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Strengthening the German Craft Sector through Innovation & Cooperation

= First findings of an ongoing research project =

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Preface

The paper is based on an explorative research project, which is conducted by the Rhine-Westphalia Institute of Economic Research Essen / Germany. It aims to describe the character of the structural changes faced by the German craft sector and to identify strategies of firms to enhance their competitiveness in regional, national and international markets. Since the authors could finish the questionnaire survey only recently, the data processing and analysis is still going on. However, first findings in regard to innovation and cooperation can be presented. But also changes in regard to the intended structure of the paper must be made. Therefore we present first findings on innovation/cooperation, focussing on the comparison between the crafts sector and the non-crafts industry. In a second paper the RWI team would like to present the outcome of a thorough statistical analyses of the raised data, considering regional, size and trade-wise differences in cooperation and innovation within the crafts sector. This paper shall be submitted for the R-Session at the ERSA conference in 2004.

1. Issues and aims, questions and structure of the paper

The German craft sector traditionally consists of SME. This part of the economy comprises of artistical trades, firms involved into mass production of goods (e.g. foodstuff), construction work and installation / maintenance / repair services. Most of the trades serve the local and regional markets. Between 1994 and 2002 the sector as a whole faced a remarkable loss, considering for example its share in the gross value added, the annual turnover, labour force and facilities for vocational training. Surely the actual economic depression contributes to the decline. But other factors seem to determine the structural changes too, such as the massive introduction of IT and the resulting possibility for industry firms operating in the same branches as craft firms to realize very flexible the production of small series at moderate costs. The process of European integration, the changing demographical structure and newly emerging consumption patterns are other important determinants. Moreover, the effects of the German unification should be kept in mind. The density in the construction sector and in the electrical/metal – working trade was extraordinary high in East Germany by the middle of the 1990s: around 30 labourers per 1.000 inhabitants against an all German average of 20 in the construction sector and 25 in the electrical/ metal sector respectively (FSO 1995). A large number of companies in the electrical/metal-working branch were formed in the course of re-structuring the large industrial complexes. Secondly the huge demand for construction work in the field of infrastructure, housing, industry and the related governmental programmes offered good chances for newly established firms, absorbing thereby a remarkable number of released labourers from the manufacturing industry. But due to the end of the boom during the mid 1990s trades related to construction faced a serious decline in demand.

Against this background scientists, representatives of trade associations, politicians and the media state, the craft sector would not be properly prepared for the defiance's of 21. century. They refer to deficiencies in will and ability to innovate and cooperate, on the limited capability to react flexible on new demands and on the missing service orientation. A very interesting point in the discussion is the fact, that most of the reviewers do not argue on the base of empirical but anecdotic evidence.

Only a limited number of publications deals with questions like:

- What are the differences in dimension and character of innovation and cooperation between craft firms and their competitors in industry and trade?

- What is the position of craft firms within a national/regional innovation system?
- In which way do the craft firms organise their innovation processes? To what an extend do they cooperate other firms in this process?
- Which role do craft oriented intermediary organisations and public business development schemes play?

From the authors point of view the empirical analysis of the craft firms attitude towards innovation and cooperation seems to be a very interesting and challenging task. Hence, this paper aims to provide a first insight into their relevant activities. Considering the heterogeneity of the sector the analysis should at least focus on four fields:

- comparison between craft firms and competitors in the same markets (e.g. construction sector, medical/optical instruments & prosthesis, foodstuff),
- differences between the craft trade groups,
- issues related to the business size,
- regional differences considering the trade related distribution pattern.

Taking the early stage of the research work into account the paper comprises of:

- theoretical considerations regarding innovation / cooperation in SME (section 2)
- note on the methodological approach (section 3)
- brief descriptions of the structure and development the craft sector in the 1990s and the relevant networks/institutions supporting craft firms (section 4 and 5)
- some survey results to compare dimension and style of innovation and cooperation in the crafts sector and the non-crafts industry (section 6)
- notes on the continuation of analyses and related tasks (section 7).

2. Theoretical considerations and hypothesis

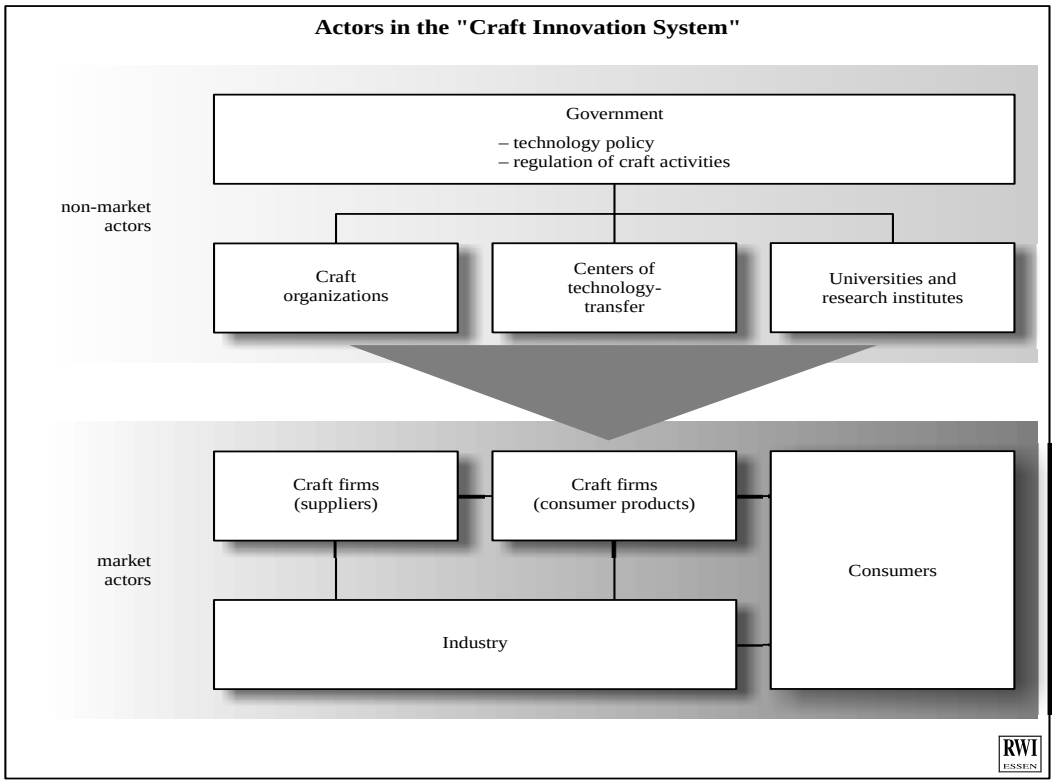
2.1. Innovation in the craft sector

The literature on innovation and industrial organisation provides a very heterogeneous picture of the SMEs' contribution the technological progress. Certain differences in their innovation behaviour do occur in comparison to large firms (for an overview see Lageman 2001): (i) SME in general prefer to handle R&D schemes which are comparatively less resource intensive; (ii) they focus on projects with a high market proximity, mainly of incremental character, therefore hardly subject to public financial support; (iii) since fundamental research plays a subordinate role, the cooperation with research institutes is of a very moderate extent; (IV) major sources of information are clients,

supplier and competitors; (V) as measured by employment, patents, and R&D expenditure, large companies seem to contribute to a larger extend to the technological progress of a nation.

However, the contribution of SME will be underestimated as long as only formal expense will be considered. The innovation process is characterized by the interaction of many actors, such as companies (suppliers, customers, competitors), public authorities and the results of their action, as well as institutions belonging to the (semi-) public finance and research infrastructure, professional organisations and so on (see chart 1). The individual contribution to technical progress depends largely on the style and degree of a companies integration into such a regional, national, sectoral innovation system (Lundvall 1988, Nelson 1993, Edquist 1997).

Chart 1



Craft firms play an important role for several aspects of these innovation and diffusion processes

- in the sense of a recipient, who is transmitting new ideas, techniques or management methods into the own company and transforms them finally into new products and services,
- in the sense of an actor who supports the use of innovative products, techniques and/or methods through his function as advisor for private consumer and

companies. The function is closely linked with the traditional field of installation / maintenance / repair service.

Chart 1 provides an illustration, how the craft firms are positioned, in order to fulfil their function within an innovation system. It shows the position of craft firms against market and non-market actors. As described in the following sections 4 and 5, the government defines craft activities and considers the sector as an important target of its technology policy. Moreover, a strict hierarchically arranged craft organisation provides advisory service through different kinds of institutions – thereby keeping the links to the research sector. Additionally, craft units are exposed to results of the innovation process through their integration into the market. Changing consumption patterns might be one major driving force for innovation as well as new offers from the supply side or demands of large industrial companies, holding a leading position in a value-added chain.

2.2. Cooperation in the craft sector

Since interaction and cooperation plays an important role in order to run an innovation system successfully, the dimension and character of craft firms collaboration deserves a thorough analyses. Although a long list of literature on collaboration in the craft sector exists, far reaching, structured empirical surveys are exceptional (ZDH 2002, DIW in IWH 2002, Rautenstrauch et al. 2003 for SME). Instead case studies and the presentation of best practices are dominating (itb 1999, Regge 2000, ZDH 2000a). However, well structured and large scale cooperation have a long tradition in the craft sector. Purchasing and credit cooperative societies do exist since decades. The chances to reduce costs play the major role for the ten thousands of members. On the other hand recent studies indicate that the establishment of long lasting cooperation's seems to be difficult in the sphere of research & development, production and marketing/sales. Less is known about the dimension and character of partnerships and networks as well as about their spatial interaction. The studies available suggest, that the acceptance of collaboration grows with a firms size. Moreover small firms prefer to operate in smaller groups where all processes remain manageable. Companies like to join if competencies and capacities can be pooled without disturbing each others clientele (Rautenstrauch et al. 2003). Moreover a firms particular know how shall be not exposed to probable competitors. Hence it seems quite rational that SME prefer to work on the base of

informal arrangements. They allow to go scot-free if the partnership breaks (Lageman 2001).

2.3. Hypothesis

Based on the given theoretical consideration the following hypothesis shall be formulated to go with the reader: Compared to the (large scale) industry the SME dominated craft sector as whole will show a different feature of innovation, R&D and cooperation. It is expected, that craft firms prefer non-formal types of collaboration in the case of joint production, marketing and sales. Research work and the development of new products/services innovation will be done occasionally. It is an open question whether or not the outcome will enable the firms to enhance their business result substantially.

3. Notes on the research methodology

The background of the paper is the above mentioned explorative study conducted in 2002/2003 by the RWI Essen. It aims to describe the character of the structural changes faced by the German craft sector and shall contribute to appropriate policy measures, considering the effects of the sectors development on the spatial economic structure. According to the targets different research methods were implemented, such as:

- study of the relevant literature on the development of the German craft sector,
- analysis of the official statistics, in particular the craft census 1995,
- 65 expert interviews (associations, chambers, researchers, authorities, firms)
- 60 personal interviews with craft firms based on standardized questionnaires in the hinterland of the City of Leipzig (locational factors and spatial interaction of the local building and construction trade),
- nationwide survey based on written standardized questionnaires on innovation, R&D, use of IT and forms of cooperation in all craft trade groups and regions.

4. The German craft sector

4.1. Definition and structure of the sector

The term “Handwerk” is difficult to translate into English. In most of the countries the terms “handicraft” and “craft” focus on the activity itself. That is to say, the production of goods and services will be mainly done by hand. In contrast the German concept refers to a sector of the economy. The German craft sector (“Handwerk”) is defined by law, the “Act regulating the Craft Sector”, as encompassing certain categorised occupa-

tions and currently includes 94 trades ("Gewerbe") in 7 trade groups. These trade and trade groups are listed in Appendix A of the law, as "…trades which may be exercised in the craft sector" (FME 1994: 7; Aberle 2002). Furthermore, modern definitions take into account (i) the technical progress which influences the craft trade and (ii) that modern industry has its roots within the craft sector. Hence, the main attribute of a craft firm is the particular mode of production: individual manufacturing of goods (in small series), based on technical and artistic vocational skills according to consumer wishes and with the help of modern techniques, permitting a high degree of flexibility.

The vast majority of craft firms fulfils the common criteria of SME. In nearly 90 % of all establishments only up to 19 persons are engaged. And 74 % of all firms do operate with less than 10 workers. Another important attribute is the strong focus on private consumers, i.e. the local markets. Around 70% of the firms serve mainly private households thereby receiving nearly 50% of the craft sector sales. Another 10 % of the sector sales will be realized through serving public (local) authorities (Zdrowomyslaw/Dürig 2000). Table 1 provides the actual classification of the craft sector, which changed several times since 1953. For each of the seven trade groups some main important trades are listed. Firms operating in these trades will register with the regional chambers of crafts. The tabulation reveals – in addition to the above given definition and related tables - that the craft sector contains not only a large variety of businesses but forms really one hard core of many SME dominated sectors of the economy. As the figure 1 shows for the year 2001 the groups of electrical and metal-working, as well as the building and construction industries dominate the whole craft sector in regard to the number of firms (64 % out of 573,300), the labour force (60 % out of 4,7 Mio), the turnover (77 % out of 375 billion €) and the facilities for vocational training (66 % out of 405.600).

4.2. Institutional setting

The organisation of the craft sector in Germany is shown by table 2. As mentioned above, all firms are registered with a regional chamber of craft. The master craftsmen diploma is a precondition for the registration. The respective courses will be offered by the chambers. Their aim is to develop technical and vocational skills, to build up management capacities and to provide pedagogical knowledge with a view on the vocational training of school leavers. In addition to the compulsory membership in the chambers all craftsmen are free to join their respective local guild, in this way becoming also a member of the professional associations and the district craft association. They pro-

vide a wide range of consultancy services, mainly related to technology. The chambers of crafts provide technical advisory service too, but the main focus of their consultants is on business management and vocational training. All the local institutions are united in regional, state and national units, but finally in the Central Association of German Crafts (ZDH). Here also seven scientific institutes are aliened in the so called German Craft Institute (DHI).

4.3. Position and development of the craft sector in the 1990s

As defined by law the craft sector plays an important role in the German economy. In the year 1999 around one fifth of all businesses recorded by the federal statistical office do belong to the craft sector. The total number of workers reached 38 Mio in the year 1999. Whilst approx. 5.1 Mio people were engaged in the craft sector. The craft sectors share in regard to the annual turnover is around 10 %. Perhaps the most remarkable contribution during the past four decades was made in the field of vocational training. During the 1990s up to one third of all training places were provided by the craft sector. In the year 1999 the share was still at about 27 % (table 3). The large variety of training places is of high importance for those school leavers who are not able to join universities and technical colleges. Moreover the large scale industry is gaining from the effort of the craft sector, since the best trainees will be always poached. Hence, strengthening the SME of the craft sector is at least out of these two reasons a very serious issue.

During the first half of the 1990s the craft sector was characterized by a growing employment in all parts of Germany. Moreover the share on the national gross added value grew slightly from around 10,5 % in 1990 to nearly 11,5 in 1994. But in recent years - 1996 to 2002 - the whole sector faced a remarkable loss in nearly all regards. Its share in the gross added value diminished from 10,7 % to 8 %. The annual turnover went down from 409 to 370 billion €. The number of employees was reduced by 1,5 million. At present, about 4,5 million people are employed in nearly 562.000 firms (RWI, 2003). Figure 2 illustrates the change for selected characteristics in the trade groups. The building and construction industries faced the biggest loss in labour force and trainees. In regard to the annual turnover clothing/textile/leather and woodwork trades faced a tremendous lost of around one fifth, followed by the construction sector. The total labour force reduced by 19% while the number of establishments diminished only by 2 %. It indicates, that on average craft firms became smaller in size.

5. Advisory networks of the crafts sector

Based on the above described institutions of the craft sector three networks have been formed over the last decades. They aim to promote innovation and modern technologies, to open up new markets and to pool competence and capacities in order to compensate the disadvantages of a smaller business size. The so called Heinz-Piest-Institute for Technology in the Craft Sector (HPI, a member of the DHI) operates since the year 1950. Being affiliated to the Technical University Hannover it aims to monitor the trends in technology development and to suggest modes of appropriate adoption of modern techniques by the craft firms. Until the end of the 1980th the process was mainly arranged through a permanent updating of curricula for apprentices and candidates for the master craftsmen's diploma. Since 1989/1990 the Federal Ministry of Economics supports the establishment of a nationwide operating network for technology transfer (TT). The HPI acts as the management centre for the network. Until the year 2002 around 60 branches could be established nationwide, where 92 engineers and scientist are working as consultants for the craft firms (Fülbier/Prik 2002).

In the beginning of the 1990s another network was established with public financial support. Altogether 53 centres for environment provide individual consultancy in regard to compliance with laws, rules and regulations (ZDH 2000b). Moreover they conduct jointly a wide range of training courses with the aim to support firms by entering into new markets such as the vast field of energy efficient heating systems, isolation and energy saving/eco-friendly reconstruction of buildings, energy advisory, systems for integrated regulation of heating, energy and water supply. In order to cover all major trades in all regions the network consists of 43 branches under the roof of chambers of crafts and selected professional associations. A group of ten specialised centres for environment do operate as monitoring units. They design particular training courses, publications and alike.

There are more networks arranged by DHI-Institutes. One is conducting research projects in close cooperation with the chemical industry and universities in order to assist those trades, were polymer materials are largely used (roofer, insulators, painter/ lacquerers, automobile mechanics, joiner, gas and water connection (Michaeli/Wolters 2003). Another net of craft training centres offers courses in business management, focussing strongly on innovation and cooperation (Hantsch 1999). Furthermore the company *handwerk.de/AG* – owned by the craft chambers and professional associations –

operates a large web presentation, through which latest news on technological development, public procurement and possibilities to enter into collaboration are available.

All together good preconditions seems to be given in order to develop and to combine the knowledge about new technical possibilities and the capability to manage innovation processes in craft firms. However, the expert interviews revealed, that a closer linkage between the different networks, could make the system more efficient. Moreover, the collaboration with universities and research institutes should be intensified.

6. Innovation and cooperation in craft firms and industry

In spring 2003, a survey was conducted on innovation, R&D, the use of IT and forms of cooperation (section 3). According to the structure of the sector and the spatial distribution of firms and labourers a sample of 4000 craft firms was created in cooperation the firm *handwerk.de/AG*, which runs the largest databank on craft firms in Germany. Since the response was about 15 %, the random sample finally consist of 619 respondents. In addition, 1.000 firms were selected on the basis of another databank (databyte 2001). These companies operate in the same markets as the selected craft firms (construction sector, foodstuff industry, manufacturing of optical and medical instruments, facility management). Finally, 99 respondents formed a control group of industry firms operating in the same markets as the craft firms.

The craft group of the sample represents the whole sector quite well: in regard to the trade and state wise distribution, regarding the business size structure and the composition of the client group. Moreover a comparison between craft group and control group reveals the expected differences in size structure, customer profile and spatial orientation regard sales market (see RWI 2003). In comparison to other studies on innovation/cooperation in the German economy the survey deals with even the smallest establishments. The group of firms with up to 20 labourers holds a share of 83 % and 47 % of the craft firms responding to the survey operate with less than 5 workers. In contrast, the Mannheim Innovation Panel covers only firms with at least 5 employees. Furthermore, some branches covered in our survey are usually excluded from innovation surveys (table 1).

6.1. First findings regarding the innovation process

The control group shows a higher degree of innovativeness with respect to different kinds of innovation: for the development of new products and services approx. 58% vs.

53%, for the process innovation 55% vs. 43% and for organisational innovation 40 % vs. 15% (see figure 3). However, one may agree to consider also the craft group performance as acceptable. Although dominated by smallest firms, the share of firms which conducted product innovations in the years 2000 to 2002 was above 50%. Some often mentioned products and services are: computer aided diagnosis by car mechanics, the installation of solar equipment and E-Bus systems by electricians, the usage of special ceramic products by orthopaedic mechanics and dental prosthesis makers, new sorts of bread, rolls, cakes, snacks and party service in the foodstuff trades. In contrast, typical innovations in the control group are: prefabricated elements for the construction sector, the offer of an all-around service (facility management), production of devices with new therapy possibilities, functional food. Hence, 40% of the innovators of the control group classified their new products as brand new in the market. The respective value for the innovators of the craft group is only around 25 %. The craft probands are mainly focussed on the introduction of new components in an already existing range of articles and services.

In regard to new techniques and processes the respondents of both the groups use CAD and CNC technology in the construction sector, for the preparation of optical and medical instruments, prosthesis, wood products and for the manufacturing of food stuff. However, for non-craft firms the process innovation is stronger linked with the training of the staff and restructuring of the company as for craft units. In both the groups IT and the use of the internet plays an important role. In contradiction to the control group the respondents from the craft group underlined the importance of purchasing new equipment in connection with the process innovation (figure 4).

6.2. Modes and fields of cooperation and R&D

Also in the field of cooperation, the non craft firms perform better compared to the craft group. Table 4 shows that just half of the later ones entered into cooperation during the past three years (68% for the control group). But one must point out, that 55 respondents did not confirm a collaboration but approved to be a member of a (purchasing) cooperative society. Therefore, the share of cooperating craft firms can be calculated as around 57%. However, non-craft firms are also ahead in the case of formalized cooperation. About 85 % of the co-operators work jointly on the basis of a contract and 23 % of them form a separate company. The craft firms values are 43% and 7 % respectively.

Asked for reasons not to cooperate, 70% those craft respondents argued, that they do not see any necessity.

Figure 5 provides an additional hint for the dominance of informal co-operations in the craft sectors. About 90% of the co-operators collaborate with other craft firms. Just one third joins hands with companies outside the sector. And not even one of ten firms collaborate with universities, technical colleges and or other research institutes. This piece of news matches with the fact, that only two third of the craft firms conduct R&D activities; mainly occasionally. On the other hand, a share of 83% of the non-craft probands is engaged in R&D. More than one third of them conducts R&D regularly. Hence, the share of non-craft respondents cooperating with all kinds of external R&D institutions comprises of at least 40% (figure 5).

Although most of the craft firms do not seem be in close contact with the research sector, they are using a wide range of information sources to gather latest news on the technological development and markets: through internet (43%) and trade journals (70%), through training courses (56%) and other programmes arranged by the chambers/ associations/guilds (24 to 28 %). Moreover 20% of the respondents consider the informal circles of craftsmen as a very useful. One can summarize, that the institutional network of the craft sector constitutes the most important information source.

Remarkable differences do also occur for the areas of collaboration (figure 6). The co-operators of the control group show a much higher preference for the joint development of new products /services as well as for the joint introduction of new techniques. In contrast craft firms prefer to cooperate for the purpose of producing goods and services. They like to work with partners from the same region, up to 30 km distance. But unlike the non craft firms they hesitate to join hands for common sale, while joint marketing campaigns are not so prominent spheres for both groups.

Another interesting aspect is the dimension of a partnership. The survey indicates that craft firms tend to collaborate with more partners in common projects than the members of the control group, e.g. in the case of joint innovation, production, marketing. Non-craft firms, on the other hand, show a higher preference to join three and more partners in the sphere of joint sales.

6.3. Gaining strength through innovation and cooperation ?

In order to estimate, whether and how innovation and cooperation might help to strengthen the craft firms, questions on the recent firm performance were raised. Only one third of the craft companies reported growing sales between 2000 and 2002, against nearly half of the firms in the control group. In table 5 the sales trends are confronted with the innovators, cooperating firms, and firms performing R&D. Further information on the use of IT and the receipt of business development funds were added.

Table 5 shows that the majority of innovative/cooperative firms report an up warding sales trend. Against it the majority of probands not being engaged in innovation activities, cooperation, regular R&D efforts and the full usage of IT facilities face an unaltered or even downward sales trend. But in comparison to the craft group the control group shows a much better performance regarding all listed criteria, either a higher degree of success by innovative/cooperative probands or a lower degree in the case of a downward sales trend.

Another striking fact is the low share of craft firms, which received support from public funds for business development (18 %), whereas around 30 % of the probands in the control group received such funds during the past three years. Moreover, 55% of these non-craft firms got the funds for activities related to product innovation, while the benefiting craft firms were strongly supported by training courses. This might be one explanation for the high degree of non-craft beneficiaries, showing an upward sales trend during the last three years (72 % against 43 % for the craft group).

Based on the overall comparison, the hypothesis formulated in section 2 can be verified in the following manner: The craft sector as a whole seems to innovate and cooperate to a lower extend in comparison to the competitors in the industry. Moreover, craft firms prefer more informal types of collaboration within their sector. At a first glance, the network of craft related institutions seems to offer good preconditions for the gathering of information on new technologies, for developing new product ideas out of it and to find appropriate business partners. But the first findings indicate that the group of innovative/cooperative craft establishments does not gain to such a large extent on average as the non-craft firms do. Indeed, acceptable reasons for this phenomena can not be provided yet.

7. New tasks of further analysis

The presented comparison revealed new tasks for further analyses. Thorough enquiry should be oriented on the following questions:

1. Have the craft firms chosen the wrong innovation strategies? Is the more humbly success rooted in an improper functioning semi-public network of advisory and technology transfer centres? Should the linkages between craft firms and related institutions towards on one hand and universities / technical colleges on the other be strengthen, in order to manage the innovation process in a better way?
2. But considering the small business size, the main orientation towards domestic markets and their in to the private consumer one may also ask, whether the craft firms' style of innovation is quite appropriate. Can an actual slump in consumer demand combined with already rapid changes in consumption pattern be considered as a major reason for the described problems of the craft sector?
3. Are the first findings of the survey valid for all trade groups, for companies of all size and in all regions? And if business size is an important determinant to successful innovation, what role does the education of the owner-manager in very small craft firms play? Additional statistical analyses are required to formulate answers especially on these questions.

Answers to the questions raised can contribute to appropriate policy measures. In this context it should be reviewed, why craft firms – at least in the survey sample - receive to a much lower extend development funds for the purpose of product innovation. Is it the right strategy to focus on public support on the development of advisory networks? Or is it advisable to concentrate more on the design of appropriate forms of funding crafts related R&D? There are noteworthy cases of crafts oriented funding. For example the state owned development bank of Rhineland-Palatinate (ISB) provides so called "semi-public venture capital" for incumbent SMEs with innovative ideas and convincing concepts to turn them into profitable products. Certain regionally based VC-networks could be established in the 1990s on the initiative of the ISB, jointly financed by semi-public, cooperative and private financial institutions. Craft firms are a major target group of these VC funds (Rothgang/Trettin/ Lageman 2003). However, the example shows, that in addition to our type of innovation survey an evaluation of public schemes is required, in order to estimate the performance of craft firms under different conditions.

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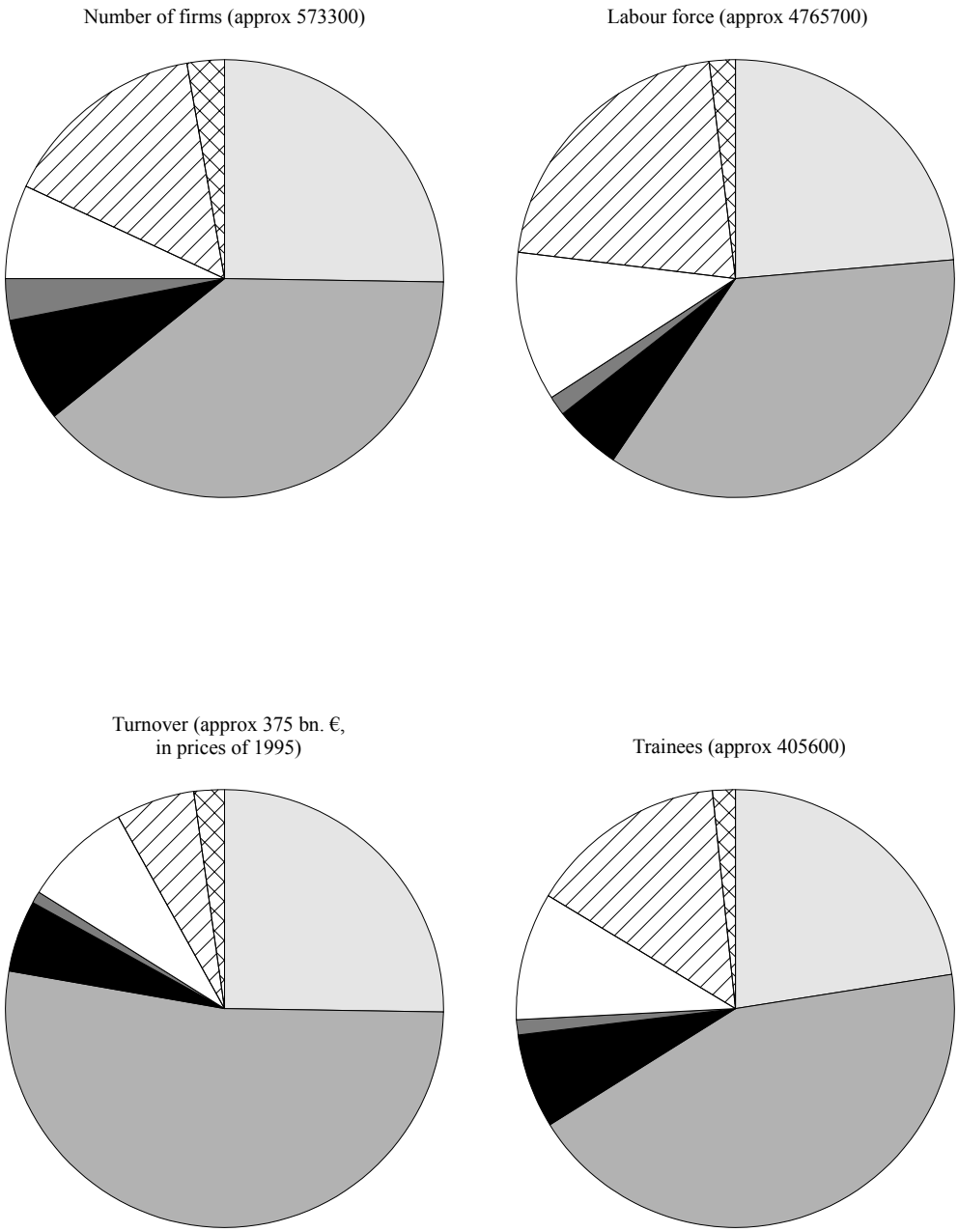
www.handwerk.de; www.dhi.zdh.de; www.zdh.de

Figure 1

Structure of the German Craft sector

(2001; share in %)



Source: RWI calculation based on the craft sector census 1995.

RWI ESSEN

Figure 2

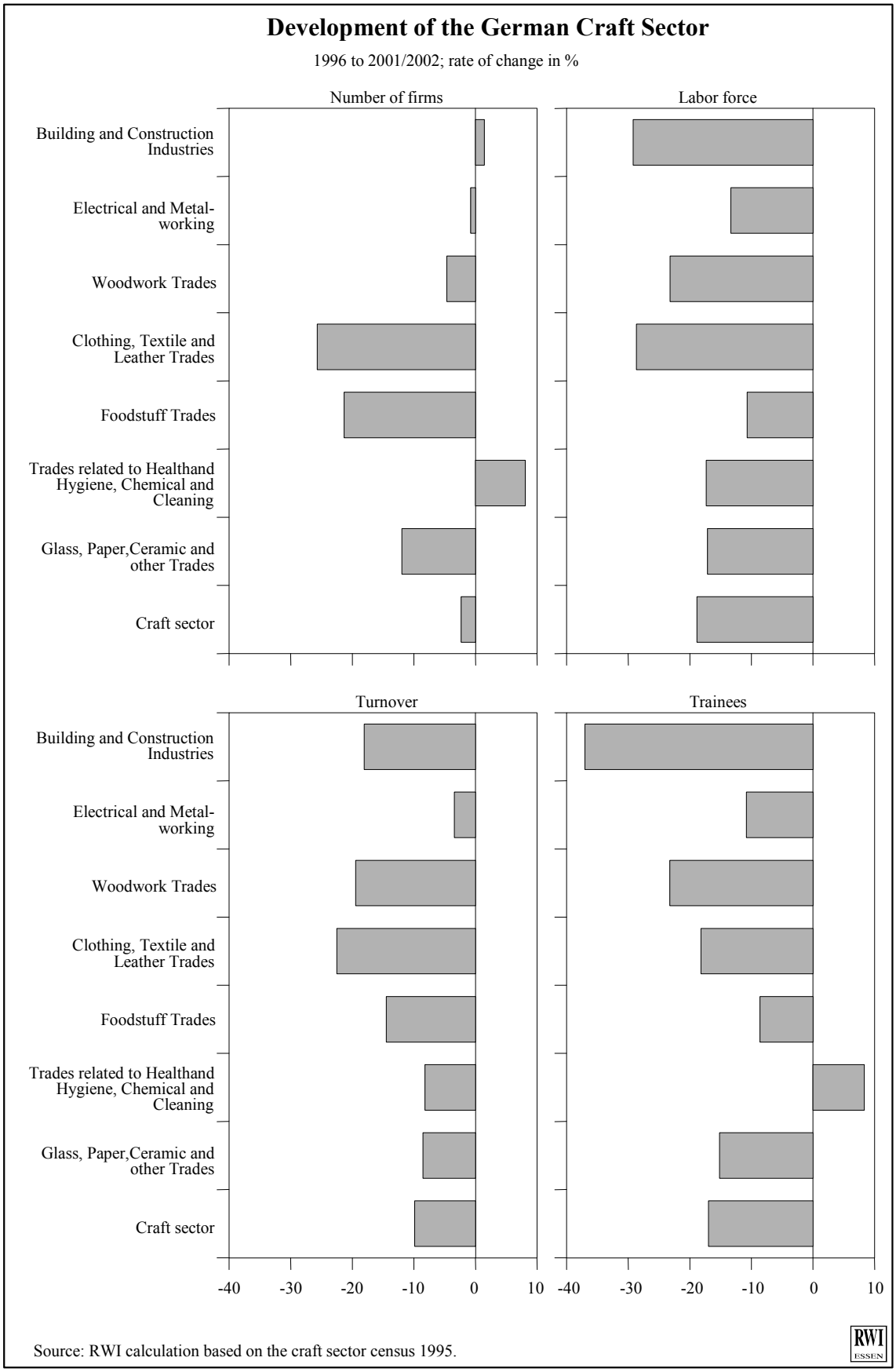

Development of the German Craft Sector
1996 to 2001/2002; rate of change in %
Number of firms
Labor force
Turnover
Trainees
Building and Construction Industries
Electrical and Metal-working
Woodwork Trades
Clothing, Textile and Leather Trades
Foodstuff Trades
Trades related to Healthand Hygiene, Chemical and Cleaning
Glass, Paper,Ceramic and other Trades
Craft sector
-40
-30
-20
-10
0
10
Source: RWI calculation based on the craft sector census 1995.
RWI
ESSEN

Figure 3

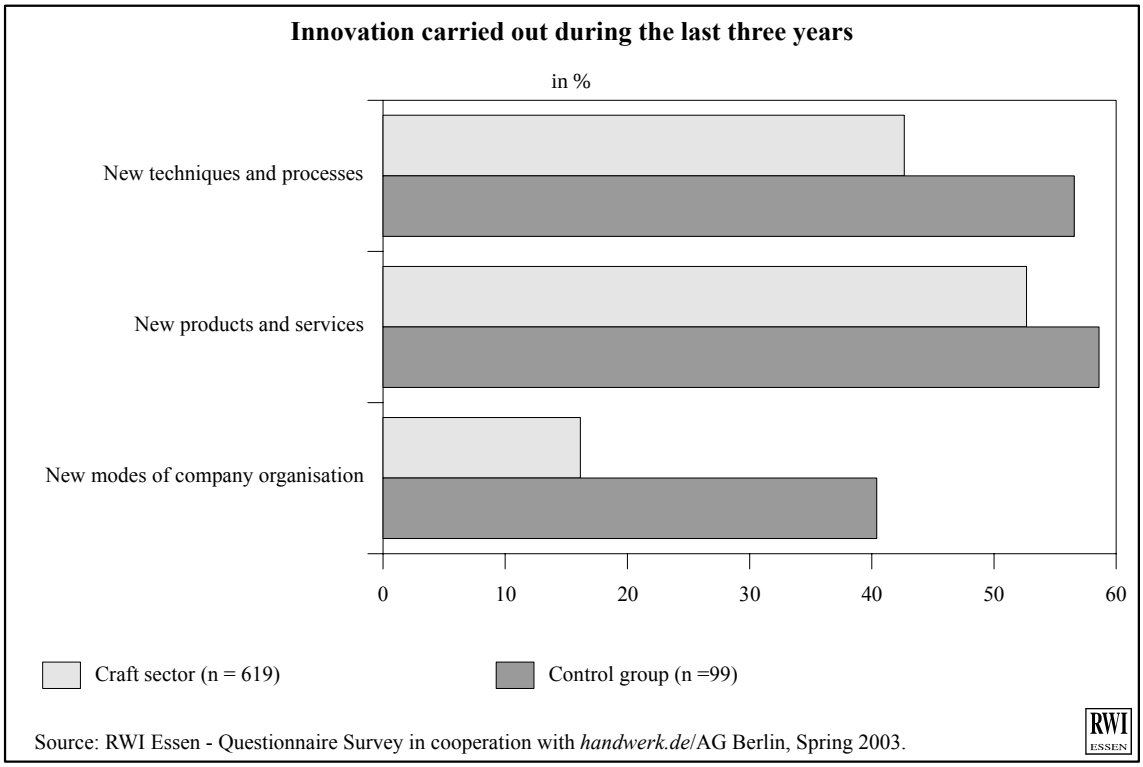


Figure 4

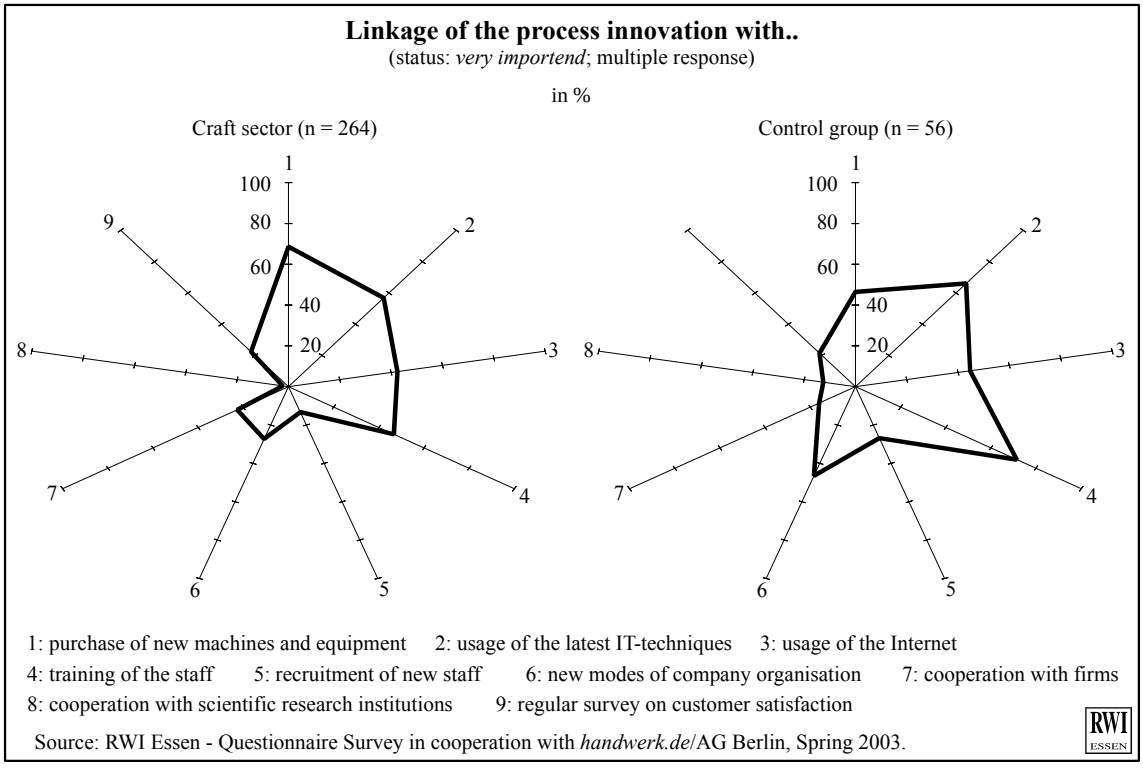


Figure 5

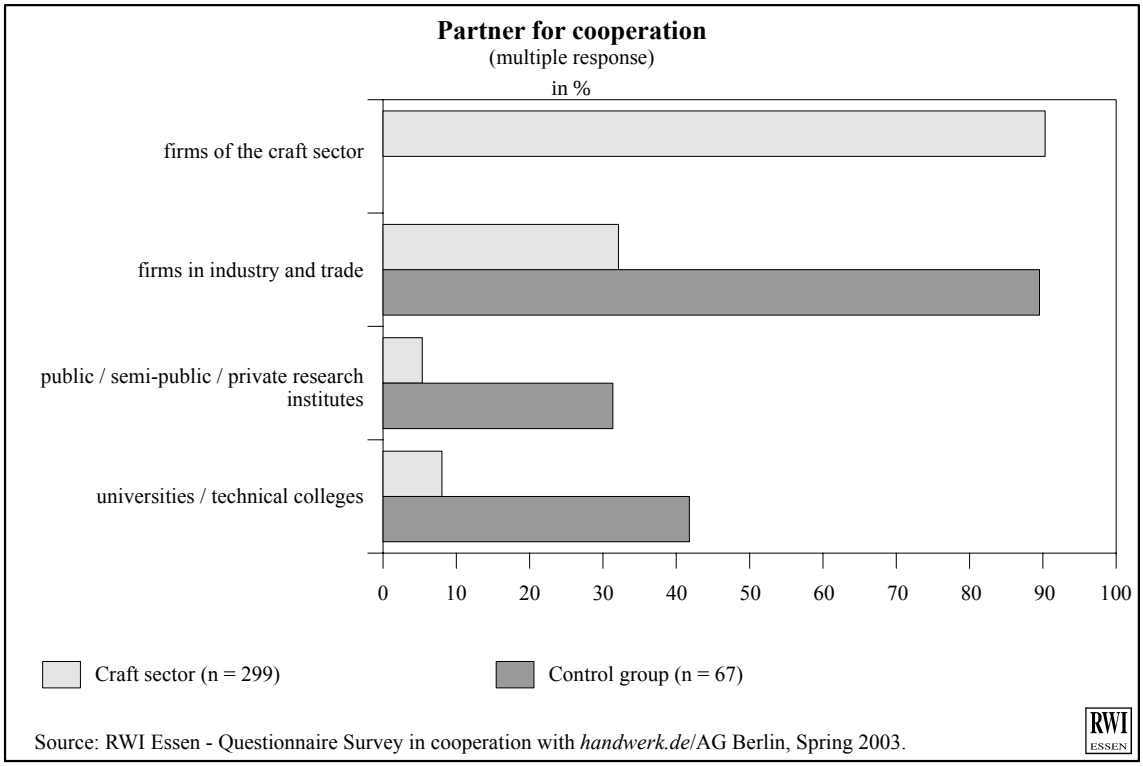


Figure 6

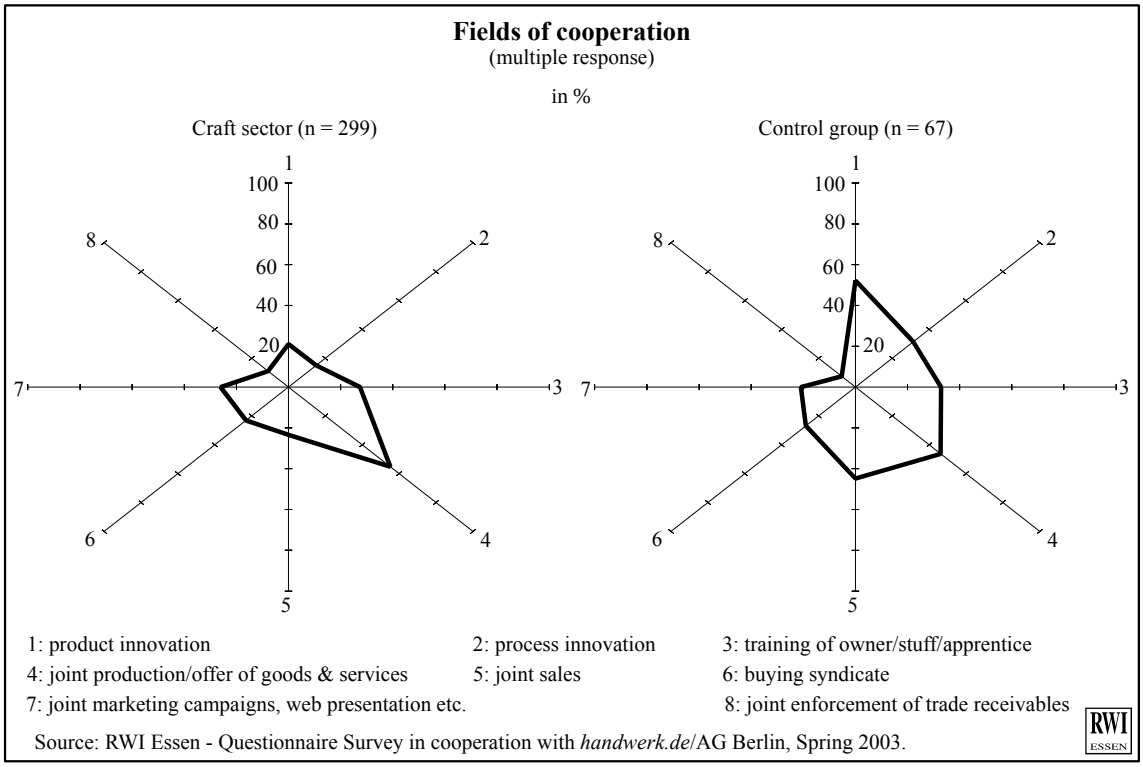


Table 1

The German Craft Sector – Trades and Trade Groups

	Trade Group	**Trades (examples)**
I	Building and construction industries	Bricklayer and concrete worker, carpenter, roofer, painter and lacquerer, insulator (heat, cold, noise)
II	Electrical and metal – working	Mechanical engineer, toolmaker, automobile mechanic, plumber, electrical engineer, surgical instrument maker, watchmaker, gold/silver smith
II	Woodwork trades	Joiner, boatbuilder / shipfitter, basket weaver, wood sculptor, cooper
IV	Clothing, textile and leather trades	Tailor, weaver, furrier, shoe maker, tanner
V	Foodstuff trades	Baker, butcher, grain miller, brewer / maltster,
VI	Trades related to health and hygiene, chemical and cleaning trades	Optometrist, dental prosthesis maker, hairdresser, textile cleaner, building cleaner
VII	Glass, paper, ceramic and other trades	Glazier, precession optical worker, photographer, book printer, bookbinder, musical instrument maker (diverse), ceramic worker

Table 2

German Craft Sector – The institutional setting

<table>
<tr><td rowspan="2">Federal Level</td><td colspan="2">Central Association of German Crafts</td></tr>
<tr><td>German Congress of Chambers of Crafts
=> 7 research institutions forming the German Crafts Institute</td><td>Federal Union of Professional Associations (50)</td></tr>
<tr><td>State Level</td><td>Regional Congresses of Chambers of Crafts</td><td rowspan="2">Regional / State Unions of Professional Associations</td></tr>
<tr><td>Regional Level</td><td>Chambers of Crafts (56)</td></tr>
<tr><td>District Level</td><td>District Craft Associations (360)</td><td></td></tr>
<tr><td>Local level</td><td colspan="2">Craft establishments
=> compulsory organised in Chambers of Crafts
=> partly (voluntary) organised in Guilds and District Craft Associations
=> guilds form the professional associations</td></tr>
</table>

Table 3

The position of the craft sector within the German economy
1999

Criteria	Unit	German economy	German craft sector	
		absolute	absolute	share in %
companies	in 1.000	2 886	582	20,2
labour force	in 1.000	38 097	5 129	13,5
trainees	in 1.000	1 698	451	26,6
turnover	in billion €	3.879	397	10,2
Source: RWI 2002, Federal Statistical Office 1999, 2002.				

Table 4

Style of cooperation

	Craft sector		Control group	
	absolute	%	absolute	%
Cooperation with firms and institutions				
n=	*619*	*100,0*	*99*	*100,0*
not applicable	8	1,3	0	0
Yes	299	48,3	67	67,7
No	312	50,4	32	32,3
Cooperation based on a contract				
n=	*299*	*100,0*	*67*	*100,0*
Yes (at least partly)	127	42,5	57	85,1
Never	172	57,5	10	14,9
Cooperation based on a newly founded common firm				
n=	*299*	*100,0*	*67*	*100,0*
Yes (at least partly)	21	7,0	16	23,9
Never	278	93,0	51	76,1
Source: RWI Essen. – Questionnaire Survey in cooperation with *handwerk.de/AG* Berlin, Spring 2003.				

Table 5

Relation between firms Innovation, cooperation, R&D, receipt of business development funds and sales trend in 2000 - 2002

	Sales trend 2000 - 2002									
	Craft sector					Control group				
	upward	unaltered	down-ward	not appli-cable	total	upward	unaltered	down-ward	not appli-cable	total
Process innovation						absolute				
yes	109	60	89	6	264	29	10	16	1	56
no	98	82	148	19	347	18	14	11	0	43
not applicable	3	2	3	0	8	0	0	0	0	0
total	210	144	240	25	619	47	24	27	1	99
Process innovation						share in %				
yes	41,3	22,7	33,7	2,3	100,0	51,8	17,9	28,6	1,8	100,0
no	28,2	23,6	42,7	5,5	100,0	41,9	32,6	25,6	0,0	100,0
not applicable	37,5	25,0	37,5	0,0	100,0	0	0	0	0	0
total	33,9	23,3	38,8	4,0	100,0	47,5	24,2	27,3	1,0	100,0
Product innovation						absolute				
yes	128	80	110	8	326	33	9	15	1	58
no	79	60	126	17	282	13	14	12	0	39
not applicable	3	4	4	0	11	1	1	0	0	2
total	210	144	240	25	619	47	24	27	1	99
Product innovation						share in %				
yes	39,3	24,5	33,7	2,5	100,0	56,9	15,5	25,9	1,7	100,0
no	28,0	21,3	44,7	6,0	100,0	33,3	35,9	30,8	0,0	100,0
not applicable	27,3	36,4	36,4	0,0	100,0	50,0	50,0	0,0	0,0	100,0
total	33,9	23,3	38,8	4,0	100,0	47,5	24,2	27,3	1,0	100,0
Cooperation with firms and institutions						absolute				
yes	110	68	109	12	299	37	14	15	1	67
no	96	75	128	13	312	10	10	12	0	32
not applicable	4	1	3	0	8	0	0	0	0	0
total	100	76	131	13	320	47	24	27	1	99
Cooperation with firms and institutions						share in %				
yes	36,8	22,7	36,5	4,0	100,0	55,2	20,9	22,4	1,5	100,0
no	30,8	24,0	41,0	4,2	100,0	31,3	31,3	37,5	0,0	100,0
not applicable	50,0	12,5	37,5	0,0	100,0	0	0	0	0	0
total	33,9	23,3	38,8	4,0	100,0	47,5	24,2	27,3	1,0	100,0
R&D activities						absolute				
Regularly	31	18	20	3	72	24	5	6	1	36
Occasionally	110	73	132	10	325	19	10	17	0	46
no activities	64	48	79	11	202	3	9	4	0	16
not applicable	5	5	9	1	20	1	0	0	0	1
total	210	144	240	25	619	47	24	27	1	99
R&D activities						share in %				
Regularly	43,1	25,0	27,8	4,2	100,0	66,7	13,9	16,7	2,8	100,0
Occasionally	33,8	22,5	40,6	3,1	100,0	41,3	21,7	37,0	0,0	100,0
no activities	31,7	23,8	39,1	5,4	100,0	18,8	56,3	25,0	0,0	100,0
not applicable	25,0	25,0	45,0	5,0	100,0	100,0	0,0	0,0	0,0	100,0
total	33,9	23,3	38,8	4,0	100,0	47,5	24,2	27,3	1,0	100,0
Use of information technology						absolute				
personal computer	205	134	217	22	578	46	24	27	1	98
internet connection	191	124	190	19	524	47	24	26	1	98
own webside	121	84	112	7	324	42	21	23	1	87
Use of information technology						share in %				
personal computer	35,5	23,2	37,5	3,8	100,0	46,9	24,5	27,6	1,0	100,0
internet connection	36,5	23,7	36,3	3,5	100,0	48,0	24,5	26,5	1,0	100,0
own webside	37,3	25,9	34,6	2,2	100,0	48,3	24,1	26,4	1,2	100,0
Receipt of business development funds						absolute				
yes	48	21	36	7	112	21	5	2	1	29
No	161	123	203	12	499	24	19	25	0	68
not applicable	1	0	1	6	8	2	0	0	0	2
Total	210	144	240	25	619	47	24	27	1	99
Receipt of business development funds						share in %				
yes	42,9	18,8	32,1	6,3	100,0	72,4	17,2	6,9	3,4	100,0
no	32,3	24,6	40,7	2,4	100,0	35,3	27,9	36,8	0,0	100,0
not applicable	12,5	0,0	12,5	75,0	100,0	100,0	0,0	0,0	0,0	100,0
total	33,9	23,3	38,8	4,0	100,0	47,5	24,2	27,3	1,0	100,0

Source: RWI Essen - Questionnaire Survey in cooperation with handwerk.de/AG Berlin, Spring 2003.