economic activity. However, the individual Länder benefited to highly differing degrees from the employment growth. In fact, the increase was limited in the old Länder (+2.1 percent), while employment in the new Länder (exclusive of Berlin) was down 1.7 percent one year earlier (Stat. BA 2001).

[17] EMU: Economic and Monetary Union. On January 1, 1999, the Euro was introduced in 12 of the 15 EU member states (Belgium, Germany, Finland, France, Greece, Ireland, Italy, Luxembourg, The Netherlands, Austria, Portugal and Spain.). On January 1, 2002, Euro coins and bills will go into circulation, and the Euro will supersede the currencies of these nations. The adoption of the Euro is the final step in the EU's plan for the Economic and Monetary Union.

Table 2: German Population, Total Workforce and Unemployment

Year	Population (1 000)	Total workforce[18] (1 000)	Unemployment (1 000)	Unemployment-rate* (%)		
				Total	Old Länder	New Länder
1997	82 053	41 019	3 888	11.4%	10.0%	18.0%
1998	82 030	41 162	3 687	11.2%	9.5%	17.5%
1999	82 087	41 310	3 428	10.6%	8.9%	17.5%
2000	82 127	41 714	3 245	9.6%	7.7%	17.2%
*Related to dependent civilian employment						

(Stat. BA 2001, Arbeitsamt 2001)

After the collapse of the German Democratic Republic and the adaptation to the monetary union, the New Länder's economy rapidly gained momentum. The overall output expanded strongly by 9.5 percent per year during the first half of the 1990's. Even the labour market was dominated by new recruitment in the mid-1990s. However, in the second half of the 1990s, the GDP[19] of the New Länder increased at an annual rate of 1.4 percent and thus lagged behind the economic growth in the Old Länder. Thus, the process of levelling out the living standards was detained by the end of the decade. (DIW 2001)

CONSTRUCTION ADDED VALUES IN GDP

The German GDP increased by 2.6 percent between 1999 and 2000 and reached a level of EUR 2 026 billion in 2000. The highest growth rates between 1999 and 2000 were achieved in the field of manufacturing industry (+6.6 percent) and in the field of financial, renting and other business activities. Particularly the field of trade and transport achieved good results in 2000 and even the GDP in public and private services had positive results (+1.2 percent). The construction industry was the only sector that presented a negative development of its contribution to the GDP (-4.9 percent) in 2000 (ZDB 2001).

18 The total workforce consists of persons engaged in economic activity and people unemployed. Persons regarded as engaged in economic activity are all persons who, either as a main or as a secondary occupation, perform work that is paid. Unemployed persons are all those who are not employed and, according to their own statements, make efforts to find a job, irrespective of whether they are registered with a local labour office. (Stat. BA 2001)

19 Gross domestic product, GDP, is defined as the value of total production measured in prices of a single year and includes only output or products produced within the national boarders of an economy. (Ive and Gruneberg 2000) In this context GDP is calculated by production (output) approach based on market prices.

Table 3: GDP, Value Added and Gross Fixed Capital Formation (Current Prices, Billion EUR)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
GDP, at market prices	1 502	1 613	1 654	1 736	1 801	1 834	1 872	1 929	1 974	2 026
Value Added by Industry, total	1 411	1 516	1 552	1 621	1 685	1 718	1 757	1 809	1 840	1 888
- Manufacturing Industry (WZ 15-37)	387	391	367	376	382	383	392	408	410	437
- Construction Industry (WZ 45)	84	100	104	114	114	109	105	101	101	96
- Other (WZ 1-14, 40-41, 50-99)	940	1 025	1 081	1 131	1 189	1 226	1 260	1 300	1 329	1 355
% Construction Value Added in GDP	5.6%	6.2%	6.3%	6.6%	6.3%	5.9%	5.6%	5.2%	5.1%	4.7%
Gross Fixed Capital Formation, Total	357	388	381	401	404	399	401	413	426	438
- Machinery, equipment and other capital formation	166	164	144	143	145	149	155	170	181	197
- Buildings and constructions	191	224	237	258	259	250	246	243	245	241
% Buildings and constructions in Total	53%	58%	62%	64%	64%	63%	61%	59%	58%	55%

(Stat. BA 2001)

The added value of construction in GDP declined from 6.6 percent in 1994 to 4.7 percent in 2000. The development of construction must be perceived as a part of global shift from industrial output to commercial services and as a consequence of the development of the construction activities in the new Länder after the reunification in 1990. However, these figures do not take the manufacture of building components into account, nor the value of the professional services provided by architects, surveyors and others.

CONSTRUCTION EMPLOYMENT

In 2000, the German construction industry (WZ 45) had about 2.76 million employees, which corresponds to 6.6 percent of the total workforce. The construction employment rate in 2000 was the lowest since the reunification in 1990 (see Table 4).

Table 4: Construction Employment in Total Work Force (in Thousands)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Total Workforce	40 689	40 460	40 448	40 583	40 524	40 692	41 027	41 233	41 431	41 769
Total Unemployment[20]	2 190	2 575	3 092	3 304	3 194	3 482	3 882	3 684	3 416	3 133
Total Construction (WZ 45)	2 796	2 914	3 025	3 165	3 227	3 126	2 999	2 901	2 851	2 761
Employees	2 536	2 628	2 728	2 849	2 887	2 757	2 631	2 520	2 453	2 356
Self-employed	260	286	297	316	340	369	368	381	398	405
Construction in Total workforce	6.9%	7.2%	7.5%	7.8%	8.0%	7.7%	7.3%	7.0%	6.9%	6.6%

(Stat. BA 2001)

Even though the number of construction employees has decreased by more than 450 000 from 1995 to 2000, construction was still a large industry sector in Germany.

[20] Unemployment is calculated according to definitions used by the International Labour Organization (ILO)

Table 5: Distribution of Employment by Trade in Total Number of Employees (2000)

Trade and transport	25%
Financial, renting and business activities	15%
Agriculture, forestry and fishing	3%
Manufacturing Industry, including energy	22%
Construction Industry (WZ 45)	7%
Other service activities	28%

(Stat. BA 2001)

Table 4 and Table 5 include the number of construction employees in the main and finishing trades (WZ 45). Thus, the number of employees does not include manufactures or suppliers of building materials, professionals, surveyors, real estate managers etc.

MAIN CHARACTERISTICS OF CONSTRUCTION WORKS

In 1999, the total construction production output was EUR 223 986 million, which corresponds to an increase of about 0.4 percent in comparison to 1998. Furthermore, the output of construction increased for the first time since 1995. The negative trend in the development of civil engineering construction works ceased in 1999, when investments increased by 5.9 percent in comparison with 1998, see Table 6.

Table 6 New Construction and Repair/Maintenance for Building and Civil Engineering Works (Million EUR in 1999 Reference Prices)

Construction (taxes excluded)	1995	1996	1997	1998	1999
Total production output	235 613	228 780	225 348	223 095	223 987
Residential, total	128 578	128 063	128 576	128 833	128 575
New	72 817	71 725	72 299	71 215	70 716
Repair and Maintenance	54 413	55 066	56 167	57 571	57 859
Non-Residential, total	71 136	66 797	63 323	61 930	61 125
New	51 872	48 345	45 348	43 942	43 063
Repair and Maintenance	19 221	18 433	17 972	17 972	18 062
Civil Engineering, total	36 122	34 027	33 516	32 377	34 287
New	27 680	25 881	25 364	24 374	25 715
Repair and Maintenance	8 131	7 854	7 854	8 011	8 572

(Euroconstruct 1999 and 2000)

New construction represented 62 percent, or EUR 139 500 million, in 1999 while the remaining 38 percent were repair and maintenance works. However, the trend for the last part of the 1990s showed a growing trend for repair and maintenance works, see Table 6.

Residential construction output represented the main part of construction works by EUR 128 575 million, which was more than half of the total construction production output. Residential repair and maintenance showed a growing trend in the second half of the 1990s while non-residential construction decreased continuously from 1995 through 1999.

Table 7: Construction Output by type of product (Million EUR, 1999 reference price)

	1999	
Residential	128 575	57%
Non-residential	61 125	27%
Civil Engineering	34 287	15%
Construction, total	223 987	100%

(Euroconstruct 1999 and 2000)

According to figures from the German Federal Statistical Office, private companies ordered 47 percent of the total value of constructions, 28 percent by the central government, local authorities, municipalities and non-profit organisations and the remaining part of 25 percent represents orders from private households (see table 8). The figures in Table 8, table 10 and Table 11 are based on WZ 45, construction, and origins from the Federal Statistical Office Germany.

Table 8: Value of Ordered Production by Type of Client in 2000

Type of Client	% Ordered Value[21]
Households	25%
Companies	47%
Central and local government	28%
Total	100%

(Stat. BA 2001)

Residential Building

The total number of dwellings in Germany in 1998 was about 37.5 million (see Table 9). The number of dwellings per 1 000 inhabitants amounted to 457 in 1998. While 450 dwellings were available per 1 000 inhabitants in the old Länder, the number amounted to 489 in the new Länder and Berlin-East.

Table 9: Existing Number of Dwellings (in Thousands)

Dwellings	1996	1997	1998
Germany	36 492	37 050	37 529
Old Länder	29 300	29 687	30 047
New Länder	7 193	7 363	7 483

(Stat. BA 2001)

The share of new constructed apartments by households was 67 percent in 1999, whereas companies (including real estate companies and tenant owner associations) provided 32 percent of the total number of new ordered apartments. The remaining part of 1 percent was represented by orders from the government, local authorities and non-profit organisations (see Table 10).

Table10: Ordered New Residential Buildings by type of Client (by value in 1999)

Households	67.1%
Companies	31.7%
Central and local government	0.6%
Non-profit organisations	0.7%

(Stat. BA 2001)

The number of dwellings produced showed considerable regional differences between the new and the old Länder (see Table 11). In the old Länder, the number of dwellings

[21] The shares of ordered production by type of clients are based on new production output limited to companies with more than 20 employees.

completed increased dramatically while a sharp decline initially was observed in the number of dwellings completed in the new Länder and Berlin-East. (Stat. BA 2001)

Table11: Completed Dwellings by Year

Year	Germany		Old Länder		New Länder	
	Number of dwellings produced	% Annual change	Number of dwellings produced	% Annual change	Number of dwellings produced	% Annual change
1993	455 451	18.0%	431 853	15.3%	23 598	105.6%
1994	572 883	25.8%	505 179	17.0%	67 704	186.9%
1995	602 757	5.2%	498 543	-1.3%	104 214	53.9%
1996	559 488	-7.2%	416 122	-16.5%	143 366	37.6%
1997	578 179	3.3%	400 350	-3.8%	177 829	24.0%
1998	500 690	-13.4%	372 243	-7.0%	128 447	-27.8%
1999	472 805	-5.6%	369 907	-0.6%	102 898	-19.9%

(ZDB 2001)

The rapid expansion of residential construction activities in the early 1990s was connected with tax benefits and favourable mortgage rates introduced by the German government after the reunification. These actions led to a noticeable relaxation on the housing market. However, vacancies and problems finding tenants continued in specific regions. This fact was significant for the New Länder where more than one million dwellings were vacant in 2000. The German number of unlet apartments corresponded to a vacancy rate of approximately 13 percent in 2000 (Euroconstruct 2000).

Repair and maintenance works of the housing stock have played a major role in the new Länder since the reunification in 1990. In the 1990s, nearly half of the seven million dwellings were been renovated or modernised, primarily with loans from the Bank of Reconstruction (Bank für Wiederaufbau) modernisation programme. Funds from this programme (EUR 40 billion) were exhausted by the end of January 2000. (Euroconstruct 2000)

Non-Residential Building

Company investments in new non-residential buildings amounted to a total of EUR 18 599 million and represented 71 percent of the total non-residential investments in 1999.

Table 12: Ordered New Non-residential Buildings by Value (1999)

Households	5.5%
Companies	70.9%
Central and local government	18.0%
Non-profit organisations	5.6%

(Stat. BA 2001)

In the Old Länder, public investment in non-residential buildings was reduced continuously to the end of 1990s. Investment activities in the New Länder also decreased steadily in the second half of the decade, despite that the Old Länder received money from the German Unity Fund since a reform of the federal fiscal equalisation system in 1995.

Table 13: Completed New Non-residential Buildings in 1994 to 1999

Year	Germany		Old Länder		New Länder	
	Non-Residential (1 000 m3)	% Change*	Non-Residential (1 000 m3)	% Change*	Non-Residential (1 000 m3)	% Change*
1994	222 548	1.0%	158 404	-9.3%	64 144	40.2%
1995	222 305	-0.1%	152 199	-3.9%	70 106	9.3%
1996	207 076	-6.9%	143 563	-5.7%	63 513	-9.4%
1997	212 828	2.8%	152 743	6.4%	60 085	-5.4%
1998	207 392	-2.6%	158 584	3.8%	48 808	-18.8%
1999	208 316	0.4%	167 107	5.4%	41 209	-15.6%
* to recent year						

(ZDB 2001)

Civil-Engineering Construction

Investments in railway systems accounted for a major portion of civil engineering construction in the 1990s. One specifically large infrastructure project was the high-speed rail link between Cologne and Frankfurt (Main). Other main infrastructure projects were concentrated to rail links and railways stations in the Berlin hub (e.g. Lehrte Station). These railway projects were part of the German unity programme, which was aimed at establishing or improving transport links between the Old and the New Länder.

The Deutsche Bahn made large annual investments in expanding and improving the German railway system in the 1990s. Most of these construction measures were for building of new high-speed stretches and modernising rail stretches for trains equipped with tilting-in-curve Technology (ICT). In addition, civil engineering construction projects also included the construction of 25 major stations, redesign of the existing buildings and placing tracks below ground level. (Euroconstruct 2001)

VALUE OF BUILDING STOCK

The territory of Germany has a geographical size of 357 022 km^2 and had 82 127 000 inhabitants in 2000. See the distribution of the German land use in TableTable 14 below.

Table 14: Distribution of German Land Use in 2001 (left) and Distribution of Built-up Land in 1997 (right)

Built-up land	12.2%
Forest	29.4%
Water	2.2%
Bog	0.5%
Agriculture	53.6%
Other	2.1%

Distribution of Built-up land:	
Land for housing	45.9%
Transport	36.6%
Construction sites, quarrying, refuse tip	3.2%
Park ground, sports field	5.4%
Industry	8.9%

(Stat. BA 2001)

In 2001, the majority (53.6 percent) of the German territory was used for agricultural purposes (including meadows and heath) and almost one third of German land was forest. Built up land represented 12.2 percent of the area, of which almost half was used as land for housing. These figures included the total area of house properties (e.g. gardens, playgrounds, parking lot, etc.) and not only the area of actual buildings. More than a third of the built-up land was used for transport constructions (e.g. streets, railway-systems, docks, etc.).

The net stock of building structures (residential and non-residential) was estimated at EUR 7 992 billion in 2000, see Table 15. The value of stock was about four times the German GDP in 2000. German households own 44.4 percent, private companies 35.8 percent, and central as well as local government own 16.2 percent of the net stock of building structures in Germany.

Table 15: Value of Building Stock and Distribution by Owner in 2000 (1995 Reference Prices)

	Value of Stock (Billion EUR)	% Total	% Residential and Non-residential
Total Value of Stock	7 993	100%	
Residential	4 183	52.3%	100%
Households	3 550	44.4%	84.9%
Companies	579	7.2%	13.8%
Central and local government	32	0.4%	0.8%
Others (private organisations)	22	0.3%	0.5%
Non-residential	3 810	47.7%	100.0%
Companies	2 229	27.9%	58.5%
Central and local government	1 262	15.8%	33.1%
Others (private organisations)	318	4.0%	8.3%

(Stat. BA 2001)

A majority of the existing dwellings were built during the post-war period of the Second World War (see Table 16). Especially in the Old Länder, the consequences of the Second World War dictated the building activity. Almost half of the existing dwelling stock was built between 1949 and 1978. (IFO 1999).

Table 16: Number of Dwellings in 1999 by Year of Construction

	Germany		Old Länder		New Länder	
Specification	Number (1 000)	%	Number (1 000)	%	Number (1 000)	%
Dwelling units, total	37 050	100.0%	29 687	100.0%	7 363	100.0%
Until 1900	3 441	9.3%	2 268	7.6%	1 173	15.9%
1901 - 1918	2 562	6.9%	1 773	6.0%	788	10.7%
1919 - 1948	4 972	13.4%	3 541	11.9%	1 431	19.4%
1949 - 1978	17 886	48.3%	15 860	53.4%	2 025	27.5%
1979 - 1986	3 971	10.7%	3 029	10.2%	942	12.8%
1987 - 1990	1 188	3.2%	849	2.9%	339	4.6%
1991 - 1993	909	2.5%	803	2.7%	106	1.4%
1994 or later	2 122	5.7%	1 563	5.3%	559	7.6%

(Stat. BA 2001)

SEGMENTS IN THE MESO-SYSTEM OF CONSTRUCTION

Construction Firms

In 2000, more than 2.7 million people were employed in more than 100 000 different companies within the main areas of the construction industry, i.e. the main trade and the finishing trade. More than 37 percent of construction employment was working in companies with less than 20 employees (Stat. BA 2001).

Table 17: Main Trade and Finishing Trade by Number of Employees (1999 and 2000)

	Construction (WZ 45)		Main Trade (WZ 45.1 - 45.2)			Finishing Trade (WZ 45.3 – 45.5)		
	Total)		Total	Old Länder	New Länder	Total	Old Länder	New Länder
Number of Firms by Size	2000		2000			2000		
1-19	84 737	79.9%	69 103	51 043	18 060	15 634	11 424	4 210
20-49	16 019	15.1%	8 386	5 732	2 654	7 633	5 577	2 056
50-99	3 616	3.4%	2 336	1 581	755	1 280	843	437
100-199	1 259	1.2%	948	654	294	311	226	85
200+	425	0.4%	339	252	87	86	75	11
Total	106 056	100.0%	81 112	59 262	21 850	24 944	18 145	6 799
Number of Employees by Size	2000		2000			2000		
1-19	619 291	37.4%	409 020	298 620	110 400	210 271	154 476	55 795
20-49	467 979	28.3%	248 500	169 784	78 716	219 479	159 877	59 602
50-99	245 032	14.8%	159 885	108 143	51 742	85 147	56 035	29 112
100-199	169 780	10.3%	127 739	88 414	39 325	42 041	31 166	10 875
200+	152 199	9.2%	124 374	94 849	29 525	27 825	24 950	2 875
Total	1 654 281	100.0%	1 069 518	759 810	309 708	584 763	426 504	158 259
Production by Size (Million EUR)	1999		1999			1999		
1-19	44 747	29%	29 244	22 031	7 214	15 503	11 844	3 659
20-49	39 789	26%	22 494	16 165	6 329	17 295	13 133	4 163
50-99	25 561	17%	17 822	12 393	5 430	7 739	5 487	2 252
100-199	21 506	14%	17 432	13 017	4 415	4 074	3 159	915
200+	20 984	14%	18 008	14 285	3 724	2 975	2 737	238
Total	152 587	100%	105 001	77 890	27 111	47 586	36 360	11 227

(Stat. BA 2000 and 2001)

Note that the total number of construction employees (WZ 45) in 2000, as presented in Table 17 differs from the number of construction employees in Table 4. This is due to different calculation methods. Table 17 is based on company reports and until recently (in 2001) companies with less than 20 employees were not obliged to report their actual number of employees to the statistical office in Germany. Still, many of the small companies did present figures on employees and accordingly, Table 17 is based on those companies.

The main trade was the most concentrated part of the construction industry. 0.4 percent of the number of companies employed 11.6 percent of the workforce and covered 17.2 percent of the total production of main trade activities, see table 18.

Table18: Main Trade Companies by Number of Firms, Employees and Production in 2000 (Production in Million EUR, in 1999)

Size by number of employees	Number of Companies	% Total Number	Number of Employees	% Total Number	Production	% Total Production
1-19	69 103	85.2%	409 020	38.2%	29 244	27.9%
20-49	8 386	10.3%	248 500	23.2%	22 494	21.4%
50-99	2 336	2.9%	159 885	14.9%	17 823	17.0%
100-199	948	1.2%	127 739	11.9%	17 432	16.6%
200+	339	0.4%	124 374	11.6%	18 008	17.2%
Total	81 112	100.0%	1 069 518	100.0%	105 001	100.0%

(Stat. BA 2001)

The 81 112 main trade companies produced more than two thirds of the total construction output of the entire construction industry in Germany in 2000. In 1999 the production was more than EUR 105 billion. More than 60 percent of the 1.1 million employees were employed in companies with less than 50 employees and 85 percent of the total amount of companies has less than 20 employees. Only 339 main trade companies have more than 200 employees, but contribute with 17.2 percent to the total production of main trade companies.

The category of installation and completion of buildings was dominated by companies with less than 50 employees, representing almost 70 percent of the total production. The total production in 2000 was EUR 48 million (see Table 19).

Table 19: Trade Companies by Number of Firms, Employees and Production in 2000 (Production in Million EUR, in 1999)

Size by number of employees	Number of Companies	% of Total Number	Number of Employees	% of Total Number	Production	% of Total Production
1-19	15 634	62.7%	210 271	36.0%	15 503	32.6%
20-49	7 633	30.6%	219 479	37.5%	17 295	36.3%
50-99	1 280	5.1%	85 147	14.6%	7 739	16.3%
100-199	311	1.2%	42 041	7.2%	4 074	8.6%
200+	86	0.3%	27 825	4.8%	2 975	6.3%
Total	24 944	100.0%	584 763	100.0%	47 586	100.0%

(Stat. BA 2001)

Professionals

In 1999, more than 120 000 engineering offices contributed with a production of nearly EUR 37 billions to the construction sector, see Table 20. The professionals were characterised by a large number of small firms. (Bundesarchitektenkammer 2001)

Table 20: Professionals by Number of Companies and Production in 1999 (Production in Million EUR)

Type of Activity	Companies	Production
Architecture	38 873	8 428
Construction, design	28 319	9 308
Installation, design	34 775	13 072
Quantity surveyors	2 695	1 100
Others	15 914	5 089
Total	120 576	36 996

(Stat. BA 2000)

Real Estate and Property Management Firms and Estate Agents

Real estate firms were, in this context, defined as estate owners while property management firms provided real estate related services. There was no distinction made between property management and facilities management firms.

Table 21: Number of Companies and Production in 1999 (Production in Million EUR)

	Companies	Production
Real Estate Firms	197 936	89 403
Property Management Firms	14 472	14 053
Estate Agents	29 435	9 087
Total	241 843	112 543

(Stat. BA 2000)

The segment of real estate firms was characterised by a large number of small firms,

generally one-man companies and firms with less than five employees. The business trade of estate agents focused on the selling process of real estates including advertising, domiciliary visits, inspections, contract documents etc.

Building Materials and Equipment
Construction materials, components and machinery represented the second largest part of the German construction meso-system. In June 2000, more than 930 000 people were employed in construction industry manufacturing. Even tough the numbers presented in Table 22 are likely overlapping with industries other than the construction industry, the size and importance of material, components and machinery manufacturers are significant. Especially companies producing ceramic, tiles, bricks, cement, lime, plaster concrete and mortars as well as producers of construction machinery were highly dependent on the construction business trends.

Table 22: Materials, Components and Construction Machinery in Numbers of Companies, Employees and Production in 2000 (Production in Million EUR)

Type of Activity	Companies	Employees	Production
Materials and components	11 772	893 664	121 090
Wood and products of wood and cork, straw and plaiting materials (excluding furniture)	756	54 187	6 688
Other non-metallic mineral products	3 749	248 112	39 631
Glass	443	65 349	9 316
Ceramics	230	36 878	3 844
Tiles	35	5 279	1 246
Bricks	200	13 516	561
Cement, lime, plaster, concrete and mortar	2 380	97 959	18 412
Other non-metallic mineral products	461	29 131	6 252
Fabricated metal products, except machinery/equipment	7 267	591 365	74 771
Construction machinery	258	40 066	7 051
Total	12 030	933 730	128 141

(Stat. BA 2001)

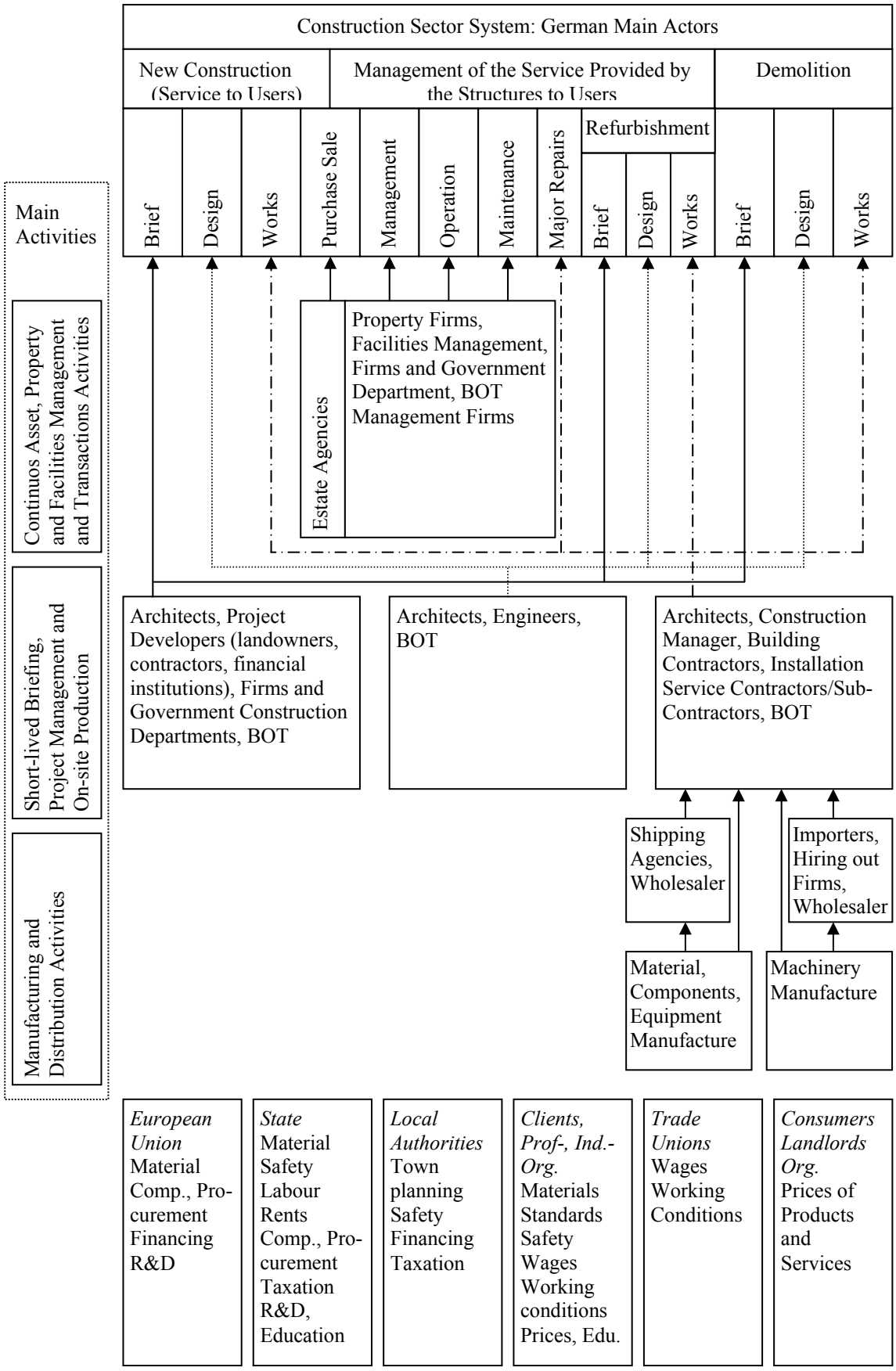
THE GERMAN CONSTRUCTION SECTOR SYSTEM

An overview of the German construction meso-system is presented in Figure 2. Segments of the construction meso-system are placed according the phases of the lifecycle of a building or construction and are described on basis of three main building activities. The first main activity is related to asset and real estate management, which in the German case are carried out mainly by property and facilities managers and real-estate agents. The second main activity covers the brief and design phase as well as production activities on site. In Germany mainly developers and professionals such as architects, engineers, quantity surveyors, etc. carry out the brief and design phase. Finally, producers and distributors of construction materials, components, equipment and machinery perform the manufacturing and distribution activities that constitute the third main activity in the meso-system.

A significant feature of the German construction meso system is the key role of the architect who has a central position in the brief and design phase as well as the on site construction works. The work of the architect (scope of work, remuneration etc) is regulated according to Honorarordnung für Architekten und Ingenieure, HOAI, which is a central document in agreements between the client and architect. Despite that the architect is still a key actor in a building and construction projects, the position of the architect, especially in large projects, is about to change. General contractors or project

developers have undertaken a growing number of projects in the 1990s. Contractors tend to expand their field of action by taking over tasks that traditionally were incumbent on the architect. A driving force for contractors to expand their project control is the possibility to gain higher profits. Another factor that supports this development is an increased need for specific skills and qualifications as building and construction projects become more complex. (Syben 1996)

Figure 2: The German Construction Sector System



GERMAN MAIN REGULATIONS AND INSTITUTIONAL ACTORS

The meso-system, see Figure 2, outlines the institutional actors, which play an important role in the construction sector as regulators as well as clients. Main institutional actors in Germany are the European Union, the German government, regional and local authorities, industrial and professional organisations, trade unions and user associations (e.g. tenants associations and consumer groups).

The German construction meso-system is mediated by institutional regulations. These regulations may concern building permits, construction standards, product and service certification, labour management, prices, procurement methods, funding, tax etc. They are defined and applied by a system of public institutions (international, national, regional, local) and private institutions (industrial, unions, consumer organisations).
The European Union has taken various initiatives in order to promote a European common market. The introduction of rules for public sector tendering commits the members of the European Union to open the inner market for non-national contractors. One example is the building materials directive that intends to remove technical trade barriers impeding the export/import of building materials (Lubanski 1999).

The matrix in Table 23 gives an overview of main regulations and institutional actors on the German construction industry.

Table 23: Main Regulations and Institutional Actors

Regulations / Institutions	Building and Materials			Firms			Environment of the Firms		
	Construction Permits	Rules Concerning Structures	Rules Concerning Materials	Professional Rules and Firms Standards	Safety/Security and personnel Management	Agreements on Price and Quality of Products and Services	Competition and Procurement Systems	Financing Taxation	R&D Support Education
International institutions			X		X		X	X	X
Government		X	X		X		X	X	X
Regional and local authorities	X	X			X			X	X
Client, industrial, professional organisations	X		X	X	X	X	X		X
Trade Unions					X	X			X
User Associations						X			

Construction Permits
Construction permits are needed for new building and construction projects in Germany. It is the architect or engineer who submits the application for the building permit. The information required in an application is detailed and extensive an may contain the following documents; site plan, architectural (and structural) drawings, specification of works, descriptions on the use of spaces, technical descriptions of heating system, kitchen equipment, building areas and volumes, fire safety calculations, list of building materials, sound insulation class, thermal insulation, safety and comfort aspects etc. (Vitt 1997)

A layman is not qualified to submit an application for construction permission. This has to be done by an authorize architect or engineer, i.e. an architect or engineer who is an

approved member of an architect or engineer chamber. Every federal state (Bundesland) has its own architect and engineer chambers.

Applications for building permits are handed in to the building supervising authority, which is a local authority that appoint an engineer (Prüfingenieur) to verify that the building documents is in accordance to the detailed development plan. The authorities decide about the construction permission when the engineer has given his/her approval. An upper building supervising authority, operating on a Bundesland level, gets involved for further investigations in case specific difficulties, appeals etc. (Vitt 1997)

Rules Concerning Structures and Materials
In Germany, two technical standards are basically used. These are the DIN (Deutsche Industrie Norm) standard that includes an annex with explanation guidance and numerical examples and secondly, the Eurocode that gradually will be introduced in construction works, and partly replace the DIN standards, as a result of the unification of Europe.

Public clients are obliged to follow the rules and regulations of Verdingungsordnung für Bauleistungen, VOB, for construction procurement. The directives on public procurement of the European Union is integrated in the VOB. Further, VOB is an integral part of the DIN system. Private clients on the other hand, are not compelled to use building materials approved by DIN.

A public supervising authority, Bauamt, is responsible for superintendence of general safety and standards matters in buildings. The Bauamt does neither represent the client nor the contractors.

Professional Rules and Firms Standards
All companies must been authorized to run business activities in Germany. Licence to a run business is applied for at Wirtschaftsministerium in each Bundesland. A business licence drawn up in one Bundesland authorizes the company to operate all over Germany, but not to establish a new branch office outside the Bundesland where the original business licence was given. Consequently, a company needs one business licence in every Bundesland where the company wants to establish branch offices.

Professionals, i.e. architects and engineers, must be members of a chamber of architects (architectkammer) or chambers of engineers (Ingenieurkammer) in order to operate in the German construction sector. An architect or engineer approved for membership in such a chamber is allowed to operate all over Germany.

The leader of a craftsmen business, that normally acts as subcontractors, must be registered in the Handwerksrolle, which is subordinate to the chamber of craftsmen (Handwerkskammer). When registered and approved by the Handwerksrolle, the craftsmen business is authorized to operate all over the country with the same restrictions as other companies about establishing new branches outside the initial Bundesland. An important requirement to get approval for running a craftsmen business is a so-called Meister degree, see
R&D Support and Education.

The Hochbaukosten Flächen Rauminhalte is a handbook based on the German DIN standard (DIN 276, 277 and 283). This handbook constitutes a template used for, among other things, the initial budget based on sketches in early stage of the design phase. Another handbook is used as a complement for the initial budget. This handbook is

named Arbeits- und Kontrollhandbuch zur Bauplanung, Bauausführung und Kostenplanung nach § 15 HOAI und DIN 276, and contains present cost data, comments on the DIN standards, guiding principles for structural design, building equipment etc. In this manual the project is categorised by three categories according to the quality level of the project, i.e. weather it is a standard or luxury project.

The HOAI-manual (Honorarordnung Für Architekten und Ingenieure) provides a basis for agreements between the client and architect or engineer on the level of remuneration. The HOAI-manual classifies the building project in five categories, describing the complexity level of the project. The complexity level and the budget estimate (by Hochbaukosten Flächen Rauminhalte) are used to find an interval for the minimum and maximum remuneration level for the architect or engineer for the specific project.

The basic document for the tender process, especially in the case of a public client, is the *Verdingungsordnung für Bauleistungen* (VOB). The VOB is a central document that has ruled the tender of construction processes in Germany for 70 years. It consists of three sections: Section A *(VOB/*A) regulates tender procedures; Section B *(VOB/*B) consists of detailed technical norms of work packages and the quality of materials to use. Section C *(VOB/C)* regulates contract conditions. As far as *VOB/B* and *VOB/C* are concerned, private clients have two possibilities to make construction contracts. Either they can do it on the basis of *Bürgerliches Gesetzbuch (BGB*), or they can make the *VOB/B* and *VOB/C* part of the contract, which offer a precise description of construction works. The difference between these two forms for the rights and duties of the parties is mainly a question of warranties, which is five years after completion according to *BG*B, two years after completion according to *VO*B.

Many private clients prefer contracts, which make in particular *VOB/B* a part of it. This is because the performance of construction works according to its norms, which are closely linked to the DIN-standards, guarantees a precise description of the level of performance that can be expected and also high quality standards of the work completed. *VOB/A* is of interest only for the public client and for construction firms, tendering for public construction orders. The *VOB* itself is not a law, but all public clients such as local and central government as well as public enterprises are obliged by order of the government to tender using *VOB/A* and parts B and C as well. This means to use open tender procedures and to obey the rules prescribed by *VOB/*A. Private clients whose construction projects are funded by public authorities to an extent of 50 percent and more are subject to the same rule (Syben 1996).

Safety and Security

The German construction workers' compensation associations (Bau-Berufsgenossen-schaften) play a major part in safety and security questions. Their main priority is to ensure safety and health at the workplace. They have adopted an overall approach in with the basic elements are the technical inspection services, expert committees and test and certification bodies as well as guidance provided on the handling of hazardous substances or preventive health monitoring at work. Their binding accident prevention regulations (Unfallverhütungsvorschriften - UVV) provide occupational health and safety measures to be observed by employers and workers, such as regulations on the design of machinery, plant and procedures intended to prevent accidents or on safe and healthy working procedures.

All German companies with at least one employee should have a work environment specialist, educated in work environment and risk matters. Companies with more than

20 employees are requested to have a safety representative. Gewerbeaufsichtsamt is the German public supervising authority on working environment issues. (Vitt 1997)
German rules and regulations on safety and security matters are regularly amended to comply with the various directives adopted by the European Union.

Agreements on Price and Quality of Products and Service
Honorarordnung für Architekten und Ingenieure, HOAI, is the central document in agreements between the client and architect or engineer. In Germany, the remuneration for architects and engineers is related to the total costs of the project and is regulated according to HOAI. Thus, the level of payment is set and architects and engineers may not compete on price according to HOAI. Consequently, higher total costs for a project lead to higher remuneration. This is a consequence that has been called in question and various alternatives have been discussed on how to model consultant's fees in order to stimulate lower building costs. Law regulates the rights and obligations of architects and engineers professions.

In every industrial sector, employers' associations and trade unions have agreements about wages, working time, social contribution and working conditions. Negotiations are first made on a national level, setting general agreements, and are then followed by local negotiations.

Competition and Procurement System
Germany comply with the European Union law governing restrictive practices, which apply to commerce between all countries in the European Union and a country within the European Economic Area, EEA. Business within Germany applies to the national rules on competition, which are found in Gesetz gegen Wettbewerbsbeschränkungen, GWB. Bundeskartellamt is the public authority that supervises that rules on competition are complied with on a national level. This authority is supplemented with a Kartellamt in each Bundesland. The German rules on competition imply that all agreements between companies that prevent or warp competition are forbidden. (Vitt 1997)
In Germany, three main different forms of tender and different possibilities to place orders are in use:

- Directly placed orders or negotiated tender
- Selective or limited tender
- Open tender

Private clients and commercial investors (industrial or commercial companies, banks, insurance companies, and building societies) often use the form of selective tender, inviting only contractors well known for efficiency and to whom they have good, long-term relations. Public clients are allowed to place orders directly or use selective tender only if the work is very small or if the work requires highly specialised qualification that only a few firms can offer. But normally public clients have to use the open tender form.

A German building client normally uses very divided contracts with bids set according to a bill o quantity. It is the architect who is responsible for coordination of all contractors on site.

Financing and Taxation
In the 1990s the German government set up action programmes in order to support construction initiatives in the New Länder. For example, it was made possible to get investment grants for construction projects up til 35 percent of the total investment cost, under the condition that jobs were generated due to the construction investment in an

area with high unemployment rates. Each Bundesland decided which areas, with high unemployment levels, that should be given priority.
Governmental initiatives were also taken through a number of development funds, providing favourable loans with low interest rates and a long period of amortisation. Various Bundesländer also have temporary subsidy programs, before as well as after the reunification, and some local authorities support modernisation works, e.g. renovation of buildings with specific cultural and historical value. Further, the Kreditanstalt Für Wideraufbau (bank of reconstruction) offers favourable loans to for modernisation or energy-saving measures. For private persons it is possible to get tax allowance (i.e. state subsidy) by declaring building expenses in the income tax return form.

All building and construction products and services are charged with an added-value tax, VAT, of 16 percent, which is the general level of VAT in Germany with exception for foodstuffs and printed matters. All companies pay a national corporate income tax of 25 percent on profits and a local trade tax of 14 – 19 percent of net profit. (Vitt 1997)

R&D Support and Education
There are a large number of trade associations for different occupational groups with nationwide coverage in Germany. Besides legal advices and relevant market information, these trade associations assist their members in educational matters.

The German education program for building and construction workers is based on an apprentice system. An apprenticeship lasts two years and mixes theoretical studies and practice at the company where the apprentice is employed. Trade unions negotiate with companies about the conditions for apprenticeship. Educational establishments, jointly organised by trade associations, provide the theoretical part of the apprentice studies. The next step for promotion, after a completed apprenticeship, is journeyman (Geselle). After three years as journeyman a Meister title can be attained after getting through a test doing a qualifying piece of work. The Meister title is required to start a craftsman company in the construction sector (similar rules for craftsman businesses in other sectors). Normally, a Meister is head of a company taking on jobs as a subcontractor. (Vitt 1997)

Currently, there is a discussion (and legal process) about weather the German master system is consistent with the rules of European Union open market, with free movements of goods and services. Thus, it is not inconceivable that the German system will change as the harmonisation process proceeds in the European Union.

The German educational system at all levels is regulated and financed by each Bundesland. Besides the public schools and universities there are also private schools providing education at a all levels. These private schools follow the rules and regulations of the Bundesland but are privately financed.

CONCLUSION

The German economy experienced two major alterations in the 1990s, the reunification and European single market. The construction sectors of former East and West Germany became one in the reunification in 1990. The two construction sectors were originated from two basically different political systems. The financial system, rules and regulations, institutional actors, and other characteristics of the construction sectors were basically different. The reunification launched a neutralisation process to even differences in social structure and the construction sector played an important role in this political effort. The German government introduced building and construction

subsidies and initiated large infrastructure projects etc as part of the neutralisation process.
Increased construction activities in Germany attributable to the German reunification lead to substantial cross border activity and coincided with the European single market in 1993, resulting in accelerated developments in the 1990s. Germany became the target for many large European contractors attempting to get established in the foreign market with particular expectations on the opening of the Eastern markets.

The political ambition to equalise the living standards in the New and Old Länder made the government initiate generous state subsidies and tax benefits to promote construction activities in the 1990s. Construction boomed from 1991 until 1994, making total construction added value grow. However, despite that the German construction industry grew in nominal terms of added value in the 1990s, the construction industry lost ground relative to the development of other industrial sectors and the national GDP. The German residential construction remained on a high and stable level even after the initial construction boom in the early 1990s, and constituted 57 percent of total construction production in 1999. Significant differences between the New and Old Länder were apparent in, for example, terms of construction volumes. The number of completed dwellings in the New Länder increased by almost 170 percent yearly between 1993 and 1997. The production of dwellings in the Old Länder decreased over the same period, but still reached 400 000 new dwellings in 1997.

Thus, the reunification and opening of the single market had impact on the development of the German construction sector in the 1990s and had influence on political, social and regulations matters in society as well as competition, demand etc. in the construction sector. In this perspective, the meso-economic analysis stands out as applicable when analysing the development of the German construction industry of the 1990s, as the meso-approach comprises political and regulative as well as structural aspects of the whole construction sector.

REFERENCES

Deutsches Institut für Wirtschaftsforschung (DIW), 2001. *The German economy: is the upturn already coming to an end?*, in Economic Bulletin 1/2001, Berlin.

Euroconstruct, 1999. Western and Eastern Europe, Austria, Germany, Switzerland. *In: 47th Euroconstruct conference, Prague.*

Euroconstruct, 2000. Western and Eastern Europe, Austria, Germany, Switzerland. *In: 48th Euroconstruct conference, Cambridge.*

Euroconstruct, 2000. Western and Eastern Europe, Austria, Germany, Switzerland. *In: 50th Euroconstruct conference, Paris.*

Ive, G.J. and Gruneberg, S.L., 2000. *The economics of the modern construction sector*. Macmillian Press Ltd., London.

Lubanski, N., 1999. *The Impact of Europeanisation on the Construction Industry – a comparative analysis of developments in Germany, Sweden and Denmark*. Industrielle Beziehungen, 6. Jg., Heft 3, University Copenhagen.

Institut für Witschaftsforschung (IFO), 1999. *Gebäudebestand in Westeuropa: Fast 17 Mrd.m² Wohn- und Nutzfläche.* IFO Schnelldienst 12/99, Munich.

Institute of World Economics (IFW), 2001. *End of the Upturn in Germany*. Kiel 2001.

Statistisches Bundesamt, 2000. *Entwicklung des Baugewerbes ab 1995 in Deutschland*. In Wirtschaft und Statistik 12/2000, Wiesbaden.

Statistisches Bundesamt, 2000. *Produzierendes Gewerbe-Beschäftigung, Umsatz und Energieversorgung der Betriebe des verarbeitenden Gewerbes sowie des Bergbaus und der Gewinnung von Steinen und Erden.* Fachserie 4, Reihe 4.1.1.Wiesbaden.

Statistisches Bundesamt, 2000. *The housing situation in Germany 1998*. Wiesbaden.

Statistisches Bundesamt, 2001. *Ausgewählte Zahlen für die Bauwirtschaft – November 2000*. Wiesbaden.

Statistisches Bundesamt, 2001. *Bautätigkeit und Wohnungen 1999.* Fachserie 5, Reihe 1, Wiesbaden.

Statistisches Bundesamt, 2001. *German economy*. Wiesbaden.

Statistisches Bundesamt, 2001. *Produzierendes Gewerbe-Beschäftigte und Umsatz der Betriebe im Baugewerbe,* Fachserie 4, Reihe 5.1.,Wiesbaden.

Statistisches Bundesamt, 2001. *Volkswirtschaftliche Gesamt-rechnungen.* Fachserie 18, Wiesbaden.

Syben, G., 1996. *Integration and disintegration of rules and actors: The German construction system under change*. Bartlett Research Papers, London & Plan Construction et Architecture, Paris

Vitt, B., 1997. *Byggande i Tyskland – En handbok*, AB Svensk Byggtjänst, Stockholm

Zentralverband Deutsches Baugewerbe (ZDB), 2001. *Analyse & Prognose,* Berlin.

Internet

www.bundesarchitektenkammer.de (May 2001)
www.diw-berlin.de (April 2001)
www.ifo.de (March 2001)
www.destatis.de (Stat.BA) (April 2001)
www.zdb.de (April 2001)