

Annika Thieme

**MARKET POTENTIAL FOR CUSTOMISED TOOLS IN THE GERMAN
ENGINEERING INDUSTRY**

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<p>The purpose of this thesis was to analyse the German market or more specifically the German engineering industry and its relation with tool manufacturers in order to investigate whether the German market is an interesting one for Mehi Oy to enter.</p> <p>The marketing research contained an analysis of the different sectors of the German engineering industry including potential customers of Mehi Oy. This analysis included amongst others a short presentation of the industry sector, the current economic situation as well as challenges and requirements. Furthermore, leading trade fairs of respective industry sectors and different company clusters were explored. Moreover, the research comprised an analysis of the German tool industry, including precision and machine tools. Finally, the kind of tools used by companies in their production was investigated within the scope of this thesis.</p> <p>An outcome of the marketing research was the finding that the German market appeared to be an interesting one for Mehi Oy to enter in case that the company would use its competitive advantages successfully. Concerning the company clusters, it seemed that most of the companies were located in Northern, West and Southern Germany. Regarding the place of market entry, several Federal Lands seemed to be appropriate, however, the location of competitors also needed to be taken into consideration. Finally, different possibilities for the market entry were discussed.</p>	
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PREFACE

This thesis was written in the period from April to August 2010. It is part of the double degree programme between Heilbronn University in Germany and Kajaani University of Applied Sciences in Finland. The subject allowed building a connection between the two countries.

I would like to thank my supervisor, Anas Al Natsheh, Ph.D. for his support during the work on the thesis. I also would like to thank my co-supervisor Prof. Dr. Ralf Bochert for his support.

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Finally, my thanks go to my family and friends. Special thanks go to my parents that always support me and that made it possible for me to live and study abroad.

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LIST OF ABBREVIATIONS

AUMA	Association of the German Trade Fair Industry
CIS	Commonwealth of Independent States
E4	Energyefficient Elevators and Escalators
FFP	Research Fund Pumps
FFVak	Research Fund Vacuum Technology
FVA	Drive Technology Research Association
FVB	Research Association Construction Equipment and Building Material Machinery
FFV	Research Association for Combustion Engines
FWF e.V.	Research Association for Machine Tools and Manufacturing Technologies
Oy	Osakeyhtiö: Finnish form of a private public limited company plc
Oyj	Julkinen osakeyhtiö: Finnish form of a public limited company plc
VDMA	German Engineering Federation
VDW	German Machine Tool Builders' Association

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1 INTRODUCTION

Globalisation plays an important role within today's business environment. Many companies do not only operate in their domestic market, but also seize the chance to distribute their products abroad. The first step towards an internationally operating company is a successful market entry. In order to enter foreign markets, companies are given different possibilities. According to Kotabe and Helsen (1998, 249), the entry mode chosen by the different companies depends on the one hand on the amount of control they would like to have. On the other hand, companies need to decide on the financial investment they plan to make.

Entering new markets allows companies to acquire new customers beyond their domestic market. At best, it results in higher turnover. New market entries are also a possibility of growth. However, in order to be successful in foreign markets, companies should precisely prepare their market entry. It is important to get knowledge about the market in order to understand it. For instance, companies should get information about the current economic situation or the requirements of the companies operating in the market. Moreover, it may be useful to explore competitors. Only understanding the functioning of the market and the needs of the market members allows a successful entry to it.

Mehi Oy is a company mainly operating in the Finnish market. Furthermore, it exports its products, mostly to China. At the moment, the company plans to attain further growth by entering other foreign markets. One focus lies here on Germany. Mehi Oy would need to explore the current situation of the German market in order to decide whether it is an attractive one for it to enter. It is necessary for the company to get information about the requirements of the market actors. Information about the location of potential customers, but also of competitors may be useful in order to decide about the attractiveness of this market. The thesis at hand should support Mehi Oy in deciding about its potential entry to the German market.

In the following will be introduced the company Mehi Oy, the theoretical background of market entries as well as the methodology of this thesis. Furthermore, the thesis includes an analysis of certain sectors of the German engineering industry as well as an investigation of the relation between the different industry sectors and tool manufacturers. Finally, recommendations for Mehi Oy complete the thesis.

2 MEHI OY COMPANY BACKGROUND

2.1 General Information

The commissioning party of this thesis is the Finnish company Mehi Oy. It was founded in Hyvinkää in 1973. Since 2001, all business operations are located in Suomussalmi in Northern Finland. (Mehi Oy 2010.) The web page of the company is www.mehi.fi, which is available both, in Finnish and in English. The company is a manufacturer of tools used for metal-cutting within engineering shops. Furthermore, the company provides necessary attachment systems for these tools. Mehi Oy's focus lies on specialised tools that are designed according to customer needs. The company manufactures special tools for requirements of diameters from 50 up to 1400. Moreover, the company has standard boring and drilling tools in its portfolio. These tools comprise clamps, joints, bores, bit holders as well as fine-tuning elements. Finally, Mehi Oy also operates in sub-contracting. That means for instance the machining of engine parts according to drawings and instructions from customers. Another example is that the company cures and smoothes finished goods. (Mehi Oy 2009.)

Tomi Holappa is the managing director of Mehi Oy. Furthermore, there are five employees working in management, production and planning. Then, there are also around 20 production workers working in a two shift system. Besides, the company benefits of a growing network of subcontractors. In 2009, the turnover of Mehi Oy was around 1.8 million Euros. For 2010, it is estimated that the turnover will decline to around 1.0 million Euros. The average growth of the company between 2000 and 2008 was 7.35% per year. Mehi Oy's credit rating is AAA. (Mehi Oy 2010.)

In 2009, 63% of Mehi Oy's overall sales were direct. However, the company also distributes its products through two resellers, namely Hertek Oy and Työkalupalvelu Tool Service Grönbrom. (Mehi Oy 2010.) They are located in Hyvinkää and Vantaa respectively (Mehi Oy 2009). Hertek Oy is responsible for 34% of the sales through resellers, Työkalupalvelu Tool Service Grönbrom for the remaining 3%. In 2009, 64% of all sales were domestic. The other 36% were gained through exporting. China was with 34% the main export country. However, Mehi Oy also exports its products to the Baltic and the European Union. (Mehi Oy 2010.) Current customers of the company include amongst others Wärtsilä, Metso Automation Oy, Kone Oyj, Gardner Denver and SEW Industrial Gears (Mehi Oy 2008).

2.2 Marketing Mix

New market entries are a market development, which means expanding with existing products to new markets (Kotler & Armstrong 2008, 43). The entry to a foreign country is a geographic market development (Aaker 2001, 221). In order to give recommendations for a successful entry of Mehi Oy to the German market, it is important to understand and analyse the marketing mix of the company. By knowing the competitive advantages, it is possible to define the entry possibilities to the new market. In the following, the marketing mix of Mehi Oy will be developed.

Product is the first P in the marketing mix. By this P is understood the combination of goods and services that are offered by the company. It includes the product variety and quality, design and features as well as packaging and services. (Kotler & Armstrong 2008, 50-51.) The products offered by Mehi Oy are metal-cutting tools used in engineering shops. The company's product range includes standard boring and drilling tools as well as customised tools. However, for the German market, the focus will lie on customised tools. Mehi Oy manufactures special tools according to customer needs and cooperates with its customers in order to provide them with the solution they need. The company utilises CAD/CAM systems for the design and manufacturing management of its products. Mehi Oy uses best raw materials for its production. This fact assures the good quality of the tools. Moreover, the company applies the ISO 2001 standard. Finally, the production period for Mehi Oy's products is as short as around three weeks, from the design to the delivery to the customer. (Mehi Oy 2010.)

The next part of the marketing mix is price. It is defined as "the amount of money customers have to pay to obtain the product" (Kotler & Armstrong 2008, 50). This P includes features as for instance the list price, discounts, payment periods and credit terms (Kotler & Armstrong 2008, 50). Regarding the pricing policy of Mehi Oy, it can be stated that the company offers its products at attractive prices. Since the company focuses on the manufacturing of special tools, the production line can rapidly be adapted. Therefore it is not needed to stop the production of a high amount of standard tools for one single special tool as it might be the case in a bigger company. Hence, Mehi Oy does not face additional costs due to a time-consuming adaptation of its production line and can offer its customers high-quality products at relatively low prices. (Private Conversation Mehi Oy 2010.)

By place is understood the distribution policy of the company. Examples for features of this P are marketing channels and locations of distribution. Furthermore, place comprises transportation and logistics. (Kotler & Armstrong 2008, 51.) In its domestic market, Mehi Oy uses both, direct and indirect marketing channels including one intermediary. However, concerning foreign markets, the company exports its products directly to the customer. The use of a direct distribution channel is also appropriate in the way that the products of Mehi Oy are customised. Therefore, the company needs to be directly in contact with its customers in order to fulfil their needs. (Mehi Oy 2010.)

The fourth P of the marketing mix is promotion. By this term are meant “activities that communicate the merits of the product and persuade target customers to buy it” (Kotler & Armstrong 2008, 51). Promotion includes the marketing tools of advertising, personal selling, sales promotion and public relations (Kotler & Armstrong 2008, 51). Since Mehi Oy is operating in the business to business market, it uses other communication tools than does a company operating in the business to consumer market. One communication tool of Mehi Oy is trade fairs. It is a possibility to get in contact with potential new customers. The company becomes renowned within the industry and may create new business relations. Furthermore, Mehi Oy contacts companies directly so as to acquire new customers. (Private Conversation Mehi Oy 2010.)

From the above developed marketing mix can be derived the competitive advantages of Mehi Oy that would help the company to enter the German market. The customisation of tools is one competitive advantage. The company develops and manufactures tools corresponding to the individual needs of each customer. Furthermore, Mehi Oy produces high quality products and markets them at attractive price points. Therefore, customers benefit of high quality tools at a relatively low price. Finally, Mehi Oy offers its customers a short delivery time of the tools. By receiving the tools early, the customer’s production is not interrupted for a long period of time.

3 ENTERING NEW MARKETS

3.1 Market Entry Modes

In order to enter a new market, a company needs to choose an appropriate market entry mode. In theory, there are different entry modes that differ most importantly in their degree of control, but also in terms of investment and risk. It is important that the company evaluates the different possibilities. A high level of control also implies a high investment and higher risks. The different entry modes from the lowest to the highest level of control are exporting, licensing, franchising, contract manufacturing, joint ventures and wholly owned subsidiaries. (Kotabe & Helsen 1998, 249-259.)

Kotler and Armstrong (2008, 552-555) divide entry modes into three different strategies, namely exporting, joint venturing and direct investment. These three types of market entry are then subdivided according to different forms. Figure 1 illustrates the different entry strategies. When exporting, the company keeps its production within the home country. Joint venturing involves one or more partners in the foreign country with whom the company cooperates in order to sell its products abroad. If a company decides for direct investment, it builds its own facilities in the foreign country, without involving a partner. The degree of commitment, risk and control as well as the profit potential increase with every step from exporting to direct investment.

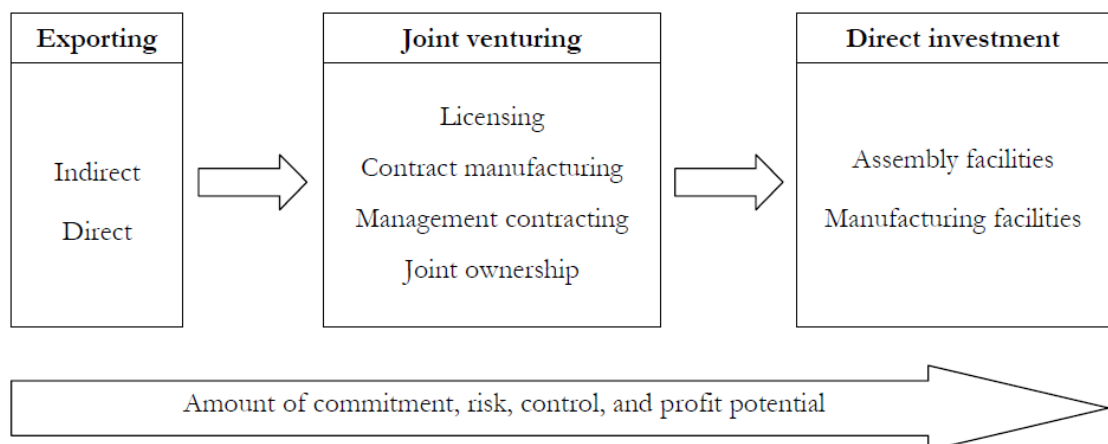


Figure 1: Market entry strategies (Kotler & Armstrong 2008, 553)

Some authors developed four different strategies for market entries. In ascending order from the lowest to the highest amount of control, these are exporting, contractual agreements, strategic alliances as well as ownership. Each of these entry modes is further detailed. For instance, exporting contains five different steps, including direct and indirect exporting. Licensing and franchising are defined as contractual agreements. Then, strategic alliances also comprise joint ventures and consortia. By ownership is meant direct foreign investment. Apart from control, the amount of equity, risk and return rises from one entry mode to another. (Cateora & Graham 2007, 323-324.)

Hill and McShane (2008, 70-71) on the other hand divide market entry modes into five different strategies, namely exporting, licensing, franchising, joint ventures and wholly owned subsidiaries. The same market entry strategies are introduced by Hodgetts and Luthans (2003, 266-269).

Even though different authors present various amounts of strategies, all include basically the same types of market entry. In the following, these will be introduced.

There are three forms of exporting. One is indirect exporting. By this form of exporting is meant that the company employs an intermediary in the domestic market in order to export its products to a foreign market. These intermediaries include companies specialised in export management, for example trading houses. One major advantage of this method is the fact that it does not require high financial investment. However, the company cannot really control its foreign operations. Cooperative exporting is a form of exporting that gives the company some control over how the product is distributed in the foreign country. Piggyback exporting is one form of cooperative exporting. A company conducting piggyback exporting uses an existing distribution network of a company already operating in the foreign country in order to market its products there. (Kotabe & Helsen 1998, 251.) In this form of exporting, the company is called supplier, while the foreign company whose distribution network is used is called carrier. Piggyback exporting is an option for a company in case that two companies sell the same kind of product. However, the products of the two companies are usually complementary and not competitive. (Ghauri & Cateora 2010, 275.) Finally, there is a third form of exporting, namely direct exporting. This form is defined as the establishment of an exporting department within the company and the distribution of products in the foreign country with the help of a middleman whose location is in the foreign market. (Kotabe & Helsen 1998, 252.) Another possibility is to create a sales branch in the foreign

country being responsible for sales, distribution as well as in some cases promotion. A third way of direct exporting is domestic salespeople that are sent to the foreign market in order to establish new business relations. (Kotler & Armstrong 2008, 553.) The major difference between direct and indirect exporting is that in direct exporting, the company itself takes care of its exports, while in indirect exporting, the task of selling the product is passed to a third party. Direct exporting gives more control to the company, however, it also requires higher investment than indirect exporting. (Kotabe & Helsen 1998, 252.)

Licensing is another possibility to enter a new market. In this form of market entry, a licensor creates a contract with a licensee. This contract allows the licensee to use certain company assets such as trademarks or production processes. In return, the company needs to pay a royalty fee. This royalty fee differs in size and ranges from less than 1% to 15% of the turnover. (Kotabe & Helsen 1998, 252.)

The next form of entry mode giving more control to the company is franchising. It is often chosen by companies operating in the service industry. Franchising is to a certain degree similar to licensing. A franchisee pays a royalty fee to a franchisor in order to be allowed to use the business concept and trademark of the franchisor's product. This business concept can for instance include a marketing plan, operating manuals or standards. One form of franchising that is often applied by companies is master franchising. In this method, the franchisor chooses a master franchisee that then establishes franchising contracts with other franchisees in a certain region. This region can be one sole country, but also several countries. (Kotabe & Helsen 1998, 254.)

Contract manufacturing is an entry mode in which a "company arranges with a local manufacturer to manufacture parts of the product or even the entire product" (Kotabe & Helsen 1998, 255). Other business activities, as for instance marketing, are still conducted by the company. This entry mode is mainly used in order to save costs. (Kotabe & Helsen 1998, 255.)

In case that a company uses management contracting as an entry mode, it provides its management know-how to a foreign partner that contributes the financial assets. Instead of exporting a physical product, the company sells its management services abroad. One famous example is Hilton that runs its hotels world-wide by management contracting. (Kotler & Armstrong 2008, 554.)

Joint ventures are generally used as an entry mode to emerging markets. In this form of market entry, a foreign company creates, together with a partner, a new business entity in the foreign country. The two companies share equity as well as other resources. The partner company for a joint venture is mainly a local company, however, joint ventures can also be formed with another foreign company. Furthermore, there also exist joint ventures with more than two participating companies. There are three different forms of partnerships. In majority ventures, the company owns more than 50% of the new entity. Fifty-fifty ventures mean that both partners have the same amount of ownership, and finally, minority ventures are defined as the company holding less than 50% of equity. (Kotabe & Helsen 1998, 256.)

The entry mode giving the highest level of control to the company, but also involving the highest amount of investment, is a wholly owned subsidiary. In this form of market entry, the company has the complete ownership of the new foreign entity. One way of attaining wholly owned subsidiaries is the acquisition of already existing companies in the new market. Another alternative is to build up a new enterprise abroad, so-called Greenfield operations. (Kotabe & Helsen 1998, 259-260.) Wholly owned subsidiaries mean a direct investment of the company in the foreign country (Kotler & Armstrong 2008, 555).

At last, a company has the possibility to build informal arrangements, so called alliances. In a strategic alliance, at least two companies decide to cooperate in order to achieve a common objective. (Kotabe & Helsen 1998, 262.) The aim is to compensate a weakness of one company with the strength of another one. All companies should benefit from the strategic alliance in order to make it a successful one. (Ghauri & Cateora 2010, 271.)

3.2 Distribution Channels

A company may choose between different kinds of marketing channels in order to sell its products. Normally, there is a distinction between direct marketing channels where the product is distributed directly to the customer and indirect marketing channels that include at least one intermediary. The different intermediaries between the producer and the customer are defined as channel levels. Figure 2 illustrates the three main marketing channels regarding business to business. (Kotler & Armstrong 2008, 338.)

Channel 1 displays a direct marketing channel. In this type of channel, a company distributes its products directly to its business customers through its own sales force. However, a company may decide to use one or more intermediaries to sell its products. When applying a marketing channel as Channel 2, the company sells its products to a business distributor that then markets the product to the end customer. The distribution channel including one more channel level is shown in Channel 3. In this kind of marketing channel, the company first sells to its representative or its sales branch. This intermediary then distributes the product to a business distributor that finally vends to the customer. It is also possible for a company to use more intermediaries, however, an increase in intermediaries is connected with a loss in control. (Kotler & Armstrong 2008, 338.)

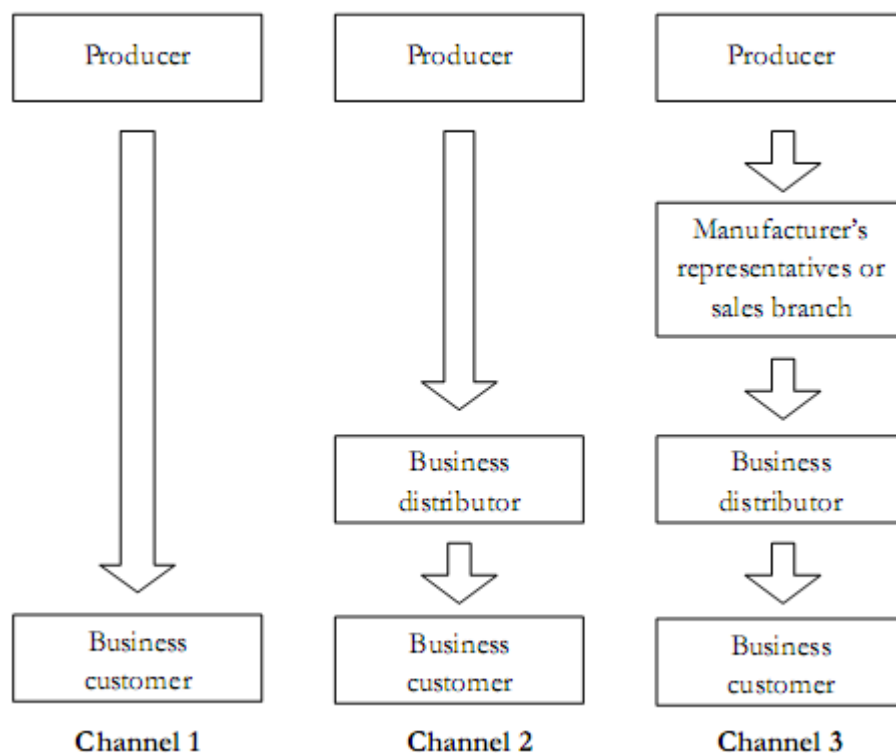


Figure 2: Business marketing channels (Kotler & Armstrong 2008, 338)

Jobber (1998, 450-451) defines four different distribution channels for industrial goods. Apart from a direct channel from the producer to the customer, there is a channel including one intermediary, namely a distributor. Furthermore, two marketing channels comprising an agent are part of his distribution channel model. One of these channels involves an agent as the sole intermediary between the producer and the industrial customer. The other channel consists of two intermediaries. The producer first distributes the product to an agent that

then markets the product to a distributor. Finally, the distributor sells the product to the industrial customer. The product range of agents may include products from more than one producer. Whether a producer uses a marketing channel involving an agent usually depends on costs. Czinkota and Ronkainen (1995, 338) also introduce four types of distribution channels for industrial products.

Marketing channels can be organised in different ways. In a conventional distribution channel, the different channel members are independent and have their own business. Each member aims to increase its own profit, even if it means a loss for other channel members or the distribution channel as a whole. The different members cannot control each other. Within vertical marketing channels on the other hand, the different members collaborate as one single system. Furthermore, the different channel levels are connected through ownership or contracts. This kind of distribution channel gives members more control over each other. There are different types of vertical marketing channels, namely corporate, contractual and administered ones. Then, there also exist horizontal marketing channels. In this type of distribution channel, different members at one level cooperate in order to achieve new business opportunities. Finally, a distribution channel can be organised as a hybrid marketing channel, also called multichannel distribution. Hybrid marketing channels are defined as a company using more than one distribution channel at one time. For instance, a company may apply a combination of direct and indirect marketing channels to distribute its products. (Kotler et al. 1999, 900-907.)

3.3 Examples of Market Entry

In 1996, Ali and Mirza conducted a study with the title “Market-entry, motives and performance in Central Europe: The case of British firms” (Ali & Mirza 1996, 257). During their research, the two authors investigated the foreign direct investment of British companies in Hungary, Poland and the Czech Republic after the end of communism in this region (Ali & Mirza 1996, 257).

For both, Hungary and Poland, exporting was the mostly used entry mode. The second frequent entry mode chosen by British companies to these countries was agents, followed by wholly owned subsidiaries and majority joint ventures. Regarding the Czech Republic, it can be stated that exporting was the third most important entry mode. In this country, compa-

nies mainly used wholly owned subsidiaries or majority joint ventures to enter the market. Regarding the total frequency of entry modes, the two authors researched that the entry mode chosen by most of the companies was exporting. 25.8% of the interviewed British companies applied this mode to enter one of the above mentioned foreign markets. The second and third frequent entry modes were wholly owned subsidiaries with 24.8% and majority joint ventures with 21.7% frequency respectively. With 20.2% frequency, agencies were on the fourth rank. Minority joint ventures were scarcely used to enter the market. All in all, there were twelve different kinds of initial market entry modes that were chosen by British companies to go into foreign markets. The authors also investigated that in some cases, a company chose more than one entry mode at the same time. (Ali & Mirza 1996, 268.)

During the same year, Efimova, Kapustkin and Sutyryn established a “comparative analysis of foreign entry strategies of Western and the CIS firms in each other markets” (Efimova et al. 1996, 166). According to their analysis, Western and CIS (Commonwealth of Independent States) companies preferred exporting to licensing or investments as entry mode to the foreign market. As one reason for this trend was mentioned the fact that uncertainties caused by different political and economic factors were limited when exporting. Moreover, companies could relatively easy quit the market in case of any problematic issues. The losses in that case were comparatively low. (Efimova et al. 1996, 170-171.) Furthermore, the authors noted that exporting was almost the sole entry mode for CIS companies to foreign markets, mainly due to financial reasons (Efimova et al. 1996, 177-178).

Moreover, Lesakova researched in 1997 about “Foreign investment in Central and Eastern Europe” (Lesakova 1997, 59). The focus lay on Slovakia and the Czech Republic (Lesakova 1997, 59). Regarding the different forms of foreign investment, licensing, joint ventures, strategic alliances as well as wholly owned subsidiaries were taken into consideration (Lesakova 1997, 63-65). One research outcome was that licensing and joint ventures were mainly used as an entry mode to the Slovakian and Czech market (Lesakova 1997, 59). In order to investigate the criteria influencing the investment decisions to certain countries, 30 large investors from countries belonging to the European Union were asked to assess selected criteria in terms of importance. Regarding market attractiveness, the sales potential of a country was regarded as most important, followed by labour skills and labour cost. Concerning the climate for foreign investment, the amount of ownership of the foreign companies in joint ventures was ranked as the main factor. (Lesakova 1997, 61-62.)

4 METHODOLOGY

4.1 Definition of the Research Problem and Objectives

In order to achieve meaningful results, marketing research needs to be conducted in a structured way. According to Burns and Bush, the marketing research process can be divided into eleven different steps. One of these steps is the definition of the problem, followed by the establishment of objectives. (Burns & Bush 2008, 63.) The problem of the thesis at hand was defined as the potential entry of Mehi Oy to the German market. An objective to solve the problem was the analysis of this market. That meant not only the investigation of different industries including potential customers of Mehi Oy, but also the research for different company clusters in order to define the place of market entry.

4.2 Definition of the Research Design

After the definition of the research problem and the formulation of the objectives, the research design needs to be determined (Burns & Bush 2008, 63). The research design chosen for this thesis was exploratory research. According to Burns and Bush (2008, 106), exploratory research can be conducted in different ways, for example by analysing secondary data or by studying similar cases that occurred before. Other possibilities are experience surveys, focus groups or projective techniques.

The marketing research for this thesis mainly consisted of an analysis of secondary data. Secondary data is defined as data that “have previously been gathered by someone other than the researcher and/or for some other purpose than the research project at hand” (Burns & Bush 2008, 137). There exist two different kinds of secondary data, namely internal and external secondary data. For this thesis was used external secondary data from published sources. (Burns & Bush 2008, 139-140.)

A main source of information was the web presence of the German Engineering Federation VDMA (Verband Deutscher Maschinen- und Anlagenbau e.V.) since it includes useful information about the industry. Furthermore, the web pages of other associations and trade fairs, special magazines as well as newspaper articles were analysed for valuable information.

Not only industry information was gained from secondary data, though. The company contact details that helped to investigate different company clusters and to define potential customers were collected from secondary data, too. Finally, information from academic literature about different market entry modes and new market entries of other companies could serve as examples for best practise, but also as source in terms of which faults to avoid.

However, there was not only an analysis of secondary data. Primary data was collected specifically for the thesis at hand during telephone interviews. These telephone interviews had the aim of helping to obtain more in-depth information about the behaviour of the German market actors. This marked the next step in the marketing research process, namely the decision about the design of data collection (Burns & Bush 2008, 63). A questionnaire was the design of data collection used for this thesis. It helped to conduct structured telephone interviews (Smith & Albaum 2005, 195).

4.3 Collection of Primary Data

Before conducting the interviews, it was first needed to define the population. This last includes all units to which the study results are generalised (Smith & Albaum 2005, 501). In the present case, the population was defined as German manufacturers of heavy-metal products and machines. It included all sectors of the German engineering industry belonging to Mehi Oy's potential customers. Since not all members of the population could be interviewed, it was decided to conduct the telephone interviews with a sample. The research conducted was qualitative research.

The methodology used for the telephone interviews was a conical approach. Of the overall population, there were first conducted interviews with representatives of a major trade association, namely the VDMA. This trade association combines and reflects the interests of most of the industry members. That is why it can provide information that can be projected to a certain degree to all industry members. The sample number was 18.

After the definition of the population and the sample that would be interviewed, the questionnaire needed to be designed. Since the aim of research was to get more information about the German market, the questionnaire mainly consisted of open-ended questions. This format allows the respondent to answer in his or her own words, a fact that might pro-

vide more valuable information (Burns & Bush 2008, 232). The questionnaire consisted of twelve questions. An unaided response format was used for questions about the field of activity of the member companies, the challenges they are facing and their location and distribution channels used. Furthermore, the questionnaire included questions in an unaided response format about whether member companies currently invest in new production facilities, about major manufacturers and sales representatives of tools as well as about the exhibition policy of the trade association. There were also a few questions in a categorical format, though. The response format chosen for these questions was dual-choice (Burns & Bush 2008, 233). There were given two options, and it was asked whether companies have one supplier or multi-supplier relations. Besides, there were questions regarding whether companies buy from sales representatives or directly from the manufacturer. Finally, the questionnaire included a question concerning the use of standard or multi-purpose tools. The combination of the questionnaire formats should help to get more detailed information about the German engineering industry.

In a first attempt were contacted the secretariats of the different sector associations of the VDMA in order to investigate the possibility of telephone interviews with the managing directors of the associations. Since this attempt has not been resulting in sufficient feedback, the author decided to contact the public relations departments of the sector associations directly by telephone in order to conduct the interviews. It was not possible to conduct interviews with all sector associations, though. Reasons for this fact were either a refusal for cooperation or the fact that respective persons were not available. Finally, twelve interviews were conducted with representatives of the VDMA. Another three questionnaires were sent out by email, out of which two were partly filled in and returned.

Due to the fact that the research conducted was qualitative research, there was no processing of the data with SPSS. The answers of the interviewees were rather individually evaluated and analysed in order to research the requirements and behaviour of the industry. The outcomes were included in the results part of the thesis.

However, it appeared that the representatives of the VDMA sector associations could not answer the questions concerning the tools used by their member companies. That is the reason for which the author faced the next step in the conical approach. After the interviews with representatives of the VDMA, the author now directly collected contact information of companies belonging to the target group of Mehi Oy in order to investigate the type of tools

they use. The contact information was gained from the web pages of respective VDMA sector associations. Since manufacturers of engines and gear boxes are a main customer group of Mehi Oy, the author decided to contact companies operating in this field of business. The sample consisted of 30 companies.

Since the questionnaire has been designed for representatives of trade associations, it needed to be changed for the next step of the telephone interviews. The adapted questionnaire consisted of eleven questions. The questions were mainly open-ended in an unaided response format, however, the categorical questions with a dual-choice response format were still part of the questionnaire, too (Burns & Bush 2008, 233). The areas of questioning remained the same, only the part regarding exhibition policy was taken away since companies usually do not organise exhibitions. The questions were reformulated, though.

The next step in the process was then the contacting of the different companies in order to conduct the interviews. Unfortunately it was not possible to conduct interviews with the overall sample, resulting mainly from a refusal for cooperation. This refusal was mainly based on time issues meaning a lack of time of the interviewee and on suspiciousness or reluctance of companies to participate in surveys. Some companies did not have a production line and were therefore not appropriate for a participation in the survey. However, the conclusions drawn from the conducted interviews were valuable and included in the results part. Eight interviews were conducted with companies, two others were interrupted by the companies due to time issues and suspiciousness. Some conclusions might be drawn from these interviews as well, though. The telephone interviews were evaluated with the aid of Excel.

4.4 Development of the Company Clusters

Another part of the market analysis was the investigation of company clusters. In order to develop these clusters, different steps needed to be taken. First, information about the member companies of respective sector associations of the VDMA was collected. This information was either taken from the associations' web pages or from published documents. The next step consisted of research on the companies' web presences about their offered products. In case that a company produced the core product of respective industry and not a component, the contact details with the postal code of the company's location were gained from the web page. In the next step, the author inscribed the first two figures of the differ-

ent postal codes in a list. After that, the amount of companies located in the different postal code areas was entered in a map of Germany containing all postal code regions. This step helped to explore whether companies are predominantly located in certain parts of Germany. After their investigation, the clusters were transferred to a map in digital form and included in the results part of the thesis.

4.5 Evaluation of the Collected Data

The final step of the marketing research was then the combination of information gained from secondary and primary data. The analysis of secondary data was combined with the outcomes of the telephone interviews and included in the results part. Moreover, the map with the company clusters was added.

In the first section of the results part, the different industries that might contain potential customers of Mehi Oy were introduced. Then, the precision as well as the machine tools industry were studied. The third part of the results subsequently connected these two areas in form of an examination of the tools used by members of the engineering industry in their production. Afterwards, the implications of the research for Mehi Oy were analysed and included in the discussion part. The conclusion finally summarised the outcomes.

5 RESULTS

5.1 The German Engineering Industry

The mechanical engineering industry is among the largest employers in the German market and its products are world-wide recognised. Since around two thirds of the products are sold abroad, it can be stated that exports play an important role. (VDMA 2010 a.) In 18 out of 30 different engineering industry sectors, German manufacturers are global market leaders. However, the German engineering industry was affected by the economic crisis. In 2009, sales decreased by 24.4%, the number of incoming orders by 38%. In order to avoid personnel reductions and to keep permanent employees during the crisis, companies introduced short-time work. Furthermore, temporary work was minimised. (VDMA – Volkswirtschaft und Statistik 2010.) The German government approved an economic stimulus package so as to stimulate the market (Völklein 2008). Currently, the economic situation seems to ameliorate, though. For 2010, an increase in production of 3% is forecasted (VDMA 2010 b). One main topic of the German engineering industry is energy efficiency and hence resulting environmental protection (VDMA – Volkswirtschaft und Statistik 2010).

Members of the German engineering industry are not only represented on domestic, but also on foreign trade fairs. In order to allow companies to attend these trade fairs at favourable terms, there was created a programme. It implies, in cooperation with AUMA, a participation of the German federation in foreign trade fairs. In the majority of cases, this presence is in form of joint stands of the companies. AUMA is the Association of the German Trade Fair Industry (Ausstellungs- und Messe-Ausschuss der Deutschen Wirtschaft e.V.). (AUMA 2010.)

The German Engineering Federation VDMA is an important trade association within Germany and Europe. Around 3,000 companies are member of this association that is subdivided into associations according to different industry sectors. Most member companies of the VDMA are small and medium-sized enterprises. In the following part of the thesis, the different sectors of the German engineering industry including potential customers of Mehi Oy will be presented. (VDMA 2010 a.)

5.1.1 Engines

One sector of the German engineering industry is engines. This industry comprises companies that manufacture combustion engines. The engines are used in mobile machinery as for instance agricultural tractors or construction machinery. Furthermore, they are needed in ships, locomotives and in stationary energy supply. Then, they are also used in automobiles. (VDMA – Engines and Systems 2010.) Large engines are usually sold directly to customers, as for example dockyards. Standard engines are also mainly distributed via a direct marketing channel. It is possible that companies vend via intermediaries, though. (Telephone interview VDMA Engines and Systems 2010.)

The economic crisis had an impact on the engines industry. While manufacturers of small engines already faced a decline in turnover in 2008, the situation of large engines manufacturers was stable until the end of 2008, beginning of 2009. Since many large engines projects are long-term, the companies were affected by the decrease in turnover at a later time. (VDMA – Motoren und Systeme 2010 a.) The number of incoming orders has been increasing since the end of 2009, beginning of 2010, though. This rise mainly concerns manufacturers of small engines. Due to the characteristic of long-term projects, the increase in orders for large engines will happen a bit time-delayed. (VDMA – Motoren und Systeme 2010 b.) The economic situation of engine manufacturers also differs between the fields of application. For instance, mobile machinery such as agricultural machinery benefited from a growth in turnover until 2008. Due to a surplus of orders, the downturn from the beginning of 2009 on was alleviated. Engine suppliers for construction machinery on the other hand were affected by a decline in orders of more than 30% during the last quarter of 2008 compared to the same period in 2007. (VDMA – Motoren und Systeme 2010 a.) Yet, the situation within the construction machinery segment seems to ameliorate in 2010. Manufacturers of agricultural machinery expect a rise in demand by midyear, what would in consequence result in a higher demand for engines. (VDMA – Motoren und Systeme 2010 b.) Another field of application for engines are ships or rather the shipbuilding industry. After six years of ongoing growth, this industry faced a decline in demand in 2008. Reasons for this decrease were not only the economic crisis, but also a cyclic downturn and surplus capacities regarding cargo ships. Due to the fact that there were still open orders at hand, it was expected by engine manufacturers that the turnover would not decline in 2009, but in subsequent years. (VDMA – Motoren und Systeme 2010 a.) Concerning the current situation, it can be stated

that apart from some orders for special ships used for example for the establishment of off-shore wind parks, there is no remarkable rise in incoming orders. However, it is estimated that global demand grows. Finally, energy conversion is another field in which engines are used. This industry sector was relatively stable and not strongly affected by the economic crisis. Large orders from the end of 2009 may compensate for missing orders for large engines caused by the shipbuilding industry. (VDMA – Motoren und Systeme 2010 b.) Regarding investment, it seems that members of the engines industry currently do not invest in new production facilities. A reason for this event is the fact that the industry experienced years of high growth before 2008, during which companies did investments. As a result of the economic crisis, not all of the newly built capacities are currently used. However, companies make short-term investments as for instance machine tools. (Telephone interview Engines and Systems 2010.)

Challenges for the engines industry mainly arise from climatic and environmental aspects, such as limits in terms of pollutant emissions. Political demands for the reduction of CO₂ emissions increase the pressure to develop more efficient engines. Furthermore, engines are requested to consume less gasoline. In order to solve the different challenges, manufacturers of engines work closely together with their suppliers. (Telephone interview VDMA Engines and Systems 2010.) Besides, engine manufacturers collaborate in terms of research and development in order to meet the increasing demand for innovation and environmental requirements. This joint research is done by the Research Association for Combustion Engines FVV (Forschungsvereinigung Verbrennungskraftmaschinen e.V.). (VDMA – Motoren und Systeme 2010 c.) The research association that was founded in 1956 combines manufacturers of automobiles, engines and turbines as well as their suppliers. Its objective is not only to improve efficiency ratios, but also to decrease emissions of engines and turbines. The research projects are defined by both, the companies from the industrial side and universities and other research institutes as for example the Fraunhofer Gesellschaft from the scientific side. (FVV 2010.)

For the elaboration of the company clusters, the focus lies on manufacturers of engines for rail, inland waterway vessels, seagoing ships and mobile machinery. Mobile machinery includes construction and agricultural machinery as well as materials handling equipment. As regards the location of these companies, different clusters can be established. One is located in Northern Germany. Four companies are member of this cluster that stretches from Schleswig-Holstein via Hamburg to the north of Lower Saxony. Then, there are two smaller

clusters in Southern Germany. One of these is in the postal code area starting by 68. Two companies are situated here. Another two companies have their location in the postal code area beginning with 88. (VDMA – Motoren und Systeme 2009.)

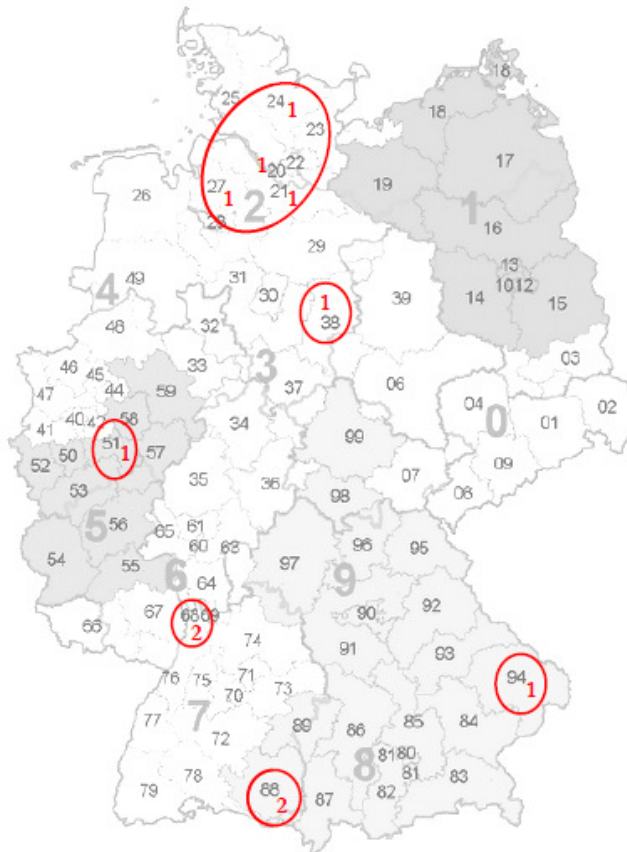


Figure 3: Clusters engines

The engines industry is generally represented on its customers' trade fairs. Major trade fairs for manufacturers of engines are in the area of mobile machinery AGRITECHNICA for agricultural machinery and bauma for construction machinery. (VDMA – Motoren und Systeme 2010 d.) These two trade fairs will be introduced in the chapters of the corresponding industries. Besides, in September 2010, manufacturers of respective engines may be present on SMM in Hamburg, the major trade fair for the maritime industry. It is organised every two years. (VDMA – Motoren und Systeme 2010 d.) Moreover, there are trade fairs within the area of energy production or energy supply. One of these trade fairs is BioEnergy De-central which takes place in November 2010 in Hannover. (DLG e.V. 2010 a.)

5.1.2 Power Transmission Engineering

The term power transmission engineering is defined as companies manufacturing mechanical transfer components. This comprises amongst others brakes, clutches, drives, gear boxes and bearings. (VDMA – Power Transmission Engineering 2010.) Members of this industry mainly distribute their products directly to customers (Questionnaire VDMA Power Transmission Engineering 2010).

In 2007, the production volume of the power transmission engineering industry increased by 16.6% compared to the previous year. 45% of the production volume was gearwheels and gear boxes, 26% bearings and 24% drive elements. In 2007, 57.5% of the total turnover was exported. (VDMA – Antriebstechnik 2008.) Members of the power transmission engineering industry currently hardly invest in new production facilities (Questionnaire VDMA Power Transmission Engineering 2010).

Innovation plays an important role within this industry and technology continuously develops further. Parts need to have the lowest failure rate, a high effectiveness as well as a good price/performance ratio. Furthermore, compact units combining mechanical and electrical drive technology increase. In order to stay competitive in an ongoing globalisation, shorter product development cycles are demanded. (VDMA – Power Transmission Engineering 2010.) Since companies within the power transmission engineering industry cannot face the growing number of requirements on their own, they are more and more collaborating in the field of research and development. The Drive Technology Research Association FVA (Forschungsvereinigung Antriebstechnik e.V.) combines around 200 companies. These companies work together and conduct projects with universities. This allows them to benefit of future, well-qualified employees. The FVA initiative “E-MOTIVE” has the aim to research in the field of electric mobility and to strengthen the leading role of Germany within this area. (FVA 2010.) Yet, companies within the power transmission engineering industry are not only confronted with challenges in terms of technological innovations. The companies also face the aftermath of the economic crisis. During the crisis, manufacturers tried to maintain their qualified workforce with the help of short-time work. However, downsizing was needed in some cases so as to avoid bankruptcy. (Questionnaire Transmission Engineering 2010.)

The focus for the company clusters lies on manufacturers of geared motors, gear boxes as well as drive elements. There can be established three larger clusters in Germany. The one containing most companies is located in North Rhine-Westphalia. It includes around 20 companies, out of which three are situated in the postal code area starting by 42. Furthermore, there exists one cluster in Baden-Württemberg and some parts of Southern Bavaria and one in the north of Bavaria. In addition to these clusters were investigated two smaller ones in the postal code areas beginning with 22 and 31. In each of these clusters is the location of two companies. (VDMA – Antriebstechnik & Fluidtechnik 2009.)

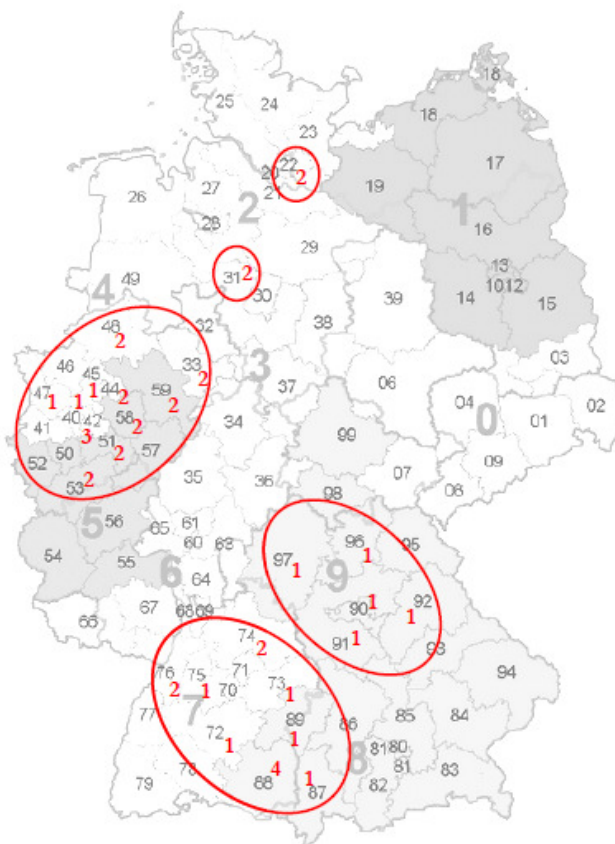


Figure 4: Clusters power transmission engineering

The leading trade fair of the power transmission engineering industry is MDA – Motion, Drive and Automation. Exhibiting companies of this trade fair operate in the areas of electrical and mechanical as well as fluid power transmission. Examples of product categories in the area of electrical and mechanical power transmission are gear boxes, bearings, couplings, brakes or electric motors. The next MDA is organised in April 2011 in Hannover. (Deutsche Messe 2010.)

5.1.3 Valves

Within the valves industry, a distinction can be drawn between building and industrial valves. Building valves comprise amongst others valves reducing pressure, check valves, flow rate regulators or valves that are self-closing. Examples for industrial valves are gate valves, butterfly valves or membrane valves. (VDMA – Valves 2010 f.)

The economic crisis affected the valves industry. Within the industrial valves sector, the nominal turnover fell by 9% in 2009. There was a 5% decrease in foreign turnover, compared to an even higher domestic decline of 13%. It is expected that the markets stabilise in 2010, however, a remarkable increase in investment is only anticipated from 2011 on. (VDMA – Valves 2010 d.) Within the building valves sector, the impacts of the economic crisis were even stronger. Here, the decrease of nominal turnover in 2009 was 16% compared to 2008. Contrary to the industrial valves sector, exports fell with 18% stronger than the domestic turnover, which declined by 9%. A positive signal is the fact that the domestic turnover of the heating and technical building valves sector increased by 4% and 2% respectively in 2009. However, for 2010, a further decrease in turnover is expected for the building valves sector. (VDMA – Valves 2010 e.)

“Information gets more and more complex and extensive, while the degree of specialisation increases on all levels” (VDMA – Valves 2010 a). This quotation highlights the requirements of the valves industry. There are ongoing technical developments. Other requests for valves are the need for smooth operation and leak-tightness. Since valves are also used within living areas such as bathrooms, the design should to a certain degree also be taken into consideration. Regarding thermostats, user-friendliness and convenient regulation are important features. Furthermore, due to the fact that valves are applied within potable water installations, it is necessary to guarantee that no toxic substances from the material get to the water. Since some of the valves are employed within chemical technology, the valves should be corrosive resistant against possible aggressive fluids. Besides, valves without splits are for hygienic reasons especially important within the food processing technology. (VDMA – Valves 2010 f.) As the requirements of the valves industry are fast-growing, small and medium-sized enterprises collaborate in terms of research and development. Furthermore, valves manufacturers cooperate with universities and research institutes. (VDMA – Valves 2010 h.) One challenge that the valves industry faces is plagiarising of merchandise. There is a fight against countries

There are several trade fairs where valves manufacturers are represented. One trade fair is ACHEMA that takes place in Frankfurt. It is organised the next time in June 2012. (DECHEMA e.V. 2010 a.) Most of the exhibiting companies belong to the pumps, compressors, valves and fittings industry, followed by manufacturers of laboratory and analytical techniques and thermal and mechanical processes (DECHEMA e.V. 2010 b). Furthermore, ISH is a trade fair in Frankfurt that valves manufacturers attend. The fields of activity of exhibiting companies range from bathroom equipment, building and energy technology and renewable energy systems to technologies of air conditioning as well as cooling and installation technology. The next ISH is in March 2011. (Messe Frankfurt Exhibition GmbH 2010 a.) Moreover, Wasser Berlin is an important exhibition venue for valves manufacturers since their products are used within water supply and distribution. Wasser Berlin is located in Berlin and is arranged in May 2011. (Messe Berlin GmbH 2010.) Finally, one trade fair within the area of water and sewage management as well as waste and raw materials management is IFAT ENTSORGA in Munich. It is organised in September 2010. (Messe München GmbH 2010 a.)

5.1.4 Pumps and Compressors

The following part includes a presentation of the pumps as well as the compressors industry. Pumps are used in potable and sewage water systems. Other examples are heating pumps and pumps in power stations. (VDMA – Pumpen und Systeme 2010 a.) The pumps industry can be divided into the different product categories oscillating and rotary displacement pumps. Moreover, there exist centrifugal pumps. (VDMA – Pumpen und Systeme 2010 c.) Regarding compressors, it can be stated that there are different types, as for instance mobile air compressors, turbo compressors and oscillating or rotating displacement compressors. Besides, there exist vacuum pumps and other air and gas compressors. (VDMA – Kompressoren, Druckluft- und Vakuumtechnik 2010 b.)

Manufacturers of pumps and manufacturers of compressors were both affected by the economic crisis. Within the pumps industry, exports declined by 14.5% in 2009 (VDMA – Pumpen und Systeme 2010 c). Exports of the compressors industry decreased in 2009 by 7.5% (VDMA – Kompressoren, Druckluft- und Vakuumtechnik 2010 a).

One important requirement of pumps and compressors is the need to resist to high demands in operation. Since pumps are continuously in use within the production process, the design of the whole pump system and high quality material are essential. Moreover, the large product line reaching from standard pumps to customised pumps that meet special needs requires technical know-how from the companies. This know-how is also important due to the fact that the size of pumps increases more and more. Besides, pump systems should be more compact while at the same time offering a high performance. Regarding the customisation of products, pump manufacturers face another challenge. On the one hand, customers ask for customised pumps that meet special needs. On the other hand, the price of the pump should not to a high extent exceed the price of a standard pump. It is here necessary for pump manufacturers to have an efficient production line in order to offer their products at attractive price points. Then, pumps should become more energy-efficient. One measure to optimise the efficiency of pump systems is speed-controlled pumps that adjust themselves to system and operating conditions. The compressors industry offers potential for energy efficiency, too. The energy that is needed to operate a compressor is converted into heat that can be reused. Besides, the application of air cooling instead of water cooling is more cost-efficient. Furthermore, safety needs to be taken into consideration. It is essential to guarantee the leak-tightness of pumps to avoid for instance the leakage of gas. In order to meet the growing requirements and to improve their products, manufacturers of pumps and compressors collaborate in terms of basic research for new technologies. In the field of pumps, companies cooperate within the Research Fund Pumps FFP (Forschungsfond Pumpen), in the field of vacuum pumps, the joint research is done within the Research Fund Vacuum Technology FFVak (Forschungsfonds Vakuumentchnik). As for the power transmissions engineering industry, there exists cooperation with universities. (VDMA – Pumps and Systems & Compressors, Compressed Air and Vacuum Technology 2010.)

The largest cluster of manufacturers of pumps and compressors is located in North Rhine-Westphalia. The highest company density is in the postal code areas beginning with 40 and 58. Here is the location of six and seven companies respectively. Moreover, there are two clusters in Baden-Württemberg. Most of the companies are situated in the postal code area starting by 72. In Schleswig-Holstein and in Hamburg and Lower Saxony can be established another two clusters. Each of them comprises four companies. Then, there is one small cluster in Bavaria as well as three small clusters in Hesse. (VDMA – Pumps and Systems & Compressors, Compressed Air and Vacuum Technology 2010.)

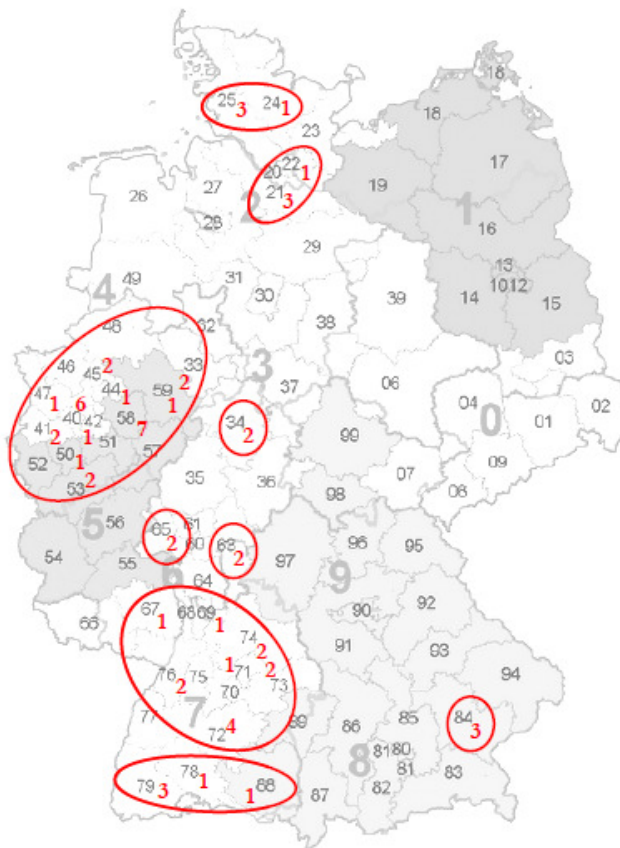


Figure 6: Clusters pumps and compressors

As for the valves industry, IFAT ENTSORGA in Munich is an important trade fair for the pumps and compressors industry. Furthermore, manufacturers of pumps as well as manufacturers of compressors participate in foreign trade fairs or in symposia that are organised by the VDMA. (VDMA – Kompressoren, Druckluft- und Vakuumtechnik 2010 c; VDMA – Pumpen und Systeme 2010 b.)

5.1.5 Wind Energy

The wind energy supply industry includes manufacturers of wind turbines as well as manufacturers of components (Schiel 2009 a). Since their products concern mainly large-scale projects, most of the companies choose a direct marketing channel in order to distribute their products (Telephone interview VDMA Power Systems 2010). Strategic partnerships between manufacturers of wind turbines and suppliers secure the supply chains (VDMA Power Systems & Bundesverband Windenergie e.V. 2009).

In spite of the economic crisis, the German market for wind energy grew in 2009. The amount of wind turbines rose by around 15% in 2009 compared to 2008. (Gerder & Dr. Schramm 2010.) The increase can be explained by the fact that wind energy is a growing market and that energy is continuously needed (Telephone interview VDMA Power Systems 2010). In 2008, 6.5% of the German gross power consumption was generated with wind energy (Schiel 2009 b). By the end of 2009, 21,164 wind turbines were installed in Germany (Gerder & Dr. Schramm 2010). It seems that companies currently invest in new production facilities (Telephone interview VDMA Power Systems 2010).

One characteristic of the industry is the fact that German manufacturers of wind energy systems are facing pressure for innovation. The performance of wind turbines increases every year. Furthermore, their efficiency and environmental compatibility augment. (VDMA Power Systems & Bundesverband Windenergie e.V. 2009.) One challenge holds China where new competitors enter the market. Moreover, the financing of projects remains difficult. It depends not only on the financial situation of the company, but also on the one of its customers. Especially during the financial crisis, companies faced difficulties in obtaining capital or bank loans. (Telephone interview VDMA Power Systems 2010.) Regarding the onshore market, repowering can be mentioned. By this term is meant the change of old systems for new, more powerful ones. Repowering carries potential for the German wind industry within the next years. Furthermore, the German offshore market develops. (Gerder & Dr. Schramm 2010.) According to the consulting firm KPMG, Germany will be the second most important offshore market world-wide behind Great Britain. At the beginning of 2009, 29 wind parks in the North and Baltic Sea were authorised, with another 40 currently planned. (VDMA Power Systems & Bundesverband Windenergie e.V. 2009.) In April 2010, the first German offshore wind park “alpha ventus” was opened on the North Sea coast (Deutsche Offshore-Testfeld und Infrastruktur GmbH & Co. KG 2010). It can be stated that the overall situation within the wind energy industry is good since it is a growing and future market. Wind energy plays an important role for the aim of the European Union to increase the share of renewable energies on the overall energy supply to 20% until 2020. (VDMA Power Systems & Bundesverband Windenergie e.V. 2009.) Moreover, the Renewable Energy Law augments the initial compensation for onshore and offshore wind energy and thereby increases the economic attractiveness of wind energy in Germany (Schiel 2009 b). One major restraint for a further development of wind energy is the fact that some national grids do not have enough capacities to transport current gained from wind energy to

customers in urban centres. In order to resolve the issue and to discuss potential solutions, there is organised the Grids 2010 conference in November 2010. It takes place in Berlin. (Gerder & Dr. Schramm 2010.)

The establishment of company clusters is focused on manufacturers of wind turbines. Most of the companies are located in Northern Germany, namely in Mecklenburg-West Pomerania, Schleswig-Holstein, Hamburg and Bremen. Two companies are situated in the postal code area beginning with 22. Another three wind turbine manufacturers have their location in Lower Saxony, Rhineland-Palatinate and Bavaria. (VDMA – Power Systems 2009.)

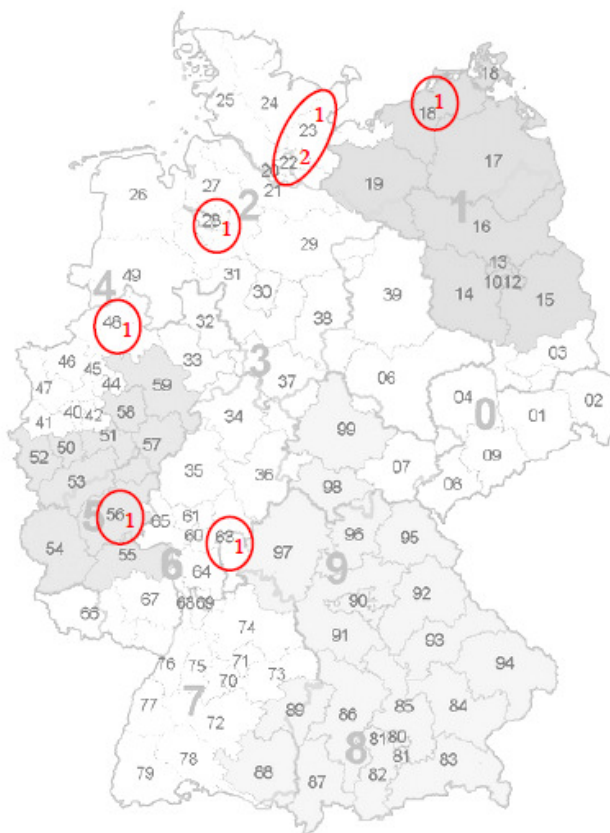


Figure 7: Clusters wind turbine manufacturers

One trade fair for the wind industry is HUSUM WindEnergy which takes place in Husum in Northern Germany. It is organised every two years. Exhibiting companies are manufacturers of wind turbines as well as suppliers of components. Furthermore, operators, planning offices and power networks are represented amongst others. The next HUSUM WindEnergy is in September 2010. (Husumer Wirtschaftsgesellschaft mbH & Co. KG 2010.)

5.1.6 Lifts and Escalators

In the following will be introduced the lifts and escalators industry. Apart from small and medium-sized enterprises, there are four international corporate groups in the German market. These large companies that operate in the area of escalators are Schindler, Thyssen, Otis and Kone. According to projections of the VDMA, their market share is around 60%. (VDMA – Aufzüge und Fahrtreppen 2010 a.)

The economic situation within the construction industry has an impact on the lifts and escalators industry. Since the construction industry was affected by the economic crisis, it seems that the crisis also concerned manufacturers of lifts and escalators. Incoming orders for lifts decreased only slightly in 2009, though. On the other hand, incoming orders for escalators declined to a higher extent. (Editor 2010 a.) However, it appears that the business prospects for 2010 ameliorate (Editor 2010 b).

As one requirement of the lifts and escalators industry can be mentioned energy efficiency. In order to increase the efficiency of lifts and escalators in service sector and residential buildings, the research project E4 was conducted in Europe. E4 is the abbreviation for Energyefficient elevators and escalators. The project was finished in April 2010. One outcome of the research is that modern technologies can help to augment energy efficiency, however, there seems to be a lack of information about the subject. (Hirzel & Dütschke 2010.) Lifts and escalators not only need to be more energy-efficient, though. In order to enhance the functionality and to meet security and engineer standards, lifts are equipped with a growing number of electronic devices. This leads to a higher complexity of lifts. (Hellmich 2010.) Finally, manufacturers of lifts and escalators need to find solutions for a decrease or even avoidance of vandalism in public lifts (Lernet 2010).

Lift and escalator manufacturers are located in different regions. Five companies are situated in Berlin. Another cluster in Northern Germany can be established in the postal code areas starting by 21 and 22. Moreover, there is one cluster reaching from the postal code area beginning with 46 to the areas beginning with 48 and 49. Then, there is one cluster in some parts of North Rhine-Westphalia and Hesse. The highest company density within this cluster is in the region with 33 as the first two figures of the postal code. Five companies have their location there. At last, one cluster is in Baden-Württemberg. (VDMA – Aufzüge und Fahrtreppen 2010 b.)

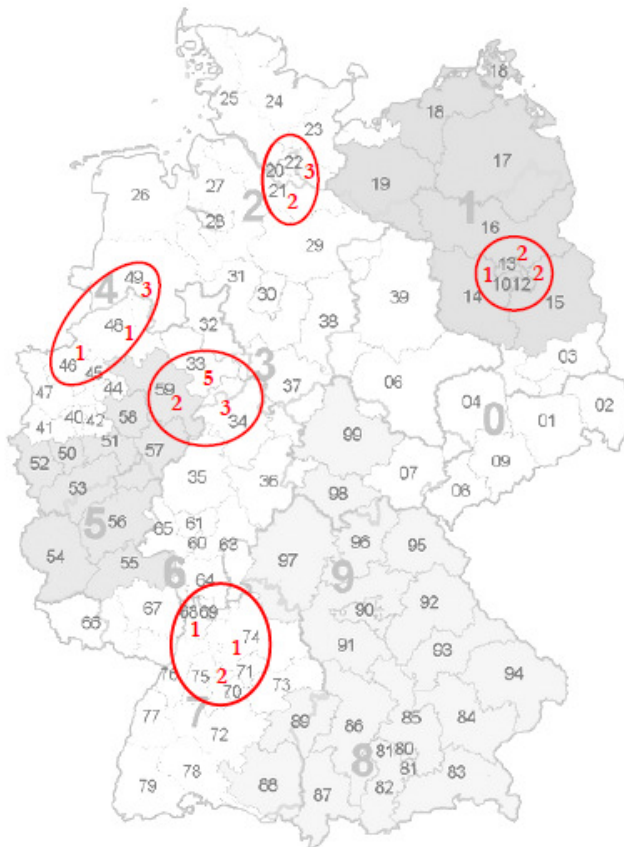


Figure 8: Clusters lifts and escalators

The lifts and escalators industry is represented on mainly two trade fairs. One is interlift, an international trade fair for lifts, components and accessories. It takes place in Augsburg in October 2011. Exhibiting companies operate for instance in the areas of lift plants, escalators, moving walks, parking systems and lift cabins. Different components complete the range of exhibited products. (AFAG Messen und Ausstellungen GmbH 2010.) Another trade fair is BAU in Munich. The next BAU is organised in January 2011. It represents the different areas of construction and interior work. Regarding construction, it covers industrial, commercial as well as residential construction. Other areas besides lifts and escalators are for example chemical building products, energy and solar technology or gate and parking systems. (Messe München GmbH 2004-2010.) The VDMA association Lifts and Escalators is conceptual partner of this trade fair (Questionnaire VDMA Lifts and Escalators 2010).

5.1.7 Robotics

Robotics is connected to the automation industry. Other areas within automation are assembly and handling technology as well as machine vision. In 2009, World Robotics estimated the amount of industrial robots per 10,000 persons that is used in the manufacturing industry. In this list, Germany is second behind Japan. (Baumtrog & Brodtmann 2010.) As regards distribution channels, it seems that components are sold both, directly and via intermediaries. For systems on the other hand, companies seem to choose a direct marketing channel. (Telephone interview VDMA Robotics 2010.)

After a decline in turnover of 33% in 2009, the economic situation of the robotics and automation industry improves in 2010. It is expected that the turnover increases this year by 5%. (Brodtmann 2010.) Whether companies invest in new production facilities depends to a certain degree on their customers' orders. The main customer group of the robotics and automation industry is the automotive industry. The fact that this industry was affected by the economic crisis had an impact on companies operating in the field of robotics and automation. (Telephone interview VDMA Robotics 2010.) Other important customer groups are the plastics, rubber and chemical industry as well as the metal industry (Baumtrog & Brodtmann 2010).

One feature of the robotics industry is the fact that robots decrease in terms of size and become more space-saving. Their scope on the other hand increases. Furthermore, companies prefer lightweight construction robots that help to save energy. New developments in terms of robot controls should further enhance energy efficiency. The programming and operation of robots needs to be facilitated, too. (Baumtrog & Brodtmann 2010.) Moreover, improvements of the sensor technology as well as Robot Vision augment the abilities of robots (VDMA – Robotik und Automation 2010). Finally, flexibility to adapt to new needs is important within the industry (VDMA – Robotics and Automation 2010).

Companies of the robotics industry are mainly located in West and Southern Germany. However, there does not seem to be a larger cluster. One small cluster is situated in North Rhine-Westphalia. It comprises two companies in the postal code areas beginning with 44 and 58. Another two companies form a cluster in Bavaria, namely in the postal code areas starting by 85 and 86. (VDMA – Robotics and Automation 2010.)

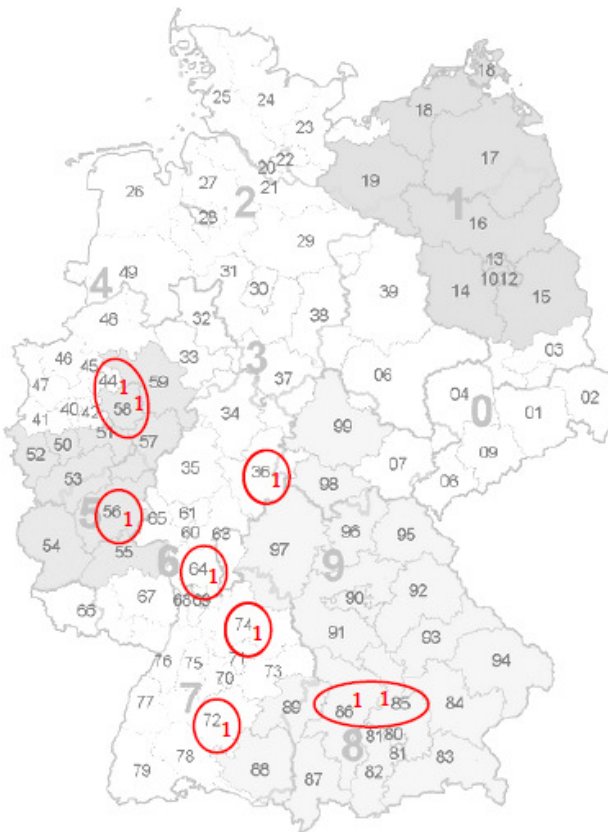


Figure 9: Clusters robotics

The leading trade fair of the robotics and automation industry is AUTOMATICA which is organised in Munich. The corresponding VDMA association is conceptual partner of this trade fair. (Telephone interview VDMA Robotics 2010.) AUTOMATICA takes place every two years and is arranged for the next time in June 2012. Exhibiting companies are not only operating in the areas of robotics, assembly and handling as well as machine vision technology, but also in associated areas as for example drive or sensor technologies. (Messe München GmbH 2010 b.)

5.1.8 Food Processing and Packaging Machinery

The food processing and packaging machinery industry can be divided into different sectors. Packaging, pharmaceutical and cosmetics machinery are some of them. Other sectors are basic food equipment, dairy technology and machinery for fruit and vegetable processing. Furthermore, the industry includes manufacturers of confectionery, bakery, meat processing

as well as beverage machinery. Machinery for the convenience food industry also belongs to it. (VDMA – Food Processing and Packaging Machinery 2010 a.) Around 50% of the companies operating within the food processing and packaging machinery industry produce packaging machinery or filling equipment (Telephone interview VDMA Food Processing and Packaging Machinery 2010). Concerning packaging machinery, it can be said that around 60% of the machinery is manufactured for the food and beverage industries. Another 20% are produced for the pharmaceutical industry. (VDMA – Nahrungsmittelaschinen und Verpackungsmaschinen 2010 a.) In order to market their products, companies seem to prefer direct marketing channels (Telephone interview VDMA Food Processing and Packaging Machinery 2010).

The economic crisis had an impact on the industry. In 2009, the turnover of the German packaging machinery industry decreased by 15%. Since more than 80% of their products are exported, German manufacturers of packaging machinery were affected by a decline in incoming orders from abroad. However, the turnover fell less than expected. Although sales rose by the end of 2009, it is expected that 2010 will still be a challenging year for the industry. (VDMA – Nahrungsmittelaschinen und Verpackungsmaschinen 2010 a.) It also seems that companies currently do not invest in new production facilities. One reason for this could be the fact that during the last ten years, the production of the food processing and packaging machinery industry continuously increased. As a result of this growth, companies did investments in the period from 2005 to 2008. However, due to the economic crisis, the companies now have a lower capacity utilisation. (Telephone interview VDMA Food Processing and Packaging Machinery 2010.)

One main challenge for the food processing and packaging machinery industry is growing competition, especially from China. For example, Chinese companies export their products to Russia, which is also an important export market for Germany. The issue arises from the fact that Chinese companies offer their products at a lower price. Machinery that is manufactured in Germany is more high-tech and needs to meet certain hygiene standards. Moreover, counterfeiting or plagiarising of merchandise is a challenge that members of the food processing and packaging machinery industry face. (Telephone interview VDMA Food Processing and Packaging Machinery 2010.) On what concerns pharmaceutical machinery, it can be stated that due to growing demands in terms of product security or small batch sizes, the machinery becomes more specialised. Particularly required is precision in terms of metering. Furthermore, the machinery needs to be sterile and easy to clean. Besides, the manu-

facturing process should be reproducible. As competition also augments within the pharmaceutical industry, production needs to be efficient in order to decrease production costs. Finally, multi-purpose plants increase and pharmaceutical machines are designed for several applications. (VDMA – Food Processing and Packaging Machinery 2010 b.)

For manufacturers of food processing and packaging machinery, different clusters can be established. Most of the companies seem to have their location in North Rhine-Westphalia, Lower Saxony, Baden-Württemberg and Bavaria. The highest company density is in the postal code area beginning with 74. Seven companies are located in this region. Six companies each are situated in the postal code areas starting by 71 and 51. (VDMA – Nahrungsmittelmaschinen und Verpackungsmaschinen 2010 c.)

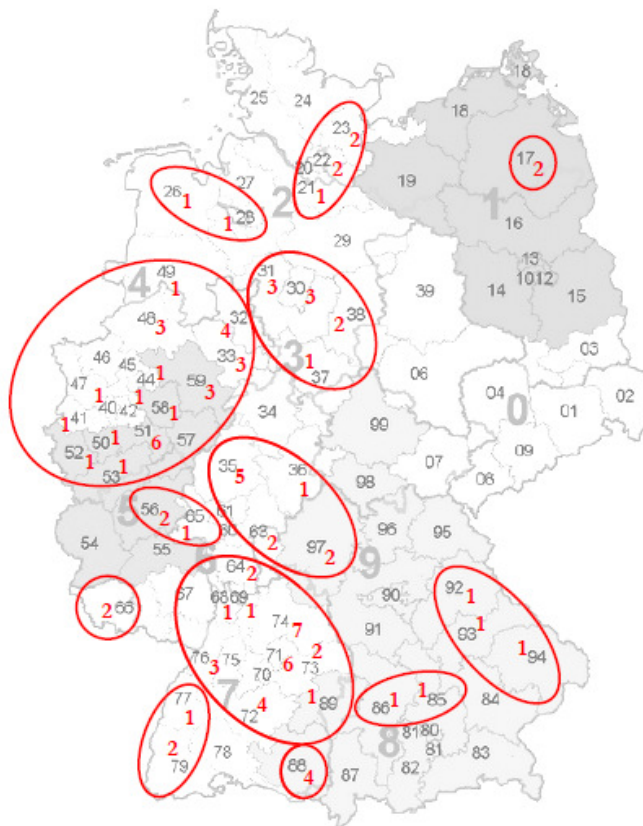


Figure 10: Clusters food processing and packaging machinery

The different sectors of the food processing and packaging machinery industry participate in various trade fairs. One major trade fair is interpack that takes place in May 2011 in Düsseldorf. It is organised for manufacturers of machinery and processes that serve for the packaging of for instance food, beverages, pharmaceuticals and cosmetics. Moreover, producers of

packaging machinery for consumer and industrial goods are among the exhibitors. (Interpack 2010.) The leading trade fair of the meat-processing industry is IFFA. It is located in Frankfurt and is arranged for the next time in May 2013. Exhibiting companies operate in the fields of processing, packaging and sales within the meat industry. (Messe Frankfurt Exhibition GmbH 2010 b.) Besides, manufacturers of machinery for bakery and pastry-making are represented on iba, the trade fair of the baking and confectionary industry. Iba is organised in Munich in September 2012. (GHM Gesellschaft für Handwerksmessen mbH 2010 a.) Then, FachPack is a trade fair for manufacturers of products related to packaging. FachPack is arranged in Nuremberg in September 2010. (NürnbergMesse GmbH 2010 a.) At last, companies also participate in trade fairs or symposia abroad (VDMA – Nahrungsmittelmaschinen und Verpackungsmaschinen 2010 b).

5.1.9 Plastics and Rubber Machinery

Extrusion and injection moulding machinery form the biggest share of the plastics and rubber machinery industry. Furthermore, foaming and blow moulding machinery are part of the industry. Then, thermoforming and presses are machine types belonging to it. Finally, parts and services complete the product range. Not only core machinery is included in the industry, though. Moulds and dies for plastics and rubber as well as flexographic printing presses for films are also part of it. (Frey 2009.) Trade fairs are important for companies to build customer contacts (VDMA – Plastics and Rubber Machinery 2007).

Manufacturers of plastics and rubber machinery were affected by the economic crisis. In 2009, incoming orders declined by 28%. Orders from domestic customers fell with 35% stronger than foreign orders, which decreased by 24%. The production declined in 2009 by 31% compared to 2008. (Frey 2009.) In the fourth quarter of 2009, incoming orders increased again. The orders came mostly from countries outside of Europe. (Kühmann 2010 a.) It is expected that sales augment by 11% in 2010. For 2011, the same rise is forecasted. The growth mainly results from foreign demand, most notably from Asia. (Kühmann 2010 b.)

Plastics and rubber machinery should become more and more customised while at the same time allowing a mass production that is cost-effective. In order to increase efficiency, manufacturers of plastics and rubber machinery focus on detailed improvements and the devel-

opment of applications for the machinery. Customers demand shorter changeover times so as to enhance their flexibility and to gain additional machine availability. Another trend within the plastics and rubber machinery industry is machinery that combines different production processes, for example compounding and extrusion. Besides, automation of the machinery augments. (VDMA – Plastics and Rubber Machinery 2007.)

The focus of the company clusters lies on manufacturers of extruders, injection and blow moulding machinery as well as foaming machinery. It seems that the companies are mainly located in West and Southern Germany. Different small clusters containing between two and four companies can be established. Three companies are situated in the postal code area beginning with 53. (VDMA – Plastics and Rubber Machinery 2007.)

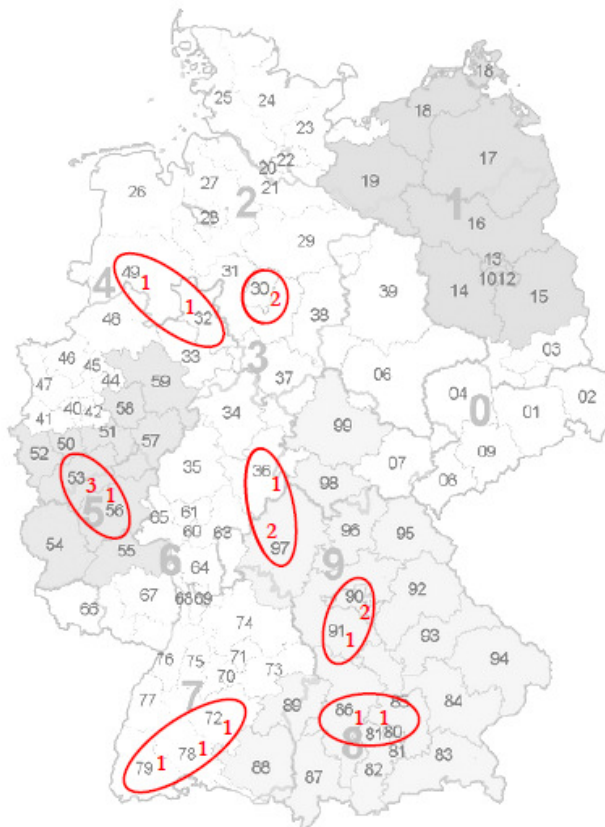


Figure 11: Clusters plastics and rubber machinery

The trade fair K is located in Düsseldorf. It is organised from the end of October until the beginning of November 2010. Alongside with plastics and rubber machinery, plastic products, raw materials and auxiliaries as for instance thermoplastics or rubbers are part of the trade fair's product range. (Messe Düsseldorf GmbH 2010 a.)

5.1.10 Textile Machinery

The textile machinery industry can be divided into different sectors. These sectors are spinning machinery, weaving machinery, knitting machinery and finishing machinery. The last includes machinery for washing, bleaching as well as dyeing. The majority of the companies are small and medium-sized enterprises. (VDMA – Textilmaschinen 2010 a.) Regarding distribution channels, it seems that companies usually distribute their products through direct marketing channels. Moreover, trade fairs are an important marketing channel. (Telephone interview VDMA Textile Machinery 2010.)

The textile machinery industry was negatively affected by the economic crisis, especially during the years 2008 and 2009. The number of incoming orders raised in the last quarter of 2009, though. For 2010, the sales volume is expected to increase by 30% to 35% compared to 2009. (VDMA – Textile Machinery 2010 a.) Due to the economic crisis, members of the textile machinery industry had to reduce capacities as well as workforce. As regards investments in new production facilities, it currently seems that companies are used to capacity for the next two years. (Telephone interview VDMA Textile Machinery 2010.)

Companies manufacturing textile machinery seem to face problems in obtaining bank loans for the financing of investment. Furthermore, the financing issues of their customers have an impact on textile machinery manufacturers. Another challenge for this industry arises from quotas or protective tariffs that are imposed on textiles by some countries. This protectionism leads to less exports and consequently to lower production. That finally results in a lower need for textile machinery. (Telephone interview VDMA Textile Machinery 2010.) Concerning characteristics, it can be said that textile machinery is increasingly developed and specialised according to customer needs. The machinery gets faster and shows higher productivity. At the same time, it needs to meet certain quality standards. Furthermore, precision plays an important role. Laser technology is used in spinning machinery in order to meet precision requirements. Besides, robots in circular knitting machinery decrease the production time. (VDMA – Textile Machinery 2010 b.) While on the one hand, textile machinery becomes increasingly high-tech and integrates different process steps, it should on the other hand be easier to operate. Moreover, energy saving plays an important role within this industry. A decline in energy costs leads to lower production costs which results in an increase of competitiveness. (VDMA – Textile Machinery 2010 c.)

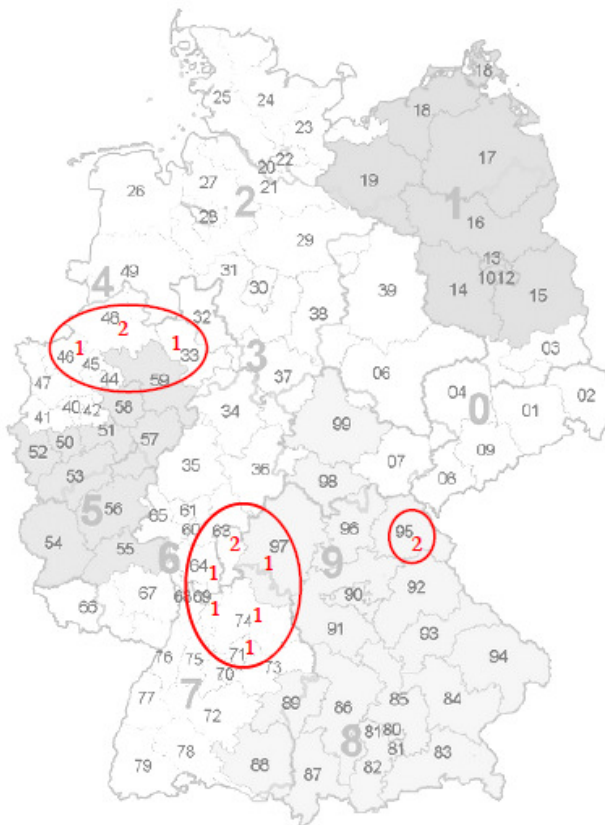


Figure 12: Clusters textile machinery

Manufacturers of textile machinery are mainly located in three clusters. One cluster is in the north of North Rhine-Westphalia and includes around four companies. A second cluster stretches over Hesse, Baden-Württemberg and Bavaria. Around seven companies are situated here. Finally, the postal code area beginning with 95 comprises two companies. (VDMA – Textilmaschinen 2010 b.)

The leading trade fair of the textile machinery industry is ITMA. It is organised every four years in Europe and also has a spin-off in Asia, ITMA Asia, which takes place every two years. (Telephone interview VDMA Textile Machinery 2010.) The next European ITMA will be in Spain, namely Barcelona, in September 2011. Apart from textile machinery, the trade fair exhibits amongst others software that is used for example for the design, but also for data monitoring and processing. (ITMA 2011 2008.) Furthermore, manufacturers of textile machinery participate in symposia in order to present their products (Telephone interview VDMA Textile Machinery 2010).

5.1.11 Construction Equipment and Building Material Machinery

The construction equipment and building material machinery industry can be divided into three different sectors, namely construction equipment, building material machinery and glass and ceramics machinery. Construction equipment comprises amongst others cranes, lifting, earthmoving and drilling equipment. Moreover, it includes tunnelling and road construction equipment. Then, light construction equipment is also part of this sector. Manufacturers of building material machinery are suppliers of machinery and plants for the cement industry. Furthermore, mineral processing technologies for open cast mining and stone quarries as well as natural stone machinery belong to building material machinery. Finally, this sector also contains concrete block machinery which is for instance used to manufacture paving stones. Production lines for the processing of glasses and ceramics are comprised in glass and ceramics machinery. (VDMA – Construction Equipment and Building Material Machinery 2010 a.) Members of the construction equipment and building material machinery industry use different distribution channels in order to market their products. While construction equipment is mainly distributed via an indirect marketing channel, building material machinery is mostly sold directly to customers. One reason for that is the customisation of products. (Telephone interview VDMA Construction Equipment and Building Material Machinery 2010.)

The economic crisis had an impact on manufacturers of construction equipment and building material machinery. In 2009, sales declined by 43%. Especially affected was the construction equipment sector whose turnover fell by 51%. Within the building material machinery sector, sales went down by 18%. However, the turnover of the construction machinery industry is anticipated to increase by 5% in 2010. Manufacturers of building material machinery on the other hand expect a further drop in turnover of 10% during the current year. (VDMA – Construction Equipment and Building Material Machinery 2010 b.) Regarding new production facilities, it can be said that companies intensified investment between 2003 and 2005. These years were marked by an economic upturn. However, in 2008, the market collapsed and investment plans were stopped. World-wide operating companies currently invest in new production facilities, though. The focus lies here on emerging markets, however, there is also investment in Germany. (Telephone interview VDMA Construction Equipment and Building Material Machinery 2010.)

One major challenge for manufacturers of construction equipment and building material machinery is increasing competition. While it was mostly faced from Japan and Korea during the 1980s and 1990s, the main competitors of today come from China. Since the majority of products are exported, it is important for the industry to keep its current market position. Companies need to handle the area of conflict between their cost structure and their good reputation. Moreover, companies within this industry are confronted with requests for higher efficiency of the machinery. Furthermore, environmental directives as well as a new generation of drive units need to be taken into consideration. (Telephone interview VDMA Construction Equipment and Building Material Machinery 2010.) In order to meet technological requirements and in order to stay competitive, companies invest in research and development. Within the Research Association Construction Equipment and Building Material Machinery FVB (Forschungsvereinigung Bau- und Baustoffmaschinen e.V.) are conducted joint research projects. These projects permit member companies to benefit from research outcomes in their new product developments. (VDMA – Construction Equipment and Building Material Machinery 2010 c.)

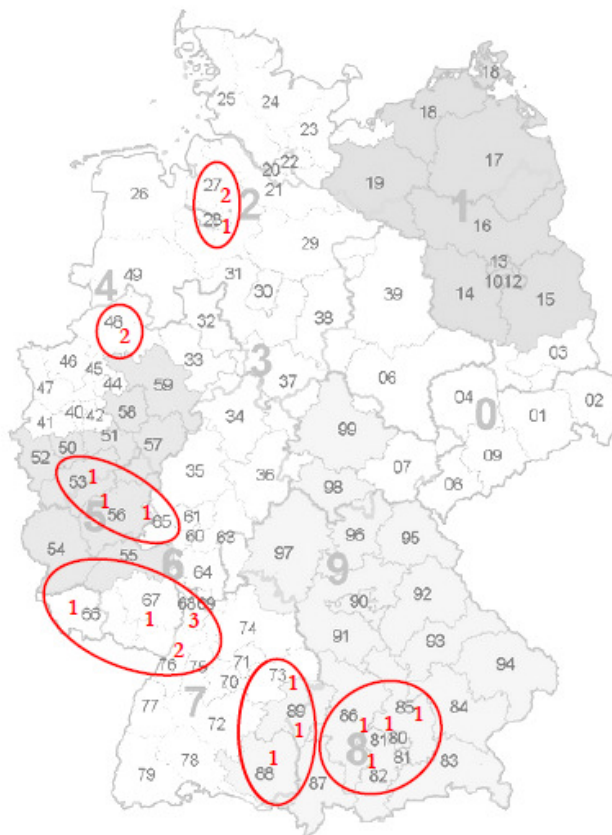


Figure 13: Clusters construction equipment and building material machinery

The focus of the company clusters lies on construction equipment and building material machinery. Manufacturers of this machinery are mainly located in Southern and West Germany. The different postal code areas within the clusters contain mostly one or two companies. An exception is the postal code area starting by 68. Three companies are situated in this region. (VDMA – Construction Equipment and Building Material Machinery 2010 d.)

The trade fair of manufacturers of construction, building material and mining machinery as well as for construction vehicles and equipment is bauma in Munich. The next bauma will take place in April 2013. (Messe München GmbH 2009.) The VDMA association Construction Equipment and Building Material Machinery is conceptual partner of this trade fair. Furthermore, there are organised trade fairs abroad. (Telephone interview VDMA Construction Equipment and Building Material Machinery 2010.)

5.1.12 Agricultural Machinery

The agricultural machinery industry includes manufacturers of tractors, transporters and tillage equipment. Furthermore, equipment for landscaping as well as for animal husbandry belongs to it. Besides, companies manufacturing harvesting machinery are part of the industry. (VDMA – Agricultural Machinery 2010 a.) Around 85% of the machinery seems to be distributed via an intermediary (Telephone interview VDMA Agricultural Machinery 2010).

Agricultural machinery manufacturers were affected by the economic crisis. In 2009, the industry faced a decline in sales by 25%. While sales further fell during the first six months of 2010, it is expected that they will increase during the last two quarters of the year. (Götz 2010.) In terms of investment, it seems that manufacturers of agricultural machinery currently invest in new production facilities. Investment projects that have been planned between 2006 and 2008 are now realised. (Telephone interview VDMA Agricultural Machinery 2010.)

Concerning challenges for the agricultural machinery industry, cost management seems to be an issue. Furthermore, revenues of customers need to be taken into consideration. In case that their purchasing power decreases, customers might invest less in new agricultural machinery. (Telephone interview VDMA Agricultural Machinery 2010.) Another requirement of agricultural machinery is a continuous improvement of technology. Customers demand

machinery of a larger size, being more efficient and automated. These machinery characteristics are needed in order to achieve lower costs per unit, a necessity resulting from the price pressure on agricultural markets. Besides, manufacturers of agricultural machinery are affected by directives on exhaust emissions that influence product developments. Finally, the sales of agricultural machinery are also dependent on weather conditions. (VDMA – Agricultural Machinery 2009.)

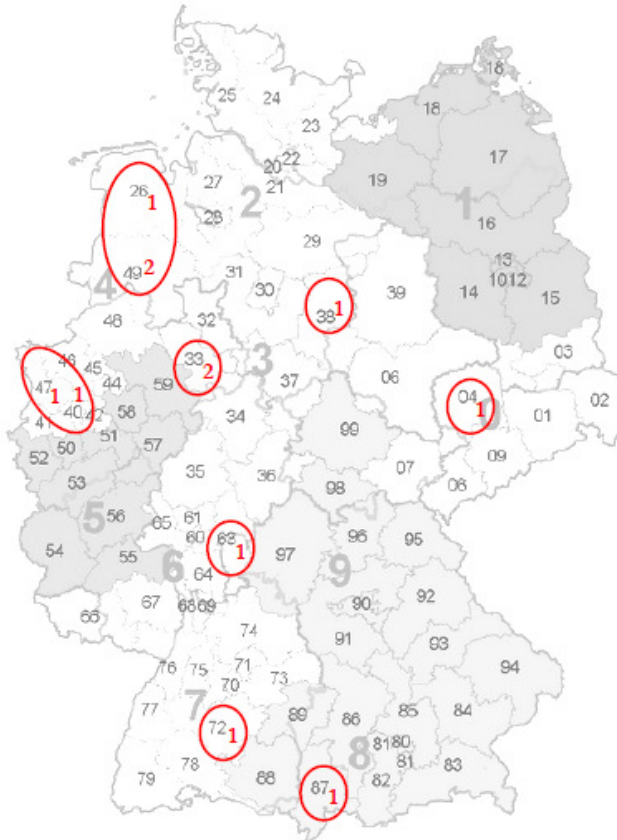


Figure 14: Clusters agricultural machinery

For the establishment of company clusters, the focus lies on manufacturers of tractors and harvesting machinery. It seems that companies are not combined in certain clusters, even though most of them are situated in West and Southern Germany. Two companies are located in the postal code areas starting by 33 and 49 respectively. (VDMA – Agricultural Machinery 2010 b.)

AGRITECHNICA is a German trade fair that takes place in Hannover. It is arranged for the next time in November 2011. Among the exhibiting companies are manufacturers of agricultural machinery. Other product groups are for example forest technology, liquid bio

fuels, solar technology and wind energy installations. (DLG e.V. 2010 b.) Another trade fair is located in Schleswig-Holstein, more specifically in Rendsburg. It is called NORLA and has its focus on agricultural machinery. The next NORLA is in September 2010. (MesseRendsburg GmbH 2010.) Finally, there is the trade fair agra in Leipzig. It is organised in May 2011 and exhibits for instance agricultural machinery and equipment for animal husbandry. (Agra Veranstaltungen GmbH 2010.)

5.1.13 Woodworking Machinery

The woodworking machinery industry produces machinery that is used for the processing of wood. Examples for product sectors are presses and plants for the wood materials industry, circular saws, drilling and mortising machinery or milling machinery. (Dr. Dirr 2009.) Different kinds of distribution channels are used by manufacturers of woodworking machinery. Manufacturers of large plants for example market their products directly, but there are also companies that distribute their products only through an indirect marketing channel. So it can be stated that woodworking machinery is sold both, directly and via intermediaries, depending on the size and the sector. (Telephone interview VDMA Woodworking Machinery 2010.)

The economic crisis affected the woodworking machinery industry. In 2009, sales declined by 42% compared to 2008. In the domestic market, sales fell with 34% less than in foreign markets where sales decreased by 44%. (Dr. Dirr 2010 b.) However, the situation of the industry started to ameliorate during the first quarter of 2010. Incoming orders during this period were 87% higher than the ones during the first quarter of 2009. Sales of the overall industry are forecasted to grow by 10% to 15% in 2010. (Dr. Dirr 2010 a.) By reason of the economic crisis, members of the woodworking machinery industry currently seem to invest less in new production facilities. Companies made investments during years of economic growth, however, they currently do not operate at full capacity. (Telephone interview VDMA Woodworking Machinery 2010.)

Just like other industries, the woodworking machinery industry faces growing competition from Asian countries. Another issue, especially after the economic crisis, is the need of woodworking machinery manufacturers to assure their liquidity in order to avoid bankruptcy. Financing options, not only for manufacturers of machinery, but also for their cus-

tomers, are therefore a challenge that should to be met. (Telephone interview VDMA Woodworking Machinery 2010.) Besides, woodworking machinery shall be resource efficient in order to support a decrease in production costs (Deutsche Messe – LIGNA-Projekt 2010).

One larger cluster of companies manufacturing woodworking machinery is located in Baden-Württemberg and some parts of Bavaria. It includes around eleven companies. Furthermore, one cluster has its location in North Rhine-Westphalia. The highest company density within this cluster is in the postal code area beginning with 32. Four companies are situated in this region. Finally, there can be established two small clusters in Bavaria and one in Schleswig-Holstein. (VDMA – Woodworking Machinery 2010.)

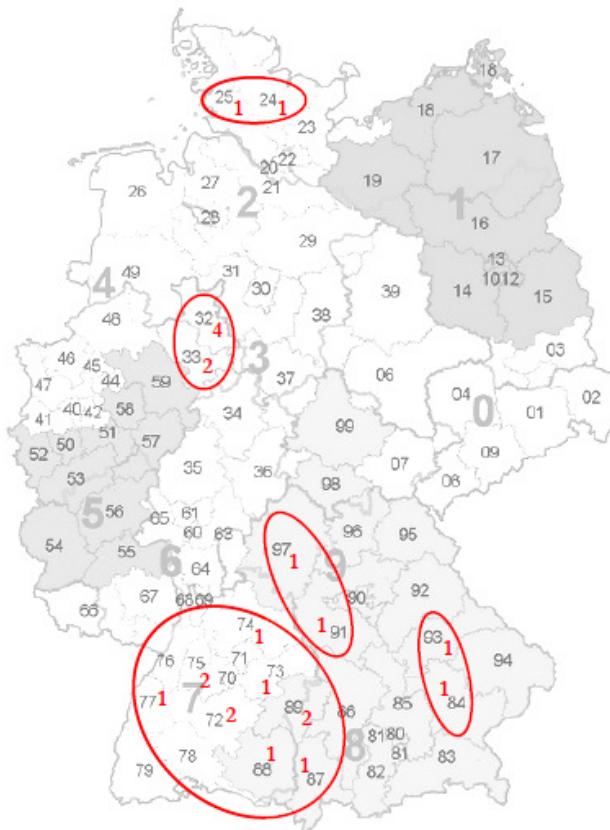


Figure 15: Clusters woodworking machinery

LIGNA is a trade fair for the woodworking machinery industry. It is organised in Hannover from the end of May until the beginning of June 2011. Exhibiting companies of LIGNA operate in the areas of forestry, sawmill technology, solid wood working and manufacturing of wood materials and veneers. Furthermore, bio energy made of wood as well as handicraft

are in the focus of the trade fair. Finally, the furniture industry is represented on it. (Deutsche Messe AG 2010 a.) Another German trade fair of the woodworking machinery industry is HOLZ-HANDWERK, which is arranged in Nuremberg in March 2012. Apart from woodworking machinery are exhibited amongst others wood and wood-based materials, electrical and pneumatic tools as well as fixing equipment. Moreover, finishing technology and disposal equipment are among the product categories. (NürnbergMesse GmbH 2010 b.)

5.1.14 Mining Equipment

Companies belonging to the mining equipment industry operate in the field of underground mining and open cast mining or materials handling (VDMA – Mining Equipment 2010 a). Mining equipment includes both, production and processing of raw materials. In respect of distribution channels of the mining equipment industry, it seems that direct and indirect distribution channels are used to the same degree. However, mining equipment for producers of brown coal is directly distributed since these are mainly large companies. (Telephone interview VDMA Mining Equipment 2010.)

Contrary to other industries, the mining equipment industry was not that strongly affected by the economic crisis. Even though they rose less than in 2008, sales increased in 2009 by 3% (VDMA – Bergbaumaschinen 2010). For 2010, the positive trend is expected to continue (VDMA – Mining Equipment 2009). Large investments in new production facilities are currently the exceptional case. Companies seem to make smaller expansion investments, though. (Telephone interview VDMA Mining Equipment 2010.)

One requirement of mining equipment is the reduction of energy consumption. Furthermore, the industry is concerned with the challenge of fast abrasion of the machinery. In order to solve this issue, manufacturers of mining equipment are given two possibilities. Either they use material that is more robust, or they use material that can be replaced at low costs. (Telephone interview VDMA Mining Equipment 2010.) Moreover, manufacturers of mining equipment face growing competition, especially from China. Future topics of the industry are for instance maritime mining and the gasification of coal already in the mineral deposit. Then, biological metal extraction with the help of microbes will be a task of the future. (VDMA – Mining Equipment 2009.)

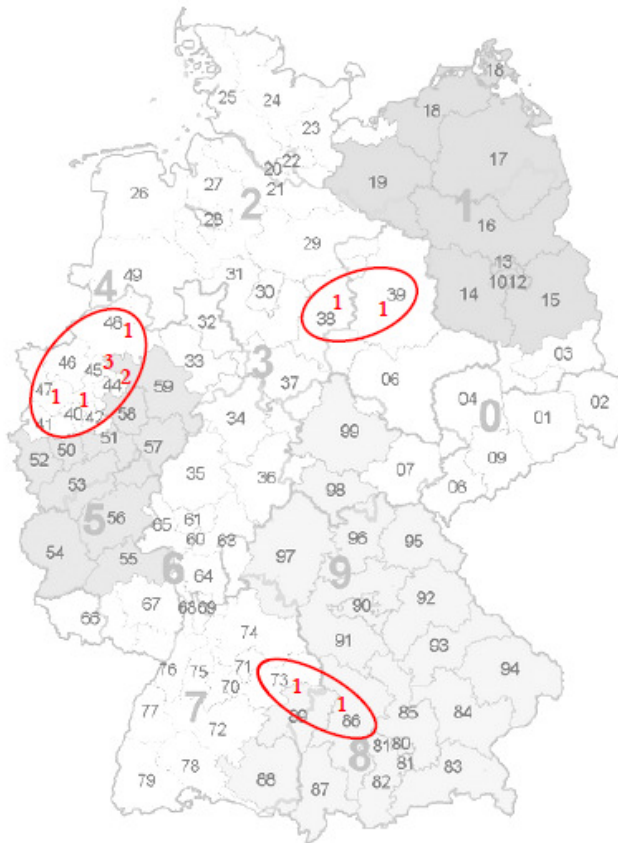


Figure 16: Clusters mining equipment

The largest cluster of mining equipment manufacturers is located in North Rhine-Westphalia. It comprises around eight companies. The highest company density is in the postal code area beginning with 45. This area includes three companies. Furthermore, there can be established two smaller clusters, each containing two companies. (VDMA – Mining Equipment 2010 b.)

For manufacturers of mining equipment, foreign trade fairs are organised. In Germany, the industry is represented on bauma in Munich, as are members of the construction equipment and building material machinery industry. The VDMA association Mining Equipment is conceptual partner of this trade fair. (Telephone interview VDMA Mining Equipment 2010.) The next bauma is arranged in April 2013 (Messe München GmbH 2009).

5.1.15 Large Industrial Plant Manufacturing

The large industrial plant manufacturing industry includes companies that are “capable to process one or more industrial plant or power generation plant projects a year with a volume of at least € 25 million each” (VDMA – Large Industrial Plant Manufacturing 2010 a). The companies offer a large range of related services, as for example planning, construction or operation. By large industrial plants are meant amongst others power stations, metallurgical, cement and paper plants as well as rolling mills. Furthermore, the segments organic chemicals, electrical engineering and air and gas liquefaction belong to this industry. (VDMA – Large Industrial Plant Manufacturing 2010 a.) Most of the large industrial plants are announced by customers. An exception is the case that companies develop projects that are then presented to the customer. There are no trade fairs specifically for this industry. (Telephone interview Large Industrial Plant Manufacturing 2010.)

Due to the fact that incoming orders decreased by 33% in 2009 compared to 2008, it can be stated that the large industrial plant manufacturing industry was affected by the economic crisis. The decline in domestic orders was with 40% stronger than the one in foreign orders with 31%. (VDMA Large Industrial Plant Manufacturer’s Group 2010.) However, companies could keep their market share. For 2010, a stabilisation or even a small increase in incoming orders is expected. (Schäfer 2010.) Manufacturers of large industrial plants mostly do not have their own production facilities, but are more operating in the field of engineering, design and management of large industrial plants (Telephone interview Large Industrial Plant Manufacturing 2010).

Large industrial plants should be energy-efficient and environmentally compatible. In order to meet these requirements, companies operating in this industry continuously invest in research and development. This investment also helps to attain higher raw materials efficiency, leading to a more economical operation of the plant. (VDMA – Large Industrial Plant Manufacturing 2010 b.) Moreover, the financing of projects is a challenge for the industry. Projects have an average duration of two to three years with an even longer financing period. Furthermore, it is here important to take into account that the scope of large industrial plant projects enlarges, a fact that leads to higher financing needs. Then, manufacturers of large industrial plants are confronted with the fact that the market changed from a seller’s to a buyer’s market. (VDMA Large Industrial Plant Manufacturer’s Group 2010.) This devel-

opment is accompanied by an increase in new competitors, mainly from Asia (Telephone interview Large Industrial Plant Manufacturing 2010). In order to stay competitive, companies operating in this industry are required amongst others to improve their cost structures. Finally, the low acceptance of nuclear or coal-fired power stations by the public causes another challenge for the industry. (VDMA Large Industrial Plant Manufacturer's Group 2010.)

Four company clusters can be established for large industrial plant manufacturers. The largest one is located in North Rhine-Westphalia, comprising around nine companies. Furthermore, there are two smaller clusters, one in Hesse and one in Baden-Württemberg. Finally, two companies are situated in the postal code area beginning with 09. (VDMA Large Industrial Plant Manufacturer's Group 2010.)

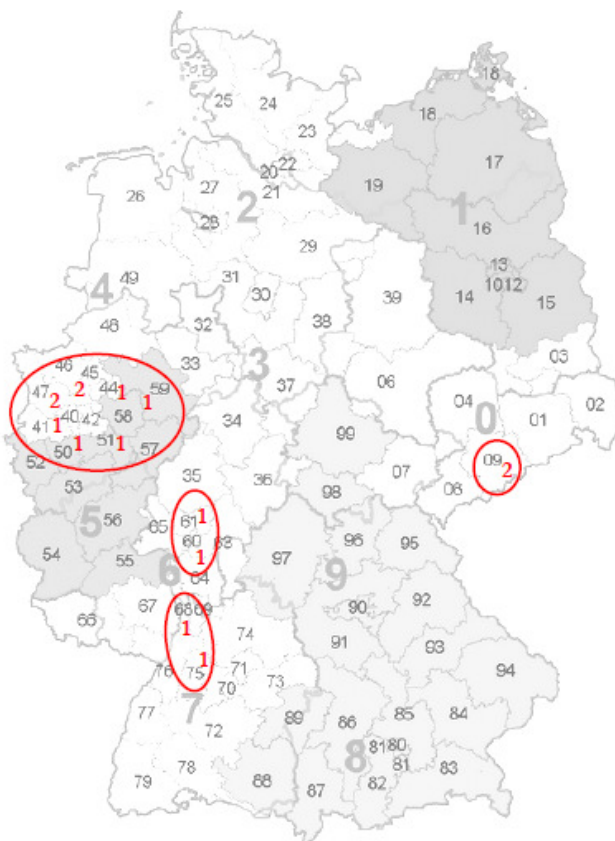


Figure 17: Clusters large industrial plant manufacturing

5.2 The German Tools Industry

In the following will be analysed the German machine tools industry. It is divided into two parts, namely the precision tools industry and the machine tool building and manufacturing systems industry.

5.2.1 Precision Tools

The precision tools industry can be divided into different sectors. During the first three quarters of 2009, tool making was responsible for 52% of the overall industry's production. The second largest sector in terms of production was during the same period machining tools with 23%. Furthermore, dimensional measuring instruments and clamping devices are part of the precision tools industry. (VDMA – Präzisionswerkzeuge 2010 a.) Companies producing machining tools seem to use direct and indirect distribution channels to the same degree (Telephone interview VDMA Precision Tools 2010). Another important possibility to get in contact with customers is trade fairs (VDMA – Präzisionswerkzeuge 2010 b).

German manufacturers of precision tools were affected by the economic crisis. In 2009, the industry faced a decrease in production of 34%. However, an increase in production of at least 8% is expected for 2010. Contrary to other sectors, the situation of the machining tools sector already ameliorated by the beginning of the year. (Graf Zedtwitz 2010 a.) It seems that manufacturers of machining tools invested before the economic crisis in new production facilities and therefore nowadays benefit of modern machinery (Telephone interview VDMA Precision Tools 2010).

The precision tools industry faces the aftermath of the economic crisis. Measures to maintain jobs during the crisis implied costs for companies. On the one hand, this results in challenges regarding the financing of projects. On the other hand, it helped the companies to keep most of their employees, a fact that is important given the need for qualified employees in order to meet the increasing requirements of precision tools. (Telephone interview VDMA Precision Tools 2010.) For instance, tool steel should meet certain quality standards. The tools are required to provide a higher resistance to abrasion. Moreover, the tool making industry is confronted with the problem of helping to lower production costs of its custom-

ers while at the same time assuring a high-quality production with short production periods. (Carl Hanser Verlag München 2009.) Efficiency plays an important role within the metal industry (Verlag moderne Industrie GmbH 2010 a). Furthermore, manufacturers of tools need to meet the challenge of material innovations within customer industries that have an impact on tools. As an example can be mentioned lightweight construction. (Hoppenstedt Publishing GmbH 2010.) Besides, precision tools are nowadays high-tech. Moreover, apart from standard tools, there is a trend towards combined and customised tools that are developed in cooperation with the customer. (Graf Zedtwitz 2010 b.) Furthermore, a growing number of machining tools manufacturers offer their customers services supporting the overall process chain (VDMA – Precision Tools 2010). So as to meet the increasing requirements, members of the precision tools industry strongly invest in research and development (Graf Zedtwitz 2010 a). Another characteristic of the industry is the fact that it comprises a lot of small and medium-sized enterprises. Customer companies on the other hand are mainly large companies that buy their tools from several manufacturers. Since there are many small and medium-sized tool manufacturers and a few large customer companies, there seems to be a disequilibrium. (Telephone interview VDMA Precision Tools 2010.)

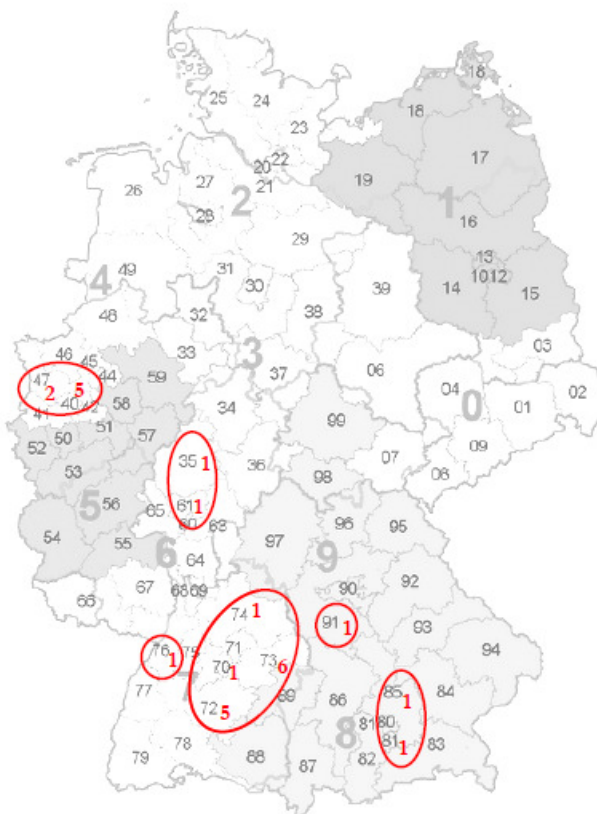


Figure 18: Clusters 25 largest machining tools manufacturers

Fertigung, the specific magazine for metal working, publishes every year the 25 largest manufacturers of machining tools in Germany. The ranking is based on sales in million Euros, generated by the companies in the German market. On the basis of this ranking, different clusters can be established. First, it can be said that the 25 largest manufacturers of machining tools are located in the southwest of Germany. The largest cluster is in the north of Baden-Württemberg, with the highest company density in the postal code areas starting by 72 and 73. Another cluster is situated in North Rhine-Westphalia. It includes companies in the postal code areas beginning with 47 and 40. Furthermore, there are two smaller clusters, one in Hesse and one in Bavaria. In each of these clusters is the location of two of the largest machining tools manufacturers. (Verlag moderne Industrie GmbH 2010 b.)

One of the leading trade fairs of the precision tools industry is AMB that is organised every two years. The next AMB is in Stuttgart from the end of September until the beginning of October 2010. Exhibitors are amongst others manufacturers of precision and machine tools, machinery and measuring systems. Furthermore, materials technology and building parts are among the product categories. (Landesmesse Stuttgart GmbH 2010.) Another leading trade fair of the precision tools industry is EMO. Different product categories are exhibited on this trade fair, as for example machine and precision tools or manufacturing systems. EMO takes place in Hannover in September 2011. (Deutsche Messe AG 2010 b.) Then, METAV is a third leading trade fair of manufacturers of precision tools. It is arranged for the next time from the end of February until the beginning of March 2012 in Düsseldorf. Companies participating in METAV operate within the machine and precision tools industry as well as in the area of automation technology. This trade fair is organised by the German Machine Tool Builders' Association VDW (Verein Deutscher Werkzeugmaschinenfabriken e.V.). (Messe Düsseldorf GmbH 2010 b.) The VDMA association Precision Tools is conceptual partner of the trade fairs (Telephone interview VDMA Precision Tools 2010). Tool construction manufacturers also participate in K, a trade fair taking place in Düsseldorf from the end of October until the beginning of November 2010. K is a trade fair representing the plastics and rubber industry. (Messe Düsseldorf GmbH 2010 a.) Besides, manufacturers within the tool making industry exhibit their products on EuroBLECH. This trade fair is in Hannover in October 2010 and represents the sheet metal working industry. (Mack Brooks Exhibitions Ltd. 2009-2010.)

5.2.2 Machine Tools and Manufacturing Systems

The machine tools and manufacturing systems industry can be divided into different sectors. One sector is metal cutting machine tools. Examples for these are machining centres, grinding, honing and lapping machines. Boring and milling machines are also part of this sector. Furthermore, metal forming machine tools belong to the machine tools and manufacturing systems industry. As machine examples can be mentioned rounding, edging and straightening machines or different kinds of presses. (Geis 2010.) In 2007, the automotive industry, including suppliers of components, was the most important customer branch of the industry, followed by mechanical engineering. Within mechanical engineering, a main customer group are machine tools manufacturers themselves. In terms of the size of customer groups, there seems to be a development towards mechanical engineering as the largest group. (VDW 2010.) Trade fairs are an important method to get in contact with new customers (VDMA – Werkzeugmaschinen und Fertigungssysteme 2010 a).

The economic crisis had an impact on the industry. In 2009, the overall production decreased by 28% compared to 2008. Incoming orders declined by 55%. (VDMA & VDW 2010.) However, the economic situation started to ameliorate by the end of 2009 (VDW 2010). Incoming orders increased by 71% during the second quarter of 2010 (Becker 2010 a). Companies belonging to this industry currently do not seem to invest in new production facilities (Telephone interview Machine Tools and Manufacturing Systems 2010).

One characteristic of the industry is the fact that it includes many small and medium-sized enterprises. Around 63% of the companies do not have more than 250 employees. Besides, numerous companies seem to be specialised in a certain niche. The customisation and the combination of machines increase. Furthermore, the machines should help to shorten the process chain. Moreover, customers demand high-quality products that are resource and energy-efficient. (VDW 2010.) In order to further develop their products, members of the industry collaborate in terms of research and development in the Research Association for Machine Tools and Manufacturing Technologies FWF e.V. (Forschungsvereinigung Werkzeugmaschinen und Fertigungstechnik e.V.) (VDMA – Machine Tools and Manufacturing Systems 2010). One challenge for the industry is the financing of projects, an aftermath of the economic crisis. It concerns not only the liquidity of the industry members, but also the one of their customers. (Becker 2010 b.)

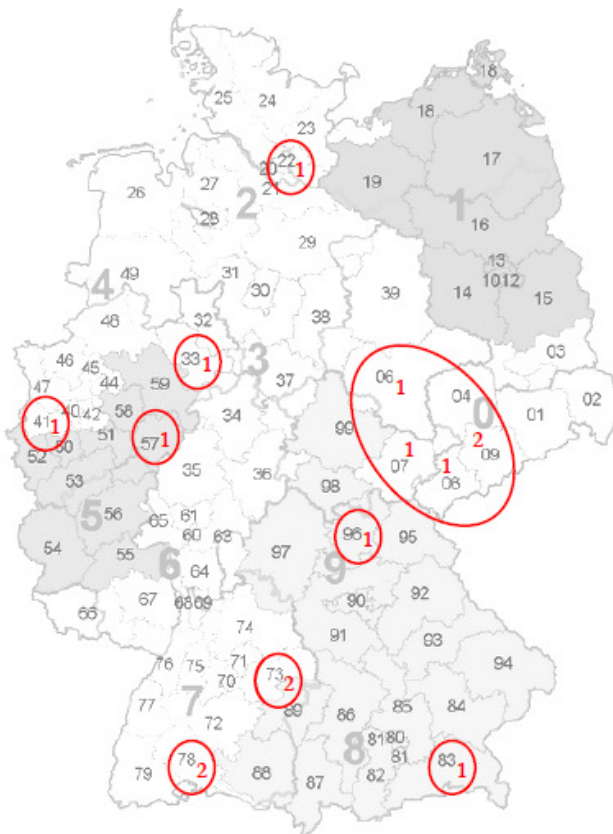


Figure 19: Clusters machine tools and manufacturing systems

Companies taken into consideration for the clusters operate in the field of metal cutting machine tools. More specifically, the companies manufacture drilling and boring machines as well as milling and boring centres. There does not seem to be a special region where the companies are mainly located. However, one cluster can be established. It stretches over Thuringia, Saxony and Saxony-Anhalt and includes around five companies. In Baden-Württemberg is the location of another four companies. Two of them are in the postal code area starting by 73, another two in the postal code area beginning with 78. Besides, three companies are situated in North Rhine-Westphalia. (VDW & VDMA 2010.)

The leading trade fairs of the machine tools and manufacturing systems industry in Germany are the same as for the precision tools industry, namely AMB, EMO and METAV (VDMA – Werkzeugmaschinen und Fertigungssysteme 2010 b).

5.3 Types of Tools Used by Companies

Telephone interviews were conducted with companies in order to investigate the relation of the German engineering industry with tool manufacturers, or more specifically to elaborate the types of tools used by companies in their production. The field of activity of the interviewed companies lies in the areas of engines and power transmission engineering. The product range includes amongst others filters, clutches, bearings and gear boxes. Moreover, catalytic converters and turbochargers are product categories of the companies. Finally, drives and combustion engines belong to the products manufactured by the companies. 87% of the interviewed companies operate one production facility in Germany, the remaining 13% have two production sites. (Telephone interviews Companies 2010.)

Concerning the distribution channels used by companies to market their products, it seems that the outcomes of the telephone interviews with trade associations are underlined by the companies. 75% of the companies indicated to use a direct marketing channel. The remaining 25% could not answer this question. None of the companies appears to sell via an intermediary. However, it seems that indirect marketing channels are utilised for the distribution in foreign markets. In regards to investments in new production facilities, half of the companies answered that they are currently investing, 13% have smaller investments. 37% on the other hand declared to currently not make any investments. (Telephone interviews Companies 2010.)

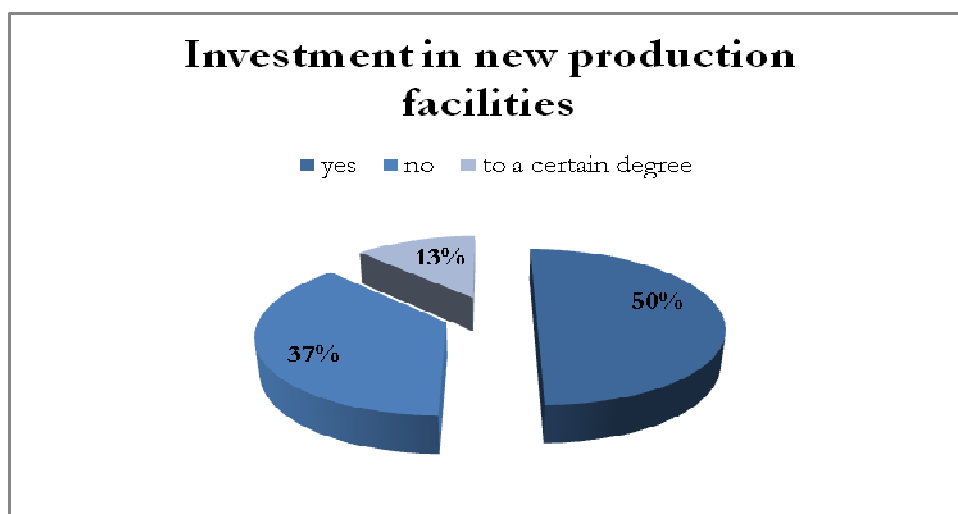


Figure 20: Investment in new production facilities

It seems that most of the companies tend to buy their tools directly from the manufacturers. As Figure 21 shows, 87% of the interviewed companies buy their tools directly. The remaining 13% purchase from an intermediary. Another research outcome is the fact that all of the interviewed companies seem to acquire their tools from several manufacturers, not just from one. The ratio of standard to multi-purpose tools varies. 62% of the companies' tools are to 5% or more multi-purpose tools, though. 25% even use solely multi-purpose tools. However, another 25% of the companies answered that only standard tools are utilised in their production. (Telephone interviews Companies 2010.) Within the agricultural machinery industry, it seems that several companies manufacture tools on their own (Telephone interview VDMA Agricultural Machinery 2010).

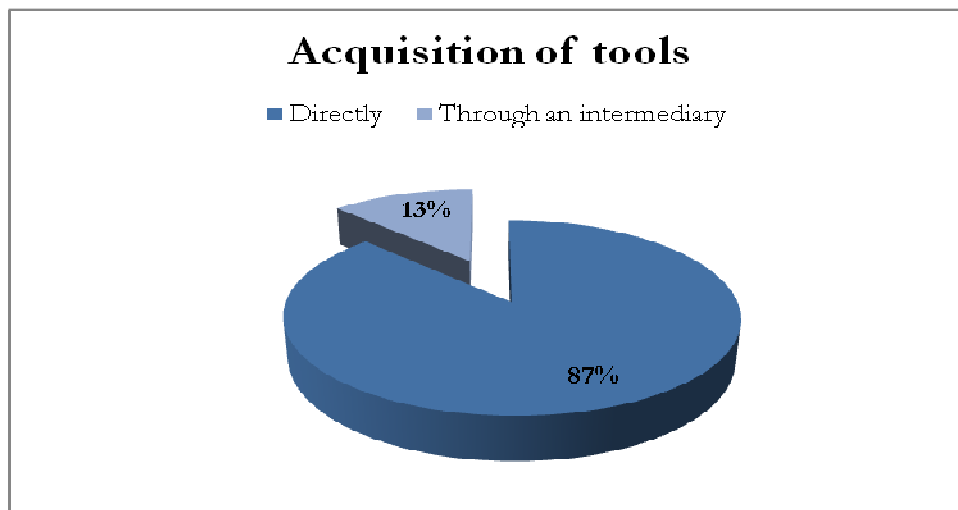


Figure 21: Acquisition of tools

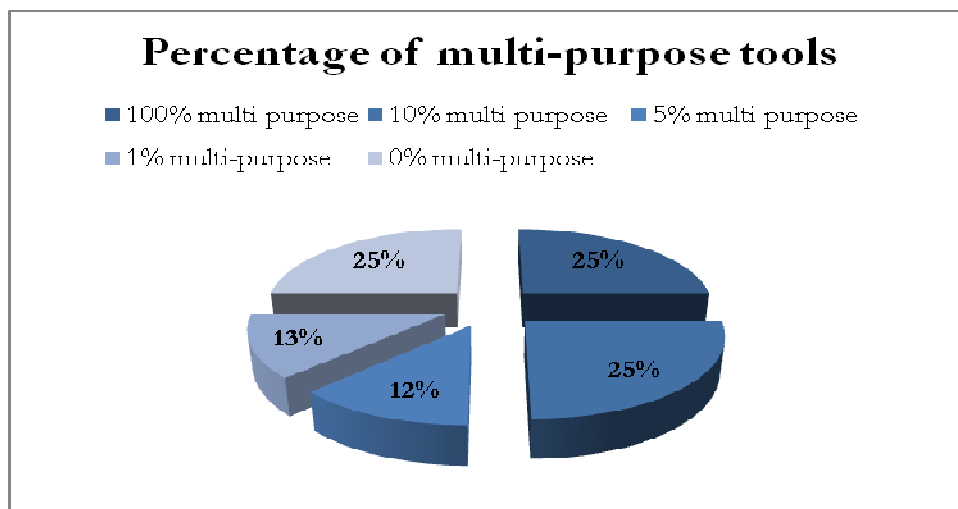


Figure 22: Percentage of multi-purpose tools

6 DISCUSSION

The economic crisis had an impact on almost all sectors of the German engineering industry. Even though the situation seems to ameliorate in most of the sectors during 2010, the companies are affected by the aftermath of the economic crisis. Not only do they need to face costs that arose due to short-time work and other job maintaining measures during the crisis. Another challenge seems to be the financing of new projects. Concerning investment, it appears that several companies made investments in the years before the economic crisis. The fact that companies seem to be concerned with their current situation and the fact that they do not seem to invest to a high degree in new production facilities might have a negative impact on the potential entry of Mehi Oy to the German market.

Regarding the products offered by the different engineering industry sectors, it can be said that energy efficiency is important in almost every sector. Furthermore, the products become more specialised. It also appears that there is a trend towards customised products. Moreover, the combination of different machine types or production steps in one machine increases in some industry sectors. All in all, it can be stated that the requirements of engines, gear boxes, valves, pumps and compressors, wind turbines, robotics, lifts and escalators as well as of the different kinds of machinery seem to augment. This trend could be a chance for Mehi Oy. Especially the customisation of products might imply a need for special tools in order to meet customer demands. Besides, since competition is growing in almost all industry sectors, it is necessary for companies to benefit of a cost-effective production. This would allow them to offer their products at attractive price points. However, the quality of products needs to be maintained, too. The special tools manufactured by Mehi Oy may help companies to increase the efficiency of their production while at the same time assuring the product quality. Since Mehi Oy's special tools allow companies to combine different production steps in one, changeover times can be reduced. This leads to shorter production times, which results in lower production costs. Furthermore, Mehi Oy offers its products at competitive prices. This may help companies to further lower their costs. Since the attractive prices allow them to acquire high quality tools with a relatively low investment, Mehi Oy's tools might also be interesting for companies facing the aftermath of the economic crisis.

With reference to the telephone interviews conducted with companies, it can be said that companies use multi-purpose tools in their production. Hence, there seems to be a potential

for Mehi Oy's tools in the German market. The analysis of the precision tools industry supports this presumption. Apparently, there is a growing demand for customised tools. However, there are already numerous tool manufacturers operating in Germany. Many of them are small and medium-sized enterprises. The disequilibrium resulting from the fact that there are a lot of small tool suppliers and only a few large customers may increase the competition in the market. Tool manufacturers improve their product offer by for instance providing their customers with services in addition to the tool. Mehi Oy needs to make use of its competitive advantages in order to successfully enter the German market. The fact that companies usually buy their tools from several suppliers could be an opportunity for Mehi Oy. Furthermore, many companies tend to buy their tools directly from the manufacturer. This could mean an advantage for Mehi Oy that plans to export its products.

As was investigated in the theoretical part, exporting is a common mode used by companies to enter new markets. It involves less investment and risk than other entry modes. Since Mehi Oy intends to utilise its production facility in Finland, market entry strategies as for example licensing or franchising do not seem to be appropriate. In case that the exporting of the products is successful, Mehi Oy could increase its investment in the German market. However, in the beginning, the company would export its tools to Germany. Regarding the form of exporting, direct exporting appears to be most suitable. It gives the company the possibility to be in direct contact with its customers. Since the features of specialised tools should be discussed individually with each customer, a direct distribution channel without any intermediaries tends to be adequate.

In terms of place of the potential market entry, the company clusters need to be taken into consideration. According to the developed clusters, most of the companies tend to be located in West and Southern Germany. Furthermore, there could be established clusters in Northern Germany. The Federal Lands with the highest cluster density seem to be Baden-Württemberg and North Rhine-Westphalia. However, there are also several clusters in Hesse and Bavaria as well as some in Rhineland-Palatinate. In the north of Germany, the clusters are mainly situated in Lower Saxony, Bremen, Hamburg and Schleswig-Holstein. It may be easier for Mehi Oy to enter the German market through a cluster. The two Federal Lands North Rhine-Westphalia and Baden-Württemberg might be appropriate market entry places. In these Federal Lands are also located two leading trade fairs of the precision tools industry, namely METAV and AMB. The trade fairs could help Mehi Oy to get in contact with new customers. Another advantage of these regions is the fact that several manufacturers of

drilling and boring machines as well as milling and boring centres have their location there. Mehi Oy would need to investigate whether there is a possibility to cooperate with these companies in terms of tools. Cooperative exporting in the form of piggyback exporting could help Mehi Oy to utilise the distribution network of the machine tools and manufacturing systems suppliers in order to market its products. However, the majority of the largest machining tool manufacturers also have their location in Baden-Württemberg and North Rhine-Westphalia. Furthermore, some of the largest 25 machining tools manufacturers are situated in Hesse and Bavaria. Taking into account the location of the largest metal-cutting tool manufacturers, Mehi Oy could also consider entering the market in Northern Germany. EMO, the leading trade fair for the precision tools industry that is organised in Hannover could be an opportunity to acquire new customers.

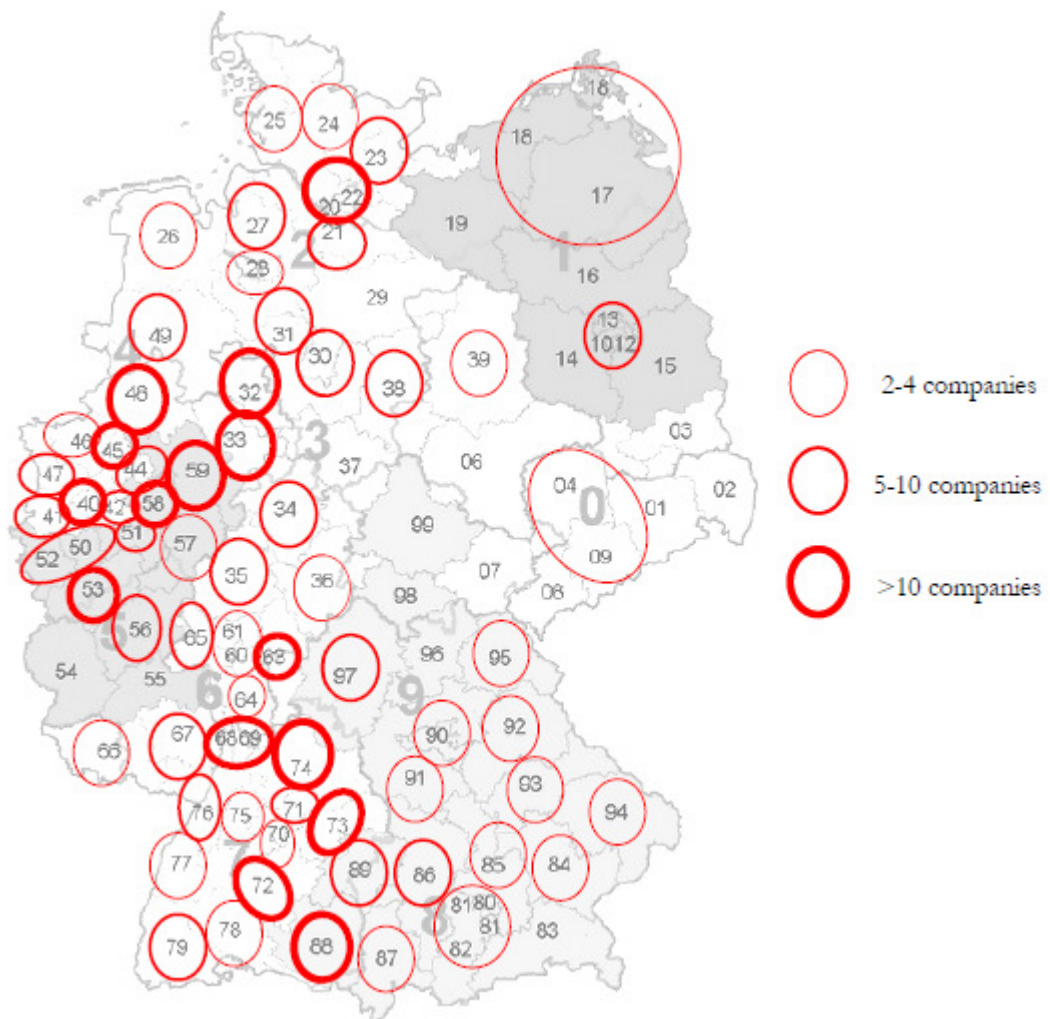


Figure 23: Overview of all engineering industry clusters

7 CONCLUSION

The requirements of the different products of the German engineering industry seem to augment more and more. Machinery should be increasingly specialised. Customers demand for products that meet special needs in terms of production and functionality. Furthermore, environmental protection is in the focus of interest. For example, pollutant emissions shall be decreased. Moreover, products of the German engineering industry are required to be more energy-efficient. Besides, the products should meet certain standards regarding quality or hygiene. In addition, competition grows, not only in the German market, but also worldwide. In order to maintain their position in the market, companies need to improve their production cycles. Besides, investment in research and development is important in terms of product innovations. Currently, it is necessary for companies to overcome the aftermath of the economic crisis. Another challenge that members of the German engineering industry are confronted with arises from counterfeiting or plagiarising of merchandise.

In general it can be said that the German market is an interesting one for Mehi Oy to enter. Even though the economic crisis had a negative impact on mainly all sectors of the German engineering industry, the situation of most of the companies seems to ameliorate in 2010. Besides, the economic crisis not solely affected the German market. Mehi Oy should benefit of the economic recovery in Germany in order to enter the market. The increasing customisation of products as well as the need of companies for shorter production periods and lower production costs could be an opportunity for Mehi Oy. Since companies are challenged with the aftermath of the economic crisis, they currently do not tend to make high and expensive investments. This does not only imply negative conclusions, though. In fact, Mehi Oy could here benefit of its competitive advantage regarding price. The attractive prices of Mehi Oy's tools may allow companies to make investments within their current financial scope. In addition, the multi-purpose tools offered by Mehi Oy might help to lower production costs while at the same time assuring the quality. Moreover, Mehi Oy should make use of another competitive advantage, namely the short delivery time of its tools. Receiving the customised tools within a comparatively short delivery time could enable companies to start their production relatively prompt after receiving orders from their customers. This may lead to a shorter time of delivery from their side which would consequently result in an advantage towards competitors.

8 RECOMMENDATIONS

There are several options for Mehi Oy to enter the German market. One would be to directly contact companies that might be potential customers of Mehi Oy. In order to do so, the author would recommend focusing on the different clusters. This approach would allow Mehi Oy to approach several companies located in a certain area. The three regions that are recommended for a potential market entry are Northern, West and Southern Germany since it appears that many companies are located there. When it comes to recommendations regarding certain Federal Lands, the main customer groups of Mehi Oy need to be taken into account. Here, the clusters of engines, power transmission engineering, valves as well as pumps and compressors are considered. Within these industries, most of the companies appear to be situated in North Rhine-Westphalia and Baden-Württemberg. Furthermore, there are clusters in Bavaria, Hesse and in the region around Hamburg, Schleswig-Holstein, Bremen and Lower Saxony. As regards competitors, Mehi Oy should take into consideration that the majority of the largest machining tools manufacturers are located in Baden-Württemberg and North Rhine-Westphalia. One downside of this market entry option is the fact that it is not guaranteed that the companies within the clusters are willing to get in contact with Mehi Oy via email or telephone. So as to avoid this downside, Mehi Oy could utilise another option to enter the market, namely attending its customers leading trade fairs. This would allow the company to directly get in contact with companies that may be potential customers. Furthermore, Mehi Oy would have the chance to introduce its tools in person and to already discuss with the companies about possible tool solutions.

However, Mehi Oy does not only have the option to be present at its customers' trade fairs. In fact, another alternative to enter the German market could be attending leading trade fairs of tool manufacturers. A stand on these trade fairs would allow Mehi Oy to present its tools. Furthermore, there is the possibility that potential customers visit these trade fairs and become aware of Mehi Oy's tools. In case that Mehi Oy does not prefer to take part in one of the three leading trade fairs AMB, EMO or METAV, it might be an option for the company to participate in other trade fairs, as for instance metall München. This European trade fair organised by GHM (Gesellschaft für Handwerksmessen mbH 2010 b) focuses on metal working in industry and trade. Machine and precision tools are part of the product range. This trade fair is organised for the next time in March 2011 in Munich.

Furthermore, there might be the possibility to cooperate with manufacturers of machine tools and manufacturing systems. Mehi Oy could perhaps deliver tools for the machines. However, a potential for this option was not investigated in the thesis at hand. In case that Mehi Oy is interested in this alternative, it would be necessary to conduct further research in order to explore the feasibility of this option as well as the willingness of companies for co-operation.

Finally, it can be said that Mehi Oy has different options to enter the German market. Even though the company needs to further research the feasibility of cooperation with machine tools manufacturers, there is the possibility to contact potential customers directly or during trade fairs. So as to enter the German market, Mehi Oy would need to use its competitive advantages in order to successfully compete with competitors already operating in Germany. Here, it is important to not only focus on the largest companies. Mehi Oy should also consider small companies. Concerning the market entry mode, the author would agree with the company's preferred entry mode, namely exporting. Since Mehi Oy manufactures customised tools, it may be an advantage to distribute the tools directly. Being in direct contact with the customer would allow Mehi Oy to respond to the different needs.

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Figure 1:

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Figure 3-19 & Figure 23:

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APPENDIX 2/1: QUESTIONNAIRE TELEPHONE INTERVIEWS COMPANIES

APPENDIX 1: QUESTIONNAIRE TELEPHONE INTERVIEWS TRADE ASSOCIATIONS

Hello. Thank you for taking the time for this interview. My name is Annika Thieme and I am a student of Heilbronn University. At the moment I am studying abroad in Finland. Currently I am writing my Bachelor Thesis about the German engineering industry and its relation with machine tool manufacturers. My focus lies on the complementary product segment of special tools. I would like to ask you some questions in order to get deeper knowledge about the industry. The questionnaire consists of 12 questions and lasts around 15 minutes. Do you now have time for the interview or shall I call again later?

- 1- What is the field of activity of the companies represented by your association?
- 2- Where are the member companies of your association located? Are there certain regions where they are favourably located?
- 3- Which distribution channels are mainly used by your member companies?
- 4- What are the main challenges that companies face after the economic crisis?
- 5- Are companies of your association currently investing in new production facilities?
- 6- How are machine tools normally bought? Do companies buy directly from manufacturers or are there sales representatives?
- 7- Who are the most important German manufacturers/ sales representatives of standard tools?
- 8- Who are the most important German manufacturers/ sales representatives of special tools?
- 9- Do companies normally buy from one supplier or do multi-supplier relations exist?
- 10- Do companies mainly use standard tools or do they prefer multi-purpose tools?
- 11- Do you provide your member companies with information about trade fairs?
- 12- Does your association organise trade fairs? In case of yes, what kind of trade fairs do you organise?

Thank you for taking the time for this interview. Have a nice day. Good bye.

APPENDIX 2: QUESTIONNAIRE TELEPHONE INTERVIEWS COMPANIES

Hello. Thank you for taking the time for this interview. My name is Annika Thieme and I am a student of Heilbronn University. At the moment I am studying abroad in Finland. Currently I am writing my Bachelor Thesis about the German engineering industry and its relation with machine tool manufacturers. My focus lies on the complementary product segment of special tools. I would like to ask you some questions in order to get deeper knowledge about the industry. The questionnaire consists of 11 questions and lasts around 15 minutes. Do you now have time for the interview or shall I call again later?

- 1- What is the field of activity of your company?
- 2- Where are the production facilities of your company located? Are there several production facilities in Germany?
- 3- Which distribution channels are mainly used by your company?
- 4- What are the main challenges for your company after the economic crisis?
- 5- Does your company currently invest in new production facilities?
- 6- How does your company normally buy machine tools? Do you buy directly from the manufacturer or are there sales representatives?
- 7- Who are the most important German manufacturers/ sales representatives of standard tools?
- 8- Who are the most important German manufacturers/ sales representatives of special tools?
- 9- Does your company normally buy from one supplier or do multi-supplier relations exist?
- 10- Does your company mainly use standard tools or do you prefer multi-purpose tools?
- 11- How is the ratio of standard tools compared to multi-purpose tools?

Thank you for taking the time for this interview. Have a nice day. Good bye.