What is the current situation of the German textile and clothing industry, and what are its prospects of development in the near future?
Made in Germany
What is the current situation of the German textile and clothing industry, and what are its prospects of development in the near future?

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Declaration of Authorship
I hereby certify that the thesis I am submitting is entirely my own original work except where otherwise indicated. Any use of the works of any other author, in any form, is properly acknowledged at their point of use.

Date:
Signature:
Preface

Throughout the past years at the Amsterdam Fashion Institute, I specialized in Production and Supply Chain management, where I was mainly concerned with the textile and clothing (T/C) industry in Turkey, China, Bangladesh and similar Far Eastern countries. Involvement with T/C industries in Europe was limited to Eastern Europe, Spain and Italy. However, as I researched other European countries out of curiosity, I discovered a whole part of the T/C industry I had been unaware of before. As a native German I was not acquainted with the advanced T/C development in my own country. Instead of investigating the conventional low-cost T/C industries China or Turkey further, I decided to explore an area generally neglected: the German textile and clothing industry.

Overall, it was complicated, but also very rewarding to research this topic for four months. Most of my time was spent in libraries with books, articles and databases, but interviews too proved to be an important source. I would like to thank all the firms and organizations I interviewed (or consulted for information) for their valuable input and time.

I would like to acknowledge the very much appreciated helpful advice and kind support from my coach Henny Jordaan. I also would like to thank Peter Buts and Constantin Freiherr Von Maltzahn for their feedback. Finally, I want to deeply thank my family and friends for supporting me throughout this semester.
Executive Summary
The intention of this thesis is to determine the current situation of the German textile and clothing (T/C) industry as well as the prospects of development in the near future. It explores to what extend and on what level Germany is still active in the global textile and clothing industry. Furthermore, it examines potential, future opportunities for growth.

This report benefits from a range of secondary data (literature from databases, books, journals and institutes) with additional primary data from interviews conducted with textile and clothing manufacturers, as well as organizations. It is structured in four different parts (see paragraphs below).

What is the role of the location “Germany” in the global T/C industry?
The German T/C industry is of modest proportions but nevertheless one of the global T/C leaders. Germany is the third biggest exporter of textiles and the European leader in the technical textile segment with a global market share of 45%. Technical textile manufacturers supply clothing, as well as parts for other industries, such as automobile or construction. Driven by globalization, clothing manufacturing has to a large extent turned into outsourcing; on the whole, only high-skill jobs of managerial or scientific nature have remained locally.

Internationally recognized German T/C manufacturers differentiate themselves through expertise and quality in various segments (from technological textiles, protective and work wear to niche, sustainable and highest quality products). Main assets of the industry are innovation, functionality, high skills and flexibility.

What are strong sides of the location “Germany”?
The advantages of German manufacturing can be determined via location factors. These are factors influencing companies when choosing a location. One of the main of such factor is a substantial supply of skilled workers (e.g. engineers or managers), as well as a high level of sustainability and innovation. The latter is fueled by the strongest location factor: a government-supported network of research institutes and T/C companies, which all cooperate closely and create synergies. Proximity of manufacturers to customers and research institutes encourages this. In contrast, handicaps are high labor costs, a lack of manual operation personnel and the absence of local sources of raw materials.

How competitive is the location “Germany” and for what entities is it recommended?
In order to measure the German T/C industry’s competitiveness, it is, in this thesis, benchmarked against significant global competitors (Bangladesh, Belgium, China, Czech Republic, Japan, Turkey, UK and USA) in the categories “Productivity”, “Wages”, “Training”, “Innovation” and “Sustainability” (important characteristics in the contemporary T/C industry). Within this context, Germany reaches an above average competitive status with the highest score in “Sustainability” and the lowest one in “Wages”. UK, Belgium and US are Germany’s most important competitors.

Some T/C segments, categorized according to strategic orientation based on Porter’s “Generic Strategies”, profit more from the production location Germany than others. Applying the different strategic orientation modes “Differentiation”, “Cost Leadership” and a combination of each with “Focus”, Germany is to be considered the right environment for T/C manufacturers with “Differentiation” strategy focusing on a niche market. In contrast, it is unsuitable for “Cost Leadership”.

4
What trends determine the future of the location “Germany” and what are its prospects for development?

The future of the T/C industry is driven by the megatrends “Demographic transition”, “Globalization III”, “Sustainability in environmental preservation and energy efficiency”, “Volatility and Knowledge” and “Individualization”. All of these share a high demand for innovation, which happens to be one of Germany’s main strengths. If used properly, Germany will be able to improve its competitiveness in the T/C industry in a decisive measure.

If the country can maintain constant progress on its competitive edge - quality and technological expertise - demand for German T/C products is likely to increase in the next decades. However, due to demographic change this demand will shift from Europe to developing and newly industrialized countries (e.g. BRIC countries such as Russia or Brazil). Many of these, which are already actively investing in German T/C products and services, are growing vigorously in size. However, these countries are also gaining economical power and along with it wealth, therefore these nations will, as Germany did decades ago, shift strategically from “Cost leadership” to “Differentiation”. This is the most serious threat for the German T/C industry, next to decreasing inland supply of skilled personnel due to an aging population.

Additional opportunities for the German T/C industry arise from the growing demand of sustainability, another of Germany’s strengths, and the increasing trend towards synergy between branches, e.g. between the textile and medical industry. Here the demand for new products such as health-sympathetic technical textiles will increase along with growing demands of health care.

Based on these findings, the additional article "Plan Innovation. How Germany can maintain its competitive status in the global textile and clothing industry." provides concrete recommendations for improving the German T/C industry.
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<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>ATC</td>
<td>Agreement on Textile and Clothing</td>
</tr>
<tr>
<td>BRIC</td>
<td>Brazil, Russia, India, China</td>
</tr>
<tr>
<td>DITF</td>
<td>Deutsche Institute für Textil- und Faserforschung Denkendorf</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>FCL</td>
<td>Full container load</td>
</tr>
<tr>
<td>GII</td>
<td>Global Innovation Index</td>
</tr>
<tr>
<td>ICT</td>
<td>Information and Communication Technology</td>
</tr>
<tr>
<td>IEA</td>
<td>International Energy Agency</td>
</tr>
<tr>
<td>KPI</td>
<td>Key Performance Indicator</td>
</tr>
<tr>
<td>LCL</td>
<td>Less than container load</td>
</tr>
<tr>
<td>MFA</td>
<td>Multi Fiber Agreement</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-Governmental Organization</td>
</tr>
<tr>
<td>SME</td>
<td>Small and Medium Enterprises</td>
</tr>
<tr>
<td>T/C Industry</td>
<td>Textile and Clothing Industry</td>
</tr>
<tr>
<td>UNO</td>
<td>United Nations Organization</td>
</tr>
<tr>
<td>USA</td>
<td>United States of America</td>
</tr>
<tr>
<td>WTO</td>
<td>World Trade Organization</td>
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</table>
1. Introduction

The worldwide textile and clothing (T/C) industry is mostly known for either cheap clothing production in Eastern countries such as China (People’s Republic of China) and Bangladesh, or expensive manufacturing of high quality textiles in traditional areas like Italy. These countries are global leaders in the T/C industry. However, it is less commonly known that Germany is also among these leaders. Germany is the European (and one of the worldwide) market leaders in the technical textile segment with a market share of 45%. (Deutsche Bank Research, 2011) Furthermore, it is home to high quality and sustainable manufacturers. This makes Germany, nearly forgotten in the T/C sector, a subject of high importance.

In order to find information about the German T/C industry, one has to search diligently. When it comes to apparel, it is often disregarding as important producer, because it is an industrialized and expensive labor country. But what about other factors that have an impact on the T/C industry? In terms of innovation, quality and productivity it is one of the most advanced nations. Furthermore, it is a lucrative option for sustainable developments.

Within the last 20 years, the T/C industry has undergone some of the most profound changes in its history. The fashion industry of the 21st century is versatile, global and incredibly fast moving. Classical supply chains hardly exist anymore, as most parts thereof are mixed together in one or a few companies. In this industry, not simply the lowest labor costs and cheapest transport systems are decisive factors anymore, but also about flexibility, innovation and sustainability. What role does Germany play in this shifting industry? Due to its status as a highly developed country, its competitive edge is not labor force, but innovation. But does this attribute make Germany an important player in the global T/C industry?

1.1 Objective

The aim of this thesis is to explore to what extend and on what level Germany is still active in the global textile and clothing industry, as well as how it has gained and maintains this status. It should give an overview of the current state of the German T/C industry, a projected outlook on the future and, where applicable, point out potential future opportunities for growth. While this thesis is partly intended for industry professionals already active in the German clothing and textile industry, it is also aimed at companies who are unaware of and could benefit from Germany’s potential as T/C producer.
1.2 Central research question

In order to explore, the status and perspectives of the German textile and clothing industry within the context of the global fashion industry, I formulated the following central research question:

What is the current situation of the German T/C industry and what are its prospects of development in the near future?

1.3 Sub-questions

The central research question can only be investigated by answering a number of more specific subquestions. These will also be the different chapters of the thesis.

1) What is the role of Germany within the global T/C industry?
To begin, Germany’s place in the global T/C industry has to be defined. This means firstly, analyzing the facts about the German T/C industry’s situation, immediate history and recent developments. Then its role can be determined in a global context.

2) What are strong sides of the German T/C industry?
After giving a basic overview of the German T/C industry in the first chapter, this section concerns positive location factors of the latter. Its purpose is to illustrate its strong points, particularly on a production level. As a contrast, this chapter also shortly addresses the disadvantages of production in Germany.

3) How competitive is the German T/C industry and for what entities is it recommended?
This chapter will analyze Germany’s status in the industry in terms of competitiveness. In order to determine the competitiveness of the German T/C industry, the following question needs to be answered, “What defines competitiveness in the T/C industry of the 2010s?” Competitiveness will be benchmarked with the help of several KPIs. Furthermore, this chapter looks at T/C companies with different strategic orientations, and determines which ones could benefit on what level from production in Germany.

4) What trends determine the future of the German T/C industry and what are its prospects of development?
The final task is to investigate the second part of the central research question concerning the future of the T/C industry. Here the megatrends, which are projected drivers of the industry, need to be determined, in order to point out its perspectives. Then with the help of a SWOT matrix, opportunities and threats can be specified.

1.4 Research Methods

The research methods used for this thesis are qualitative as well as quantitative. Chapter two and four, as well as five, will make use of qualitative data comparatively, as these conclusively describe the industry. In the fourth chapter, additionally to qualitative information, quantitative data will be applied, when it comes to KPIs and investigating competitiveness.

As this thesis is not intended as a consumer research, but focuses on the factual business side, I am mainly using secondary data. The variety of literature available on this topic has completely filled my four months research. I have made use of books, data I received from German T/C associations
(e.g. Gesamtverband textile+mode, GermanFashion, BESPO), databases (mainly ScienceDirect, Emerald and Elsevier), institutes (from Hohenstein over Centrum for European Economic Research ZEW to German Institute for Textile and Fiber Research DITF), magazines (a.o. Textilwirtschaft, Spiegel) and Internet sources.

This thesis also makes use of a basis of primary data. Overall I conducted three interviews with professionals in the German T/C industry: clothing and textile company owners, sustainable and technological brands, as well as governmental associations for T/Cs. Furthermore, short talks and panel discussions I attended at the Textilwirtschaft Young Professionals Day 2013 served as useful resources for non-literate data.

1.5 Limitations and Boundaries

The focus of this thesis is on the production segment of the industry. There are several established German brands in various segments; however, with most of these brands only their design, marketing, sales and/or distribution departments are located in Germany. Therefore many firms are included in this research only in terms of sample production.

Additionally, this report concentrates primarily on the supply side over the demand side, thus consumer research is not included.

The intention of this report is to give an overview of the industry, but of course it cannot be all encompassing. As many companies producing in Germany are quite small, it is particularly hard to obtain their information and include them in the research.

The bulk of this thesis is based on secondary data due to the unreliability of subjectivity and difficulty to obtain primary data. As the number of companies still producing in Germany is relatively small, interview-target options were limited. Having contacted over 40 companies or institutes, sometimes repeatedly, only resulted in four interviews. However, primary data seemed less appropriate in some chapters due to their subjectivity. All interviewed parties could not share quantitative data. In order to use interviewees’ answers as facts, more than hundred professional opinions are needed, which is beyond the scope of this Bachelor thesis.
2. What is the role of Germany within the global T/C Industry?

Throughout the past 40 years, Germany’s clothing and textile industry has undergone a fundamental development. From traditional local production and organization, the sector has shifted on a structural level to an international and innovative oriented one. Globalization of German textile and clothing companies has led to heavy outsourcing, whilst technological advancement has opened a new area of expertise within the country.

2.1 The T/C Industry in numbers and structures

The German textile and clothing industry of the 2010s may be of modest proportions but is nevertheless of surprising diversity. In comparison to other industrial branches, number and sizes of businesses are rather small and segmented in various categories.

<table>
<thead>
<tr>
<th>Textile Industry Statistics &gt; 20 employees</th>
<th>64478</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employees</td>
<td>64478</td>
<td>% of total</td>
</tr>
<tr>
<td>Spinning</td>
<td>3971</td>
<td>6%</td>
</tr>
<tr>
<td>Weaving</td>
<td>10226</td>
<td>16%</td>
</tr>
<tr>
<td>Finishing</td>
<td>7836</td>
<td>12%</td>
</tr>
<tr>
<td>Technical textiles</td>
<td>13202</td>
<td>20%</td>
</tr>
<tr>
<td>Crocheted and knitted</td>
<td>2933</td>
<td>5%</td>
</tr>
<tr>
<td>Other</td>
<td>26310</td>
<td>41%</td>
</tr>
</tbody>
</table>

Source: Statistisches Bundesamt (2012)
Figure 2.1 Textile Industry Employees

In 2012 the textile industry employed 64478 operators in 722 firms (Statistisches Bundesamt, 2013a, see figure 2.1). These firms are divided into several different types. The dominating technical textiles segment can be broken down into the following categories: Mobiltech (22%), Indutech (18%), Medtech (13%), Sporttech (12%), Buildtech (10%), Protech (10%), Agrotech (7%) and Packtech (5%). (Eriskat, 2011) Other important textile sectors are weaving and finishing. In terms of geographical distribution, the main areas for textiles are clearly West and South Germany: North Rhine-Westphalia, Bavaria and Baden-Württemberg. In these areas, the textile industry is a significant value-adding factor within the economy (Krippendorf, Holst, Richter, 2009).
The remaining segment of the German clothing industry is about half the size of the textile branch. According to statistics of the German Fashion Modeverband (2013a) the clothing sector employs a total of 28,537 persons in 166 manufacturers. Half of these belong to the largest division “Other Overgarments”. The rest is spread distributed between “Underwear” (19%), “Hosiery” (15%), “Work Wear” (5%) and “Others”. (German Fashion Modeverband, 2013a) However, the actual distribution varies from these statistics. The German clothing production landscape is rich on small enterprises and current statistics only include companies with more than 50 employees. Older numbers, including small business from 20 employees upwards, show higher values for the category “Work Wear”, “Underwear” and “Other”. The geographical concentration of the clothing sector is similar to the textile one: First Baden-Württemberg, then Bavaria and North Rhine-Westphalia, in these areas a total of 80% people of the industry are employed. (Dispan, 2009)

Next to manufacturers, various types of companies are involved in the T/C supply chain. Amongst these additional types are firms dealing with textile services, machines and of course the chemical fiber industry. Furthermore, vehicle construction suppliers (such as seat covers and belts) are also part of the textile industry.

Traditionally, a majority share of family businesses has characterized German fashion manufacturing, however, this has begun to change lately. (Dispan, 2009) In the last decades, investors have been buying a great deal of T/C companies, particularly to build versatile brand portfolios. In that context, mergers have become a major trend. These allow sharing of resources and knowledge, in addition to increasing negotiation powers. (Taplin and Winterton, 2004) Due to similar reasons, verticalization as well has become a widespread strategy among clothing cooperations.

### 2.2 Structural changes

What once used to be a traditional industry of domestic production has become an innovation- and service-oriented system with global production networks. Driven by strong competition, globalization and the emphasis on low wages, the structures in Germany have shifted heavily. In terms of clothing, manufacturing has almost completely moved from local to global. The textiles sector has shifted from traditional products to innovative as well as high technology goods.
For most of the past 40 years processes in the T/C industry in industrial countries have undergone significant changes: as a result of globalization, the expensive labor production sector has decreased drastically, while positions in higher skilled jobs on managerial and scientific levels have increased. At a very early time, German manufacturers moved production on a broad scale to low labor cost areas. During the 60s, when Berlin was a fashion capital, the city only hosted design and development departments, whereas production took place in France, which, in turn, outsourced to other countries and so on. This is satirically called “Wanderzirkus”, according to Dispan (2009). Later German companies mainly made use of cheap labor in Central and Eastern Europe, eventually expanding to Asia. (Dispan 2009)

During the most significant time of change in the 80s, many industries were able to automate processes and thus cut costs. Particularly in the clothing industry, however, automation of production was difficult. Additionally, it was not actively pursued, as the German industry preferred to rely on quota agreements such as the Multi Fibre Arrangement¹ to protect local production. Only office jobs, e.g. in the area of production management, were automated with the help of IT. (Adler, 2004) However, in competition with wages as low as €0,21², even production automation probably would not have stopped the shift abroad.

As a result, the output of the T/C industry in Germany decreased heavily by 70% between 1991 and 2010. For the clothing sector (-85%) this development was even more drastically than the textile industry (-50%). (Deutsche Bank Research, 2011) During the 70s and 80s, imports to Germany were already growing dramatically, up to 15% per year. The interesting part about this fact is that these imports were still to a large extent produced by German companies, only abroad. Foreign brands represented only a small percentage of these imports. (Dispan, 2009)

While globalization and wage-wars affected the German clothing industry, the declines in garment production lead to a shift towards technical textiles in the textile sector. When clothing manufactures moved production abroad, they consequently quit sourcing German textiles and therefore the textile sector had to find a new market. (Dispan, 2009) Germany’s competitive edge became its high advancement in (information) technology, innovation and quality, thus the textile market quickly shifted to technological textiles. Between 1995 and 2005 this segment increased by 30%. (Krippendorf, Holst, Richter, 2009)

With the clothing sector now geared to retaining only high-skilled jobs at home and relying otherwise on global outsourcing, and with the textile industry’s shift to technology, what does the German production landscape look like today?

### 2.3 The new German T/C Industry

In spite of structural change, German has continued to be one of the world leaders in the clothing and textile industry. Based on the analysis in the previous paragraphs, the new system can be characterized with the following values: innovation, functionality, high skills and flexibility. These characteristics together best describe the contemporary German T/C industry.

1 The Multi Fibre Arrangement (1974 until 2004; extension period for China until 2009) quotas on textiles and clothing on exports from developing countries to developed ones, such as the EU and USA. (Banks, 2011)

2 Wages per hour in Bangladesh according to statistics from the Institute for Global Labor and Human Rights in 2010
2.3.1 Innovation
One of the most important competitive advantages of Germany’s T/C industry is innovation. The German state has heavily invested in research and development for decades, thus Germany is highly advanced in technological innovations, particularly in the textile segment (for example with nanotechnological innovations such as heart rate controlling clothing or antibacterial textiles, Fibre2fashion, 2013). In addition, textile manufacturers closely cooperate with customers and governmental institutions (16 textile research institutes with 1200 employees) to further support new development. (Schlosser, 2012) Innovative textiles are particularly beneficial for the areas of health care, packaging, construction and automobile industry, as well as environmental sectors.

2.3.2 Functionality
Functional products dominate the German T/C industry. This is due to the extensive focus on innovation, as well as strong sales potential on the local T/C market. Germany is home to numerous vehicle and machine construction conglomerates, as well as to a large chemical and medicine industry. (Krippendorf, Holst, Richter, 2009) High-tech textiles are vital in these industries and the clothing segment benefits from personalized orders of corporate wear, besides a large demand for high-level protective wear. Work wear volumes grew by up to 13%, while casual wear lost 25%. Thus functional outerwear has been the most growing technological textile fashion segment. (Krippendorf, Holst, Richter, 2009) The huge variety of technological resources has led to a vast functional work and protective wear clothing segment.

2.3.3 High Skills
The employees of the new German T/C industry are predominantly high skilled, working in a variety of enterprises from global organizations to specialists’ studios. In the majority of clothing manufacturers, labor structures have change from blue to white collar. Furthermore, blue-collar jobs have shifted on a horizontal level from the sewing room to the warehouse (Adler, 2004). “Systematic head functions”, as stated by Dispan (2009), remain in Germany, whereas production is outsourced. The white-collars functions are on a managerial and organizational level, controlling global production networks, giving impulses to market developments and optimizing processes, such as logistics, with the help of ICT. Some of these jobs equal the functions of an agent. There is another breed of high-skilled workers left in the clothing industry though: creators of superior craftsmanship expressed in excellent quality, low volume couture, high fashion and casual wear businesses, as well as sample studios. (Taplin, 2006) Lastly, the textile segment depends on a high supply of high-level engineers and scientists.

2.3.4 Flexibility
Flexibility is vital for successful businesses, particularly in the volatile T/C industry. Agile supply chains, international orientation and the cultivation of local capacities shape the clothing sector. The technological textile sector caters to the most versatile and flexible areas of application. In case of big clothing manufacturers, flexibility means global production combined with local capacities for

3Blue-collar workers “perform primarily physical work and […] their career paths are relatively restricted” according to Hu, Kaplan and Dalai (2010). White-collar workers are “professional and semi-professional workers” on managerial or administrative level.
2. Germany’s role in the global T/C industry

(Paras. 2.1-2.3)

2.4 Profitability and trading balance

In 2011, the German clothing industry had a turnover of €7.5 billion\(^4\), with a 5% improvement rate compared to the previous year (BESPO, 2012). The total production volume was about 6.97\(^5\) million in 2011 according to statistics from BESPO (2012). Work wear is the strongest segment with 3.7 million pieces and a growth rate of 13% (men) and 7% (women), whereas other segments decreased by 25%.

The turnover of the German textiles industry in 2012 was higher with €9.9 billion. About 55% of these were obtained locally. In regards to the past 5 years, sales have decreased slightly by 2% in total (Statistisches Bundesamt, 2013b). On average, the general production index of textiles in Germany has shown decreasing tendency, however, technical textiles have increased (see figure 2.3, between 2000 and 2011 almost consistently by about 22% according to Deutsche Bank Research, 2011).

![Graph: Rising technical textiles vs. decreasing total textile industry](source: Deutsche Bank Research, 2011)

The trade balance for unprocessed textiles was positive in 2012 with €10.3 million exports and €9.5 million imports, most likely due to the technical textile segment. These historically achieve export rates of up to 80% (Jänecke 2007, Jungbauer, 2008). For finished clothing on the other hand, imports were twice as high (€25.6 million compared to €13.7 million exports according to Statistisches Bundesamt, 2013b).

\(^4\) Includes companies 20 < employees. A number of results are unknown or disclosed. Results for 2012 were not available yet.

\(^5\) However, this number is not complete, as it misses unknown or disclosed numbers (from firms manufacturing products such as jeans).
The most important foreign market for German manufactured clothing is Austria, followed by the Netherlands, France, Switzerland and Poland. The latter’s imports of German clothing increased by 30% compared to 2011. As first country outside the traditional European context, Russia is the 7th biggest importer of German garments and has imported 14% more in 2012 (see Figure 2.4, GermanFashion Modeverband, 2013b). On the other hand, China stays on top of Germany’s supplier list; Turkey, Bangladesh, India and Italy follow (GermanFashion Modeverband, 2013c).

Poland, France, Italy and Austria (in that order) are Germany’s most important export markets for textiles. The US is the biggest non-European importer. Top textile suppliers in Germany are once again China, as well as Italy, Turkey, Belgium and India (Eriskat, 2011). According to recent events, such as the Collection Première Moscow (CPM) 2013, Russia, Kazakhstan and Ukraine are the most promising export markets for German textiles. (Textilwirtschaft, 2013)

2.5 Role of Germany in the global T/C Industry

The role of Germany in the global textile and clothing industry can be identified through several different criterions, such as the number of employees or of trade results. In this case, Germany can be described as one of the leaders in the worldwide T/C industry in terms of

- Advanced innovation and technological developments of products and processes
- Global textile exports
- Specialized and high-tech work- and protective-wear, as well as functional outerwear products
- High quality production
- Sustainable developments and processes

On a global grid, internationally recognized German T/C producers belong to the specialized segment; their products are not mass marketed or made attractive by low prices. Their area of expertise varies from technological textiles, protective, work and functional outerwear to niche, limited edition and highest quality products. These German leaders command high market shares;
thus Germany ranks for example as a worldwide leader in the industry, next to the USA and Japan, in the technical textiles segment, with a global market share of 45%. (Deutsche Bank Research, 2011)

Further in this thesis, Germany’s position in the worldwide T/C industry will be analyzed closer by benchmarking it directly to other countries based on hard and soft KPIs.
3. What are the strong sides of the German T/C industry?

One of the main questions often raised is “How can Germany T/C producers compete with giants of the industry such as China?”. After analyzing the German T/C industry in general, it is evidence that a majority of production has been outsourced. But how exactly can the manufacture remainder successfully maintain Germany’s position as a production location?

Based on location factors, reasons for production in Germany will be determined in detail. Eventually, the disadvantages will be summarized briefly as well, in order to arrive at a critical appraisal of the industry.

Chapter two already concluded that the strength of the German T/C industry lies within innovation, functionality, high skills and flexibility. These will be rediscovered in this chapter alongside other location determining factors.

3.1 Definition location factors

Location factors are defined as “the entirety of all factors a manufacturer takes into consideration when choosing a location”, according to Gabler (2009, p.113). Furthermore, the Institute for trade knowledge Cologne describes them as economically influential and identifies them as sourcing, production and sales orientation (IFH, 2012). This present thesis focuses on first mentioned: sourcing and production. Depending on the type of business, specific location factors can be positive and negative. I will primarily focus on the positive aspects for the German T/C industry, as the objective of this chapter is to find its strong sides.

In order to give a better overview of all positive location factors for Germany, I shall divide these further into the categories “Hard” and “Soft”. This kind of division is admissible according to “degree of monetary quantifiability” (Gable, 2009, p. 113). While the first category is characterized by directly involved costs, the latter is of importance for choosing locations, but must not necessarily involve financial aspects.
3.2 Hard location factors

3.2.1 Supply skilled workers
As discussed in chapter 1.3.3 Germany disposes of a substantial high-skilled labor force, which is one of the country’s main assets. High-profile employees range from designers over production managers to engineers. These latter are dominating the technical textiles segment and are responsible for “above average” wages (Deutsche Bank Research, 2011). Evidently, blue-collar workers trained for the T/C industry make up a smaller segment of the labor force. Germany also offers the skills for production of high quality casual/evening wear, particularly in SMEs (Small and Medium Enterprises) according to Michael Rapiau, owner of Rühlmann & Co (appendix B). In a personal interview Katrin Wieschenkaemper, the owner of a high standard fashion producer, stated, “knowhow for manufacture of high quality garments is still available in Germany”. However, “unique handcraft needs to be retained in Germany”. Firms like hers favor local production to protect the industry (appendix A). A wide network of textile schools, research institutes, and supporting industries are promoting next generation successors. However, some professions, particularly in high quality pattern making are slowly starting to regress.

3.2.2 Proximity

3.2.2.1 Proximity to customer
Close customer contact is an advantage of local German production on many levels. It stimulates innovation processes and improves service, as well as benefiting short collection cycles and mass customization.\(^6\)

Commercial purchaser of technical textiles (e.g. for protective work wear or automobile upholstery) profit from close cooperation with their supplier as it stimulates the innovation process (Adler, 2004). Germany benefits from the fact that local customers are excellent clients and the top countries importing German textiles\(^7\) are almost all neighbor states. Employees from different companies come together and develop a product adapted to individual needs. Thus, here automotive companies such as Mercedes and nearby T/C producers cooperate, a process that the Indian Textile Journal (2007) calls a “symbiosis of economy and science”. Especially protective work wear, which is under strict health and safety regulations, benefits from proximity between supplier and customer. Protective work weak is a profitable market, since end-users (e.g. professionals dealing with harmful substances) have enough funding for regularly updating their corporate closet of functional clothing.

In terms of service, distance to customer, whether business-to-business or business to consumer, can be crucial. From a logistical point of view, producing locally is the fastest way to get a collection to the market. Here particularly the fast-paced technologically advanced segment benefits. Also, garment customers appreciate quick delivery, for example in case of missing orders, mending or elimination of production defects. Many appreciate a close distance to personally communicate and oversee short-term changes (Interview Michael Rapiau, appendix B). Particularly companies specialized in mass customization can enhances processes when their customers are close by. Many producers of industrial mass confection produce in Eastern European countries for

\(^6\) Mass customization: tailored garments industrially manufactured. Goal of mass-customization is manufacture of made-to-measure garments through „automation of production processes” (Dispan, 2009)

\(^7\) Poland, France, Italy and Austria (see chapter 2.4)
quick delivery of one week (Dispan, 2009), yet this time can be reduced even more within Germany.

3.2.2.2 Proximity to head office
Companies benefit from a close distance to their head office particularly in the sample making process. As designers and production managers, situated in Germany, make all decisions regarding that process, close physical distance to the head office is an advantage. A long distance between the two delays the development process, since garments in the making have to be sent back and forth per mail, and there is hardly any personal communication. In many companies, this factor is the crucial reason for undesired long lead times. (Henderson and Romberg, 2012)

3.2.2.3 Proximity to research institutes
Similarly to T/C customers, German research institutes are often highly involved in the product development of T/C suppliers. Both benefit from short distances as fuel for innovation. The variety of research institutes working on research direct or indirectly concerning textiles and clothing is exceptionally high in Germany (see 3.3.3). By coincidence most of them are clustered in specific areas\(^8\), so are most T/C companies, as discussed in Chapter 2.1. Manufacturer and research institutions in regions such as Neckar-Alb in Southern Germany are successful, because they cooperate with each other extensively. (Indian Textile Journal, 2007)

3.2.3 Productivity
The term productivity defines a ratio between output and input. According to the Bureau of Labor Statistics (2011), productivity “relates output to one or more of the inputs associated with producing that output”. Thus a raise in output per unit means an increase in productivity. The standard measurement of productivity is labor productivity, which is the ratio of output to e.g. time or wages.

The level of labor productivity in Germany is quite high if measured in output per time. Investments in technology and automation of processes have boosted textile productivity levels (+13% between 2005 and 2011 according to Statistisches Bundesamt, 2013c). This is also a result of higher capital intensity, as the supply of machinery has been heavily increased and of the more efficient use of labor time (Taplin, 2006). Particularly the decrease in the workforce is important for this development. Values for clothing and textiles also differ widely, as clothing productivity has decreased in the long term.\(^9\) On the other hand, the labor productivity value measured in output per wages is dissatisfying, because particularly in the textile industry most labor is expensive (see section 3.2.1). This is due to the high amount of high-wage occupations (such as engineers) involved in textile manufacturing.

3.2.4 Custom duty
One of the more obvious location factors of Germany is that of customs duty within the EU. Producing and then selling within the community generates no custom duties. This is a strong

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\(^{8}\) In Baden Württemberg, Bavaria and North Rhine Westphalia (Chapter 2.1)

\(^{9}\) By 16% between 2005 and 2011 (Statistisches Bundesamt, 2013c), though it has improved by 5% within the past 3 years
advantage against competition from outside of the EU and from free trade zones. With costs as high as 12% of the item’s value, this factor can be decisive. For example, the contents of a 40’ standard container (80% capacity) loaded with 30 000 welder jackets (value 51 € per item) shipped from Shenzhen, China to Hamburg, Germany will be increased by 74 501 € in form of custom duties. (See appendix F for calculation)

Here of course, it depends on the trade regulations, which party, buyer or supplier, carries the costs. In case of all Incoterms except for DDP (Delivered Duty Paid) the buyer is responsible for incoming custom duties and might choose German companies over non-EU suppliers in order to reduce costs. Under the Incoterm EXW (Ex Works), the customer also pays export customs clearance, which would add even more costs on non-EU shipments (UNDP shipping terms, 2008).

3.2.5 Infrastructure
Germany has a general infrastructure, which widely favors producers in terms of cost, quality and lead-time. According to the Global Competitiveness Report 2011/2012 of the Weltwirtschaftsforum (2011, cited in GTAI, 2013), Germany reached the second place in best quality of infrastructure in 2011. One of the main assets of this infrastructure is extensiveness and efficiency in goods and passenger transport. Additionally the quality of inland transportation and (un-) loading facilities of ports or airports is superior, as is the communication and energy infrastructure. (GTI, 2013) The fully developed train, water and road network enables speedy and secure shipments at low costs.

3.3 Soft location factors
3.3.1 Innovation
The innovation factor is the object of thorough cultivation within the German industry. Innovation, a term for “a new idea, method or device” (Merriam Webster, 2013), in the T/C industry is fueled by public and private investments, a variety of experience, competition and specialization. A long history of experience in various innovative research fields, e.g. Nano-technology, has helped Germany become technologically advanced to a large extent. (Krippendorf, Holst, Richter, 2009), and the T/C industry profits from this general development, first and second hand, may it concern product, service, organization or process innovation (Dispan, 2009) Furthermore, local T/C innovation is stimulated by one of Germany’s strongest competitors, particularly in the lead market technical textiles: the USA, which is also advancing consistently in this segment. The industry’s specialization in functional wear is an encouraging environment for new developments. In the past a majority of these have come from work wear (e.g. the jeans), and today functional wear opens doors to completely new markets, such as safety wear protecting from viruses.

3.3.2 Government support
In terms of governmental support, Germany provides a favorable climate, particularly for technological textiles and SMEs: The local government continually invests in research and development institutes, as well as it gives support to individual industry players.

101st place: Hong Kong, 3rd: Singapore.
From 2005 to 2011 the German government increased their investments solely in research and development by 46% to €13.2 billion. (BMBF, 2012a) One of these investments was for example the finding of the program “Intelligent Technical Textiles”, as part of a microsystems research. (Gesamttextil Jahrbuch, 2006) Between 2010 and 2013, about €27 billion have been invested in different areas, including key technologies highly beneficial for T/C businesses. (BMBF, 2012b) The German Association of Textiles and Fashion identifies nano- and biotechnologies, as well as production, material, energy and environmental technologies as further key areas. Also, a more efficient usage of new research results in products and processes are subject of a program called “Hightech-Strategie”. Particularly in supporting SMEs, of which the German T/C landscape mainly consists (see chapter 2.1), has this strategy has played an important role. (Gesamtverband textile+mode, 2006, pp. 24).

The German government further directly supports SMEs particularly in connection with entering new, important markets such as Russia and India. (Gesamtverband, 2012, pp. 32)

Furthermore, it is important to stress that the government does not directly subsidize the T/C industry. Therefore it secures full independence, as Sofie Mündel from the Federation of the Bavarian Textile- and Clothingindustry (VBT) remarked in a personal interview. (appendix C)

3.3.3 Research institutes
An important advantage, often mentioned in other connections, is the vast variety of research institutes that promote and stimulate the T/C industry. Specialized research centers, institutes with a wide range of application-range, private and public universities make up the versatile, internationally recognized scientific landscape.

Private enterprises and research institutes in Germany are characterized by high synergy. Thus, the field of T/C benefits from the research results of other areas, such as chemistry, material development, in general, as well as machinery and vehicle construction

Amongst the most prestigious of their number are the Bekleidungs Physiologisches Institut Hohenstein (BPI), concentrating on clothing physiology, and the “Deutsche Institute für Textil- und Faserforschung Denkendorf” (DITF), focused on textiles and fibers and biggest textile research center in Europe. The BPI continuously assists companies, particularly local SMEs, to set foot or even create significant markets of the future through their studies. The German Ministry of Economics has honored BPI for its diversity and ability to convert the results of theoretical studies into practical products in form of high standard innovations. (Fibre2fashion, 2008) With the DITF, enterprises of every part of the chain can profit from the German research sector, as it is the only textile institution worldwide involved in the full production and value chain. (DITF, 2013)

3.3.4 Sustainability
It is difficult to clearly define the term “Sustainability”, yet one of its many definitions is “meeting needs of the present without compromising the ability of future generations to meet their own” (International Development for Sustainable Development). In a wider sense this means protecting

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11 Investments in the following departments: climate/energy, health/nutrition, communication, mobility and security, as well as key technologies.
the natural environment and restoring it where it has been compromised, simultaneously and well balanced on the environmental, social and economical levels.

The topic “Sustainability” is as present as never before in the global T/C industry. Companies of all kinds want to integrate it in their products and process, whether their motivation is authentic faith or attraction of customers. Germany is incorporating sustainability progressively on environmental, political and social levels, providing a promising base for businesses involved in or planning to enter this field. In 2011 Germany placed as 9th on an ecological and human sustainability ranking of 128 countries. (Phillis et al, 2011)

3.3.4.1 Climate and energy
Germany is one of the most advanced and continuously improving countries in climate protection and development of alternative energies, providing a helpful environment for sustainable businesses. The country has a controlling market share in different green technologies and a strong labor force in the environmental segment. (Buehler et al, 2011) In 2008, it set an official goal to reduce green house gas emissions by 21% in 2012. By the following year, it had already exceeded its goal with a decrease of 25.3%. The situation with regard to shift to renewable energies is similar: the target to raise their share to 12.5% had been exceeded with 17% before 2012 (Press and Information Office of the Federal Government, 2012). In the terms of sustainable infrastructure, alternative transport modes are promoted, as are green areas imitating nature to provide “environmental services”, e.g. storm water management (Buehler et al, 2011). Particularly in the textiles segment, the high level of technological innovation contributes to a better environmental footprint due to lower energy consumption. (Martinez, 2010)

3.3.4.2 Social compliance
In social compliance Germany overtakes other countries not just because of the obvious reasons such as good working conditions, but also due to activities to reduce the gender gap and improve integration. Certainly, labor laws in Germany are generally adhered to and stricter in comparison to countries known for defying human rights, such as China or Turkey. Particularly SME companies in the clothing business chose Germany as location to ensure fair working conditions and absolute transparency in this matter (Interview in appendix A, B). Furthermore, Germany emphasizes equality in the labor sector, for example through substantial women's quota in businesses. Thus reduction of the pay gap between genders to 10% is to be achieved in 2020. Lastly, Germany is one of the head runners in integration policies, significantly supporting social cohesion and poverty prevention. (Press and Information Office of the Federal Government, 2012)

3.3.5 Local image
Enterprises can benefit considerably from a local image, and not just due to the association with sustainability. Other values are associated with in Germany producing companies, and these have a positive influence on sales. This thesis solely focuses on the business side of the industry and not on consumers, yet this point is worth mentioning, as it is a significant location factor of Germany.

12 Yet, recently social compliance non-conformities at, amongst others, AMAZON has been revealed. (Kwasniewski, 2013)
3.3.5.1 Authenticity
The label “Made in Germany” is worldwide recognized and reserved for products actually originating in Germany. Originally, the German legislators with a view to “protecting local products from lower quality” had introduced the relevant regulation. (MBS, 2013)

3.3.5.2 Quality
Products manufactured in Germany are likely to be categorized in the “excellent quality” segment. As a result of social conditions, which allow low production costs, to countries such as e.g. China, India or Turkey have virtual monopolies on the manufacture and supply of low-cost (and low-quality) products. Thus, since its own production costs make competition in this area impossible, the only area of competition left for Germany is that of quality products and services (Krippendorf, Holst, Richter, 2009). Hence, German products and producers traditionally enjoy the authentic label of “excellent quality”. This applies also to German T/C products.

3.3.5.3 Tradition
Another positive local asset is tradition. Many firms producing in Germany are family businesses (see chapter 2.1) and therefore German companies are often associated with “heritage”, a term describing tradition (Oxford, 2005, p. 729). This association of family-owned business with tradition applies to a large part of the German T/C industry; even in cases of actual outsider majority holding. Since heritage also implies “fine craftsmanship” (Oxford, 2005, p 729), an association with high quality, this is also automatically resumed with regard to such German manufacturers.

3.3.6 Safety
A further asset of the German T/C industry is its distinctive emphasis on safety standards. Safety of product plays a particularly important role in the functional wear business. A vast number of DIN standards are updated frequently by the Deutsches Institut für Normung E.V. (2013), in order to maintain the position of highest quality, as well as of security standards. Businesses located in Germany profit from these standards, in terms of image, quality and safety. Particularly if their main market is German, cooperation with the developers of these standards is beneficial.

3.4 Factors unfavorable to the Germany T/C Industry
This thesis focuses on the factors, which favor the continued presence of manufacturing parts of the T/C industry in Germany. However, since there are also factors of disadvantage, it is only realistic to consider the main ones at this point as well, in order to give a complete overview. The unfavorable location factors mentioned in this thesis are only hard ones, as any soft factor of disadvantage did not have enough significance to be included.

13 Definition of heritage: „an inheritance; denoting a traditional brand or product regarded as emblematic of fine craftsmanship“ (Oxford, 2005, p.729)
14 Safety: e.g. through DIN norms only allowing specific substances in fabrics for protective wear
Quality: e.g. with the help of standards for the sewing process
3.4.1 Hard location factors

3.4.1.1 High labor costs
The primary disadvantages of Germany as a T/C production location is high labor cost. With a minimum wage of 7,50 (Statistisches Bundesamt, 2013d), Germany ranks among the upper labor cost segment. Even though wages in the T/C field are notably lower than in other German industrial branches (Dispan, 2009), this is a significant disadvantage. Due to extensive labor intensity, wages are of high importance particularly in the clothing industry and can be the deciding factor when choosing a location. (Deutsche Bank Research, 2011) Because of a lack of automation processes, garments still need to undergo numerous stages of manual manufacturing work and, given German wage-levels, this can become a serious cost factor.

3.4.1.2 Lack of qualified operators in the T/C industry
In the T/C industry, the supply of qualified operators is comparably low. For specialists such as sewing the demand exceeds supply, since, in comparison to other industries, the image, job security and wages of the branch are below average. Manpower potential for businesses outside of cities is hard to find (Mendel, 2013, appendix C). Furthermore, many specialists only use these jobs as steppingstone for a design career (Dispan, 2009).

3.4.1.3 Scarcity of raw material sources
Germany does have own sources of raw materials for fibers and therefore has to import these, leading to a handicap in lead time, cost and most of all dependency as synthetic fibers for the technical textiles industry have to be imported, thus putting Germany in a risky dependent position (Deutsche Bank Research, 2011). Also, fibers such as cotton cannot be produced in Germany. Often textile producers choose their location following raw material sources, such as cotton industry in the USA and Pakistan. Proximity to source improves cooperation with raw material producers, full independence with verticalization and lower transport costs as well as lead times.

3.5 Conclusion
The primary question in this chapter is: What are competitive advantages of this country with a long industrialized tradition? How can Germany compete with the global T/C leaders such as China? The answer is easy: It does not compete with the common textile and clothing leaders. The German T/C industry neither has the resources nor the motivation to be a player in the global fast fashion and low-priced T/C industry. Instead it has established a niche and remarkably attractive location for entities specialized in innovation and quality manufacturing.
One of the most beneficial features of the German T/C landscape is a government-supported network of research institutes and close cooperation of these with the T/C industry, which creates synergies (see figure 3.1). In order to gain market share in areas such as technological textiles or functional wear, the producers cooperate with research units and with each other (textile and clothing, as well as other connected branches).

In this case, the soft location factors more than balance the hard ones. This is due to the orientation towards research and innovation rather than cost.

As we have seen, the most significant difficulty of the German T/C industry is high labor costs, which cannot even be compensated by the high local productivity rates. (MBS) Thus many companies avoid Germany as production location. This is not necessarily negative though, as, on the buyer-market side, high wages mean firstly, better living standards, as a logical consequence more purchasing power. Prosperity also allows better professional training, which, in turn, benefits production.

The question is whether Germany is adequately positioned as a producer of predominantly high-tech, high-quality and high-price T/C articles or whether the country would profit more from a spectrum of fast fashion production in the low-price brackets. This will be analyzed in the next chapters.
4. How competitive is the German T/C Industry and for what entities is it recommended?

Having analyzed Germany’s role as T/C producer as well as its competitive edge, it remains to specifically determine the country’s level of competitiveness within the context of the global T/C industry, and subsequently, the suitability of different competitive strategies.

In order to analyze competitiveness, the term first needs to be defined and broken down into different, industry-relevant segments that can be measured (KPIs for T/C production). These values can then be compared with other countries’ data to determine Germany’s degree of competitiveness in each area.

Furthermore, this chapter considers different strategic orientations of T/C enterprises and examines which ones can benefit from German production.

4.1 Definition competitiveness

The term competitiveness is defined as “the ability of a company, country or a product to compete with others” according to the Longman dictionary (2013).

Competitiveness can only be determined by comparison. A high level of competitiveness is achieved, if a company or country scores relatively well in comparison to the others. The level of competitiveness can be determined in general for a country or firm, or it can be analyzed in detail per performance indicator.

4.2 What defines competitiveness in the contemporary T/C industry?

Today strong performances in areas such as productivity, wage level and sustainability make a firm or country competitive. In the past centuries, quotas used to have a larger influence on competitiveness than many of those values.

Many of the countries that currently hold the most dominating positions have only gained those within the past decade. Previously the T/C production landscape looked differently (Wick, 2009). Competition was more controlled by trading agreements. The WTO Agreement on Textile and Clothing (ATC), which included the MFA, limited developing countries’ exports of T/C goods to
developed countries, The Act served to protect developed nations from the strong cheap labor competition.\textsuperscript{15} As a result, the ATC generated a competitive landscape, where quotas were at least as important as advantages in wages levels and labor force. (Deutsche Bank Research, 2011)

After the last extension of the ATC in 2009, China gained a huge amount of market share, while developed countries such as the USA and European states lost in the same proportion (Deutsche Bank Research, 2011; Lane and Probert, 2005). Today Germany is the third largest export country of textiles and clothing in the world — the first place belongs to China and the second to Italy according to a study from the BMWi (2012). Ingeborg Wicke (2009) mentions that now quotas as the most important factor have been replaced by “accessibility of high quality textiles or fibers, lead times, labor productivity and wage level.” Various interviewed professionals (appendix A-C) emphasized sustainability, craftsmanship and training. These factors are of high importance for contemporary competition.

4.3 Measures of competitive performance: key performance indicators

In order to determine overall competitiveness, several sub segments leading to competitiveness have to be identified. Competitiveness can be measured on various levels with different outcomes. The most significant measurable competitiveness indicators for the T/C industry are used in this thesis: productivity, wage levels and training, innovation and sustainability. These indicators include most of the previously mentioned elements characterizing contemporary competition, and are based on a study conducted by the Institut Francais de la Mode on competitiveness in\textsuperscript{16} the clothing and textile industry. (IFM, 2007).

4.3.1 Methodology and competitors

This chapter to a large extent makes use of quantitative secondary data extracted from different databases, particularly Eurostat, German Statistical Bureau (Statistisches Bundesamt), Laboursta and OECD. This way the competitiveness can be measured objectively based on recognized fact. The benchmarked countries were carefully selected based on relevancy for the T/C industry and available data. Furthermore, the Global Competitiveness Report (Schwab, 2012) and the Global Innovation Index (Dutta, 2012) were used for additional figures.

The selected countries for comparison are Bangladesh, Belgium, China, Czech Republic, Japan, Turkey, the UK and the USA. Each of them represents a specific T/C segment. The Asian countries Bangladesh and China were chosen due to their high export volumes of T/C\textsuperscript{17} and because they represent the contemporary generation of T/C mass production. Belgium and the UK on the other hand are more known for higher quality production and their location factors are most similar to Germany’s (Lane, 2005). The Czech Republic, in turn, represents the Eastern European T/C industry, which has been growing steadily particularly in the short lead-time segment (Curran, 2012). The USA and Japan, are technologically very advanced and strong competitors of Germany.

\textsuperscript{15} Even though the act did not completely fulfill its purpose: low wage economies that were underestimated and thus had higher quotas available started thriving T/C industries, and many European countries, having failed at using the MFA advantages, failed to develop the necessary strong T/C structure under its protection.  
\textsuperscript{16} Amongst others  
\textsuperscript{17} In 2011 Bangladesh had the highest growth rate of T/C exports (+17%) and China was world wide T/C export leader with market shares of 32% and 37% respectively (WTO, 2012)
in the technical textiles sector (Eriskat, 2011; IfM, 2007). Lastly, Turkey is one of the most important T/C producers in the world\(^{18}\) with advantages in availability of labor and wage levels similar to China (see below Figure 4.2), but, above this, in quality, communication and lead times.

### 4.3.2 Productivity

In his “competitiveness framework” Michael Porter actually defined competitiveness (“of a location”) with productivity (“that companies located there can achieve”). This is based on the thought that productivity is “the key determinant of the level of prosperity a location can sustain over time” (Porter, 1990). For the purpose of this thesis, I chose not to follow his example, and therefore did not simply focus on productivity, in order to highlight the different competitive aspects of a country or company. This perspective has hardly been discussed in literature and is extremely important. In-depth interviews conducted for the purpose of this thesis have shown that manufacturers can be competitive without over-average productivity levels\(^{19}\), if they excel in other categories. (also see Chapter 3.2.3)

#### 4.3.2.1 Comparison

Below values indicate the productivity value of a country in comparison to the EU-27.

<table>
<thead>
<tr>
<th>Country</th>
<th>Labor Productivity Value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>n.a.</td>
</tr>
<tr>
<td>Belgium</td>
<td>127.7</td>
</tr>
<tr>
<td>China</td>
<td>n.a.</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>74.1</td>
</tr>
<tr>
<td>Germany</td>
<td>106.7</td>
</tr>
<tr>
<td>Japan</td>
<td>95.6</td>
</tr>
<tr>
<td>Turkey</td>
<td>70.9</td>
</tr>
<tr>
<td>UK</td>
<td>143.6</td>
</tr>
<tr>
<td>USA</td>
<td>103.6</td>
</tr>
</tbody>
</table>

*per person employed

Index=100 (EU-27 average)

Source: Eurostat (2011)

*Figure 4.1 Comparison of labor productivity*

As can be seen, Germany’s position in labor productivity is competitive, since the productivity value of Germany is above average with 106.7. While this result is not outstanding, since it is far below the UK (143.6) and Belgium (127.7), in comparison to countries like Turkey (70.9) and Czech republic (74.1), holding positions far below average, Germany is a very competitive force.

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\(^{18}\) Ranked as export country number three behind China and India (WTO, 2012)

\(^{19}\) For example through sustainability or high quality, as Wieschenkaemper stated in a personal interview (appendix A)
4.3.3 Wages and Training

One of the most important aspects driving competitive edge is labor cost. Superior wages have lead to the decline of many T/C sectors in Western countries, whereas unbeatably low labor costs have promoted developing nations to dominating T/C producers. As demonstrated by the figures in this area shown below, Germany is no aggressive player.

Training on the other hand is very much encouraged in Germany. Generally, countries with additional and better training opportunities dispose of a larger skilled work force.

4.3.3.1 Comparison

4.3.3.1.1 Wages

<table>
<thead>
<tr>
<th>Country</th>
<th>Min. Wage €</th>
<th>Type</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>0,2</td>
<td>Sewing</td>
<td>Average</td>
</tr>
<tr>
<td>Belgium</td>
<td>8,6</td>
<td>Sewing</td>
<td>Minimum</td>
</tr>
<tr>
<td>China</td>
<td>0,4</td>
<td>Sewing</td>
<td>Average</td>
</tr>
<tr>
<td>Czech Republic**</td>
<td>2,39</td>
<td>-</td>
<td>Average</td>
</tr>
<tr>
<td>Germany**</td>
<td>10,4</td>
<td>Sewing</td>
<td>Minimum</td>
</tr>
<tr>
<td>Japan</td>
<td>5,3</td>
<td>Sewing</td>
<td></td>
</tr>
<tr>
<td>Turkey</td>
<td>1,3</td>
<td>Sewing</td>
<td></td>
</tr>
<tr>
<td>UK</td>
<td>6,5</td>
<td>Sewing</td>
<td>Average</td>
</tr>
<tr>
<td>USA</td>
<td>6,8</td>
<td>Sewing</td>
<td>Median</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Country</th>
<th>Min. Wage €</th>
<th>Type</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>0,2</td>
<td>Laborer</td>
<td>Average</td>
</tr>
<tr>
<td>Belgium</td>
<td>9,9</td>
<td>Laborer</td>
<td>Minimum</td>
</tr>
<tr>
<td>China</td>
<td>0,3</td>
<td>Threader</td>
<td>Average</td>
</tr>
<tr>
<td>Czech Republic**</td>
<td>2,56</td>
<td>Threader</td>
<td>Average</td>
</tr>
<tr>
<td>Germany</td>
<td>10,7</td>
<td>Threader</td>
<td>Minimum</td>
</tr>
<tr>
<td>Japan</td>
<td>6,4</td>
<td>Threader</td>
<td></td>
</tr>
<tr>
<td>Turkey</td>
<td>1,4</td>
<td>Laborer</td>
<td></td>
</tr>
<tr>
<td>UK</td>
<td>8,0</td>
<td>Laborer</td>
<td>Average</td>
</tr>
<tr>
<td>USA</td>
<td>7,6</td>
<td>Laborer</td>
<td>Median</td>
</tr>
</tbody>
</table>

Source: ILO

**Source: CeFe (2006)

Figure 4.2 Comparison of wages

Figure 4.2 shows that Germany is by now standard competitive in terms of wage levels. With 10,7€ per hour it heads this list with highest wage level for T/C producers, far above the most competitive value of 0,20€ (Bangladesh).
Differences exist between wages in the textiles and clothing sector, once again, due to the level of technology used. The textiles industry scores higher, because it is more automated and advanced than the clothing sector. (IFM, 2007) This becomes particularly clear, when including wages for non-manual labor such as an engineer’s payment ranging around 20€ per hour. (Gehalt, 2013.)

However, it has to be added that the foregoing data is a mix of average and legal minimum wages. The latter values are generally not the lowest ones of any given country, if dumping is considered. Even in Germany breaches of minimum wage barriers occur, particularly in the non-metropolitan areas (e.g. Bayrischer Wald or Schwäbische Alb). Here wages can decrease up to 6,98€ (Wick, 2009), which in part helps to improve Germany’s handicap in comparison to the other industrialized countries listed: UK, USA, Belgium and Japan.

4.3.3.1.2 Training

<table>
<thead>
<tr>
<th>Country</th>
<th>Training Value</th>
<th>Rank**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>2,9</td>
<td>126</td>
</tr>
<tr>
<td>Belgium</td>
<td>5,8</td>
<td>4</td>
</tr>
<tr>
<td>China</td>
<td>4,3</td>
<td>62</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>4,9</td>
<td>38</td>
</tr>
<tr>
<td>Germany</td>
<td>5,8</td>
<td>5</td>
</tr>
<tr>
<td>Japan</td>
<td>5,3</td>
<td>21</td>
</tr>
<tr>
<td>Turkey</td>
<td>4,1</td>
<td>74</td>
</tr>
<tr>
<td>UK</td>
<td>5,6</td>
<td>16</td>
</tr>
<tr>
<td>USA</td>
<td>5,7</td>
<td>8</td>
</tr>
</tbody>
</table>

*Highest score 7  
**out of 144

Source: Schwab (2012)

Figure 4.3 Comparison of training

The data is a reflection of the World Economic Forum’s measurement of education and training across all industries. It combines amongst others the quality of education systems, of enrollment rates and staff training, as well as of research and training services (Schwab, 2012).

In the field of training Germany performs remarkably well as the fifth best nation among 144 in total. Strong competitors are Belgium and the USA, whereas particularly Bangladesh is one of the least competitive nations in this respect.

The interaction between high labor costs and education becomes once more clear in this chapter. Higher developed countries are more competitive regarding training, which in turn increases wages. Generally, better training opportunities are a result of tradition and history, which produce superior levels of training culture, education and research institutes. In fact, Germany holds the fourth place in availability of research and training services. Germany and similar countries either dispose of specialized education or employers provide extensive in-company training. (IFM, 2007) The backside of the medal is that higher training levels invariably produce higher compensation demands. China’s levels in this respect are average, as opposed to its high score in wage competitiveness. This is due to the high amount of training (rank 45 in staff training) and education (rank 57 in education system quality) in cities.
4.3.4 Innovation

As stated several times in this thesis, innovation has become one, if not the, most important factor for growth. Particularly the T/C industry in Europe has used it as main defense after the quota abolishment. (IFM, 2007) However, all nations are participating in the race of growth of innovation. Whereas the industrialized countries focus on creating new innovations, mainly such technological ones, the less developed nations progress by adapting and improving existing ones. (Schwab, 2012)

4.3.4.1 Comparison

When comparing innovation “climates”, usually the first impulse is to benchmark R&D spending in different countries. However, as mentioned above, innovation involves more than that. It concerns social and business innovations as well as scientific research and development laboratories. (Dutta, 2012) Therefore, the Global Innovation Index (GII) is used in order to measure Germany’s competitiveness in this area. The GII is calculated based on the efficiency ratio of two pillars: innovation input and innovation output. While the first takes into account human capital and research, market and business sophistication (e.g. investment, innovation linkages, knowledge absorption) as well as infrastructure (such as ICT), the latter focuses on output from knowledge and technology (e.g. knowledge creation or impact) in addition to creative output (creative intangibles or goods and services). All of these factors have an important influence on innovation and are therefore the best basis for determining a country’s level of innovation.

<table>
<thead>
<tr>
<th>Country</th>
<th>Innovation Value GII</th>
<th>Rank**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>26,1</td>
<td>112</td>
</tr>
<tr>
<td>Belgium</td>
<td>54,3</td>
<td>20</td>
</tr>
<tr>
<td>China</td>
<td>45,4</td>
<td>34</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>49,7</td>
<td>27</td>
</tr>
<tr>
<td>Germany</td>
<td>56,2</td>
<td>15</td>
</tr>
<tr>
<td>Japan</td>
<td>51,7</td>
<td>25</td>
</tr>
<tr>
<td>Turkey</td>
<td>34,1</td>
<td>74</td>
</tr>
<tr>
<td>UK</td>
<td>61,2</td>
<td>5</td>
</tr>
<tr>
<td>USA</td>
<td>57,7</td>
<td>10</td>
</tr>
</tbody>
</table>

*Highest score 100
**out of 141

Source: Dutta, 2012

Figure 4.4 Comparison of innovation

Once again, Germany is among the most innovative countries. Place 15 out of 141 makes Germany one of the 10% highest-ranking countries. Both the UK and USA fairly succeed Germany, but all other nations in this comparison are less competitive. However, only Turkey and Bangladesh achieve less than the average value.

One of the main reasons for Germany’s satisfactory performance in this sector is its broad spectrum in terms of innovation. From processing (e.g. customization, operational excellence) through product (e.g. new materials, chemicals) to environmental (see Chapter 3.3.4.1) innovations, all
types of are covered (IFM, 2007). Particularly process optimization is important for a competitive status in the low-cost segment, which will be discussed later.

### 4.3.5 Sustainability

In the past two centuries sustainability has turned into an important aspect of competition in the T/C industry. Changes in processes, such as environmental efficiency, have become extremely important for cost reduction, starting from efficient use of energy or water and ending with waste disposal. Also, norms have influence on competitiveness. For example, strict chemical regulations require the T/C industry to produce products with maximum safety standards. This stimulates technical textile manufacturers to compete by continuously “increasing relevant technical standards”, as the IFM states in their Competitiveness Report (2007). On the other hand, it also restricts new competition without enough technical knowledge.

#### 4.3.5.1 Comparison

Measuring sustainability is difficult, as it involves many different factors combined under one term. Many rankings focus on only one of these aspects, such as the Ecological Footprint by the Global Footprint Network (2010) or the Yale University Environmental Performance Index (2012). However, in the T/C industry the social performance indicator is as important as the environmental one, therefore this thesis uses the social- and environmental adjusted Global Competitiveness Index (GCI) by the World Economic Forum (Schwab, 2012). There is no specific value for sustainability, only the adjusted version of the GCI, which measures overall competitiveness (based on various factors).

The sustainability index is divided in social and environmental pillars. The former includes “environmental policy, use of renewable resources and degradation of the environment”, the latter concerns “access to basic necessities, vulnerability to shocks and social cohesion”. (Schwab, 2012).

<table>
<thead>
<tr>
<th>Country</th>
<th>Social adjusted GCI</th>
<th>Sustainability adjusted GCI</th>
<th>Environmental adjusted GCI</th>
<th>Sustainability adjusted GCI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Belgium</td>
<td>5,9</td>
<td>5,46</td>
<td>5,46</td>
<td>5,68</td>
</tr>
<tr>
<td>China</td>
<td>4,61</td>
<td>4,27</td>
<td>4,27</td>
<td>4,44</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>4,89</td>
<td>4,66</td>
<td>4,66</td>
<td>4,77</td>
</tr>
<tr>
<td>Germany</td>
<td>6,37</td>
<td>5,92</td>
<td>5,92</td>
<td>6,14</td>
</tr>
<tr>
<td>Japan</td>
<td>6,1</td>
<td>5,42</td>
<td>5,42</td>
<td>5,76</td>
</tr>
<tr>
<td>Turkey</td>
<td>4,24</td>
<td>3,84</td>
<td>3,84</td>
<td>4,04</td>
</tr>
<tr>
<td>UK</td>
<td>6,03</td>
<td>5,62</td>
<td>5,62</td>
<td>5,82</td>
</tr>
<tr>
<td>USA</td>
<td>5,63</td>
<td>5</td>
<td>5</td>
<td>5,31</td>
</tr>
</tbody>
</table>

1-7 score
With 7 being the highest score
Source: Schwab (2012)

*Figure 4.5 Comparison of sustainability*

In terms of sustainability, Germany ranks highest amongst all countries selected for this thesis. It is ahead of all other T/C industries in environmental and social sustainability, scoring significantly high in the latter segment. The biggest competition in this category is the UK, Japan and Belgium, while China and Turkey perform inadequately. Therefore Germany is the most competitive as far as the factor “Sustainability” is concerned.
4.3.6 Evaluation of Germany’s competitive performance

<table>
<thead>
<tr>
<th>Performance</th>
<th>Rank (of 9)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Productivity</td>
<td>3</td>
</tr>
<tr>
<td>Wages</td>
<td>9</td>
</tr>
<tr>
<td>Training</td>
<td>2</td>
</tr>
<tr>
<td>Innovation</td>
<td>3</td>
</tr>
<tr>
<td>Sustainability</td>
<td>1</td>
</tr>
<tr>
<td>Average**</td>
<td>4</td>
</tr>
</tbody>
</table>

*With 1 being the highest rank
**In this case, all performance measures are weighted equally thus the average is calculated as follows: $(\text{Rank}_1 + \ldots + \text{Rank}_n)/n = \text{Average}$.

Figure 4.6 The German T/C Industry’s performance in the different categories

How competitive is Germany really in the global T/C industry? Of course, there is no absolute answer to this question as there is such a number of factors involved, as well as countless methods of measuring competitiveness and a vast number of ways to interpret the data. However, this thesis is one of only few others to propose an answer for the German case. Based on this specific assessment of competitive performance and my chosen data collection method, the answer is: yes, overall Germany’s T/C industry is competitive on a global level. However, the extent of competitiveness is different for each performance segment.

In this benchmarking mix, Germany reaches overall an above average competitive status. In comparison to the other eight selected countries, Germany’s level of competitiveness is above-average (Rank 4). In the five different performance categories Germany scores one first and one second place, as well as two third places and one last place. While the nation excels in sustainability and training, its major competitive weakness is wage levels.

This does not mean Germany is generally an above average competitor in the industry. Inclusion of any new performance category could change this picture. Furthermore, any one different performance measurement could be rated differently. However, a more advanced evaluation of competitiveness would be beyond the scope of this research and require a separate thesis dedicated to this subject.

What does the level of competitiveness mean for Germany? The foregoing ranking exercises show Germany’s strengths and weaknesses. The highly competitive segments should be developed further and upgraded. Above average scoring segments also have promising potential for growth with the right investments, whereas the less competitive sectors are less likely to be successfully improved. Here Germany can either implement completely new strategies, or focus on other segments that can make up for the weak ones. For example, the current advantages of low wage nations can be reduced with consistent cost-saving, low lead-time transport of locally produced items (e.g. through process optimization).
4.4 Competitive strategies

“To a very large extent competitiveness is a question of strategy and not of a particular sector of activity.” (IFM, 2007) Following the last subchapter that explored Germany’s performance strengths and weaknesses, this subchapter analyzes and recommends competitive strategies based on those.

The T/C industry is full of various types of manufacturers with diverse strategic orientations. One of the most prominent kinds of strategic direction at the moment is Cost Leadership with businesses such as ZEMANN and KIK focusing on the lowest price for their garments. On the other hand, there are T/C producers focusing on differentiation with unique products such as NIKE. There is slow and fast fashion, and various other kinds of brands. All of these businesses require different location factors. But which kinds of manufacturers would profit most from production locations in Germany?

In the following pages, this question will be answered. First, to give a simplified overview, basic competitive strategies will be analyzed with the help of Porter’s “Generic Strategies” model. Finally, the compatibility of these strategies and the location “Germany” will be assessed.

4.4.1 Porter’s “Generic Strategies”

“Though a firm can have a myriad of strengths and weaknesses vis-à-vis its competitors, there are two basic types of competitive advantage a firm can posses: low cost or differentiation”, Porter states (1985, p. 11). His “Generic Strategies” model focuses on the two elements in question, Low Cost and Differentiation, plus, additionally Focus/Segmentation as strategic directions. In his publication, he writes that ultimately companies can reach above-average results, and thus be competitive, by specializing in just one of these generic strategic areas (Porter, 1985, p. 12). Combining strategies is only in a few cases possible and potentially successful, as Porter states later on (Porter, 1990).

**STRATEGIC ADVANTAGE**

![Figure 4.7 Porter’s Generic Strategies](image)

4.4.1.1 Differentiation

The Differentiation strategy is all about uniqueness. Here the producer focuses on new, original products, which still fulfill buyers’ needs, and it positions it accordingly. (IfM Cambridge, 2013). Furthermore, Porter states the “reward for uniqueness” is a “premium price” (1985, p. 14). However, Thompson and Strickland expressed, that this strategy can include premium, as well as
Differentiation can also be implemented by creating unique branding around a less original product. Product differentiation can involve technological as well as creative innovation. Companies such as ADIDAS or HERMES and many technical textile producers mainly focus on Differentiation.

4.4.1.2 Cost leadership
Price is of utmost importance for the second strategy, Cost Leadership, or, as Keitel (1981) stated, the aim, is “underpricing everyone else”. This strategic advantage can only be achieved, if a manufacturer is “the low-cost producer in its industry” (Porter, 1985, p. 12). Companies try to make use of any possible cost advantage. Therefore the products are generally standardized and for a wide market. Cost leadership causes problems when too many competitors follow the same strategy for one product. In so-called “price wars”, profitability dangerously decreases (Porter, 1985, p.12) Particularly discounters such as KIK and NKD, but also fast fashion businesses such as H&M and GINA TRICOT partially are involved in Cost Leadership strategies.

4.4.1.3 Focus/Market segmentation
The last strategy tool, focus or market segmentation, is made up by two versions of the former two strategies. Most importantly, the focus strategy distinguishes itself through “a narrow competitive scope within an industry” (Porter, 1985, p. 15). Additionally, it specializes either in Cost Leadership or in Differentiation for this limited market. In both cases, the market segmentation strategy focuses on niche markets. This does not necessarily mean, the niche has to have “unusual buyers”; it can also be completely different production or delivery systems (Porter, 1985, p.16). Many German T/C companies have implemented a focus strategy, particularly in the sustainability or haute couture segment.

4.4.2 The T/C Industry and “Generic strategies”
The T/C industry is made up of thousand of different manufacturer types, which regularly make use of more than just one of Porter’s generic strategies.

Businesses worldwide follow strategies with focus on different parts of the supply chain (from design over marketing to manufacturing), on various customers (business to business or business to consumer), as well as on one or more performance instrument (such as costs, flexibility or quality). In addition to the foregoing examined standard strategies, the T/C industry often applies combinations of all of those. Amongst these are producers of components, such as textiles, oriented towards high differentiation and expensive prices for a small market, but at the same time their target groups are not geographically focused. Then there is mass customization. Here Differentiation plays an important role, as items can be very individual (such as made-to-assemble suits), yet also extremely low in price. Technologically advanced producers, particularly in the technical textiles segment, may highly differentiate themselves individually by product, whereas in contrast a small group may be turning simultaneously towards Cost Leadership. (IfM, 2007)

4.4.3 Evaluation of Germany’s compatibility with different strategic orientations
Which competitive strategies match Germany’s competitive strengths? Multiple strategic options as well as performance strengths have to be considered together in order to answer this question.
Taking into account conclusions arrived at in this and former chapters, Germany is a location to be recommended for production of firms in the Differentiation-field. Extensive resources in innovation, training and R&D are beneficial for Differentiation strategies, particularly niche markets. The smaller labor force may hinder large industry-wide production, but perfectly suits a quality-oriented and flexible environment.

Any strategy leaning towards overall Cost Leadership (whether it is combined with Differentiation, as mentioned in the previous chapter 4.3.1.4 or strictly cost oriented) will hardly benefit from German conditions. The competitiveness analysis in chapter 4.2 has shown labor cost is Germany’s predominant weakness. Business focused on low costs can only profit in Germany in combination with other strategies, such as local market base (here the low logistics costs could balance high labor costs). Another possibility for success of cost leaders in Germany is a large amount of high-skilled labor, as that can be even more expensive in other countries of the same quality standard (e.g. Scandinavia).

4.5 Conclusion

Even though the worldwide awareness on Germany’s T/C industry is quite unspectacular, Germany is unquestionably competitive on a global level, particularly in terms of sustainability and training, Germany enjoys large competitive advantages, even compared to other strong European forces. In almost all categories it beats T/C leaders such as China and Turkey. Yet the emphasis of Germany’s T/C industry remains on high quality and expertise, and therefore Germany is less the focus of attention.

Whether or not Germany will stay or even advance its competitive position depends on how its industry will handle strengths and weaknesses. The above-mentioned competitive advantages can be developed further and used to cover weaknesses. While specific strategic businesses, particularly in the Cost Leadership sector, are unlikely to benefit from local production, enterprises directed towards other goals, specifically any kind of Differentiation, can profit extremely from it. Of course, the main market share of global T/C products will still belong to cheap production countries, as competition is driven by wages. However, there are also options to challenge the low labor cost leaders of the world through process optimization. The remaining question is, whether this aspect might become even more important than wage competition in the future. This will be discussed in the next chapter.
5. What trends determine the future of the German T/C Industry and what are its prospects of development?

The objective of this thesis concerns the present and future of the German T/C industry. Within the past chapters, the current situation of that industry has been discussed from all angles. Therefore, this final chapter targets the yet missing aspect: What are its prospects of development near future? What trends determine its future?

These questions will be analyzed with the help of relevant mega trends. Furthermore, specific recommendations for improvement will be given in an additional article "Plan Innovation. How Germany can maintain its competitive status in the global textile and clothing industry".

In this thesis, the time frame “near future” is limited to the next thirty years, as this is the usual minimal timespan of megatrends, which are here used as a tool to determine the T/C industry’s future.

5.1 Trends

The future of the T/C industry is driven by projected trends. These can serve as guidelines for a potential picture of the German T/C landscape in the upcoming years. While most future trends are extrapolated from facts, they cannot be defined as facts themselves. Instead they have to be seen as possibilities.

5.1.1 Definition “Megatrends”

Megatrends are long-term trends with a foreseeable sustained impact on the economy, society and environment. They are “blockbuster of change” and influence at least three decades (Horx, 2007) with consequences for upcoming generations (Credit Suisse, 2013). Furthermore, megatrends can be of economical, social, political, technological or environmental nature, and have an influence on all kinds of industries. Additionally, a megatrend can have several sub trends and these may overlap. Similarly, one trend can oppose another. Megatrends deeply influence commercial and industrial players when analyzing risks and chances (Schwenker and Raffel, 2012).
5.2 Demographic transition

Demographics are changing on a global level, heavily influencing the T/C industry. Transitions of different economies are extremely opposing. Furthermore, many countries, most of all Western ones, are subject to increasing importance of health care. In comparison to other megatrends, this one is the most reliable due to its measurability. (Schwenker and Raffel, 2012)

5.2.1 Extreme population developments

The German T/C industry will face changes in labor availability and demanding markets due to the demographic evolution. This latter takes two extreme directions: a rapidly shrinking population in early-industrialized countries, and a heavily growing population in others. According to a UN study from 2010, world population will grow to more than 9 billion people up to 2050 (compared to 7 billion today), mostly in underdeveloped countries. (Gregosz, 2012) Meanwhile, the German population will shrink due to lower birth rates and, at the same time, age severely. (Gesamtverband textile+mode, 2012) This feud can have a diminishing effect on a country’s capacity for innovation. While the average life expectancy of the German population is expected to grow to 90 years in 2030, the global mean is likely to increase to only around 37 years (Martens, 2008).

This heavily influences the T/C industry in terms of labor availability. The shrinking, aging German population leads to a smaller labor force, across industries, and reduces the country’s capacity for innovation, which is an important competitive advantage of the T/C industry (see Chapter 2.3.1).

This trend can also be a driver for global evolutions in economic growth and distribution of wealth. While a growing population also means an expanding consumer market, a shrinking and aging one suffers from market saturation (Deutsche Bank Research, 2011). Demand for textiles and clothing will increase in developing nations\(^{20}\), whereas the opposite applies in regard of early-industrialized ones.

These developments have a tremendous influence particularly on the sustainability trend, as harmful emissions increase with growing population size.

5.2.2 Health

With the demographic shifts come significant changes in the health area, which in turn offer opportunities for the Medtech industry (medical technical textiles). The aging population has higher requirements for health care. While the increasing importance given to health is a result of the aging population, it is simultaneously a reason for the latter phenomenon. Currently industrial nations such as Germany and the US spent 11% and 14% respectively of the GDP on health, and these investments are supposed to triple by 2025 (Martens, 2008).

This is an important opportunity for the T/C industry, as health is not limited to medical aid and precaution measures, but also includes health-sympathetic functional clothing (currently in development are textiles that can measure heart rates, blood pressure and regulate body temperature). The demand for these will increase, and along with it the requirement for new innovative products in this market.

\(^{20}\) Presuming the economy’s level of wealth increases accordingly (an example is the Chinese middle class)
5.3 Sustainability in environmental preservation and energy efficiency

A more fitting labeling for “Sustainability” is necessity rather than trend. The requirement for sustainability will long surpass the next decades. In order for much later following generations to exist, it must become a fixed topic on the agenda of companies, organization, institutions and individuals. Environmental preservation, which includes resources as well as living spaces, and energy efficiency, will become subjects of highest importance for the T/C industry along with all other branches.

5.3.1 Resource and energy shortage

Unsurprisingly, there is no endless supply of resources such as water, oil or natural gas. Nevertheless, many economies depend to a large extent on these. Certainly the demographic changes towards a larger world population (Chapter 5.1.2) will lead to an even more severe resource shortage. Predictions show that gas resources only last around 63 years from now (Schwenker and Raffel, 2012) and oil for a maximum of 50 years (IEA, 2012). The T/C industry needs these resources (or alternatives) equally as much as other industries. A particular problem of the T/C industry is water scarcity. Manufacturing (and later on, when used by the end consumer, washing) of textiles and clothing requires large water resources, and on top of that it causes severe water pollution. Developments such as wastewater treatment plants reduce the problem of water scarcity, but for a long-term solution, manufacturing facilities need to run only on reused water. In order to overcome this obstacle, development of more efficient cleaning and production processes as well as alternatives for traditional resources will be required in the next decades. These will lead to increasing competition in the alternative resource market segment and in technological innovation. (Foresight companies, 2012) Already now, Germany is ahead of most states concerning wastewater management and alternative resources, yet it needs to continuously progress these developments. Nations that can evolve here will have competitive advantages.

Shortage of raw materials is likely to create significant shifts in the worldwide division of power (Schwenker and Raffel, 2012). In addition to the availability of natural resources, the financial and technical ability to put them to use, such as water in the T/C industry, will also determine the competitive status of nations (Gregosz, 2012).

5.3.2 Climate change

The global climate change is an already traditional trend, which will become even more significant in the future. Climate change, meaning increasing temperatures and extreme weather conditions, is bound to result in severe costs on ecological, economical and social levels (from tsunamis to intensive heat periods). These are caused by CO2-emissions from, among other sources, factories or traffic. The latter kind of emission is expected to grow by 40% until 2030 according to a prognosis by the International Energy Agency (IEA; Burmeister, 2012). As a result, the worldwide average temperature is supposed to grow by 0,5°C – 1,5°C during this time, leading to sea levels rising by up to 11cm. (Schwenker and Raffel, 2012). Particularly traffic emissions are very high in the T/C industry (a large part of all T/C shipments from manufacturer to stores come by road in several loads). Innovative measures to radically reduce emissions, as well as measures for protection against and/or reversal of climate change’s consequences will be important for coming decades.

21 In wastewater treatment plants water is cleaned from pollution to be reused. However, new water generally has to be added for reuse (Thirty, 2011).
5. TRENDS AND PROSPECTS OF DEVELOPMENT

5.4 Globalization III

Like “Sustainability”, “Globalization” is an old megatrend. However, the future form of globalization differs from what it has been in the past decades. This type of globalization does not concern on physically interconnecting countries, fundamental T/C outsourcing nor the buildings of technological network fundaments (Horx, 2007); the third type of globalization is taking the necessary steps further.

5.4.1 Multipolarity

Globalization is driving multipolarity22 and setting the T/C industry in motion. Economic power will shift from the early-industrialized countries more equally to the advancing developing countries, thus creating a more diverse landscape of power centers. (Credit Suisse, 2013) Among the main reasons for this are the financial and sovereign debt crises (2008 until today), which have heavily affected Europe and the US, but only slightly hurt upcoming Asian industrialized nations such as India and China. These economies have profited from foreign investments, which will boost other Asian countries in the future, as well. Goldman Sachs has predicted Brazil, Russia, India and China (BRIC) to become the dominant economies by 205023. (Gregosz, 2012)

As a result of these shifts in power and wealth, the T/C industry is on a long-term move towards other nations less prosperous at the moment (such as Myanmar, Central African countries). Rising wages in China and India are driving this development, similar to the European situation forty years ago. (Gregosz, 2012) This in turn means, these countries will shift strategic orientations from Cost Leadership to Differentiation, and are bound to become competition for Germany this segment.

5.4.2 Increasing global responsibility

Another aspect of Globalization III is an increasing global responsibility. People already have full communication access to everyday global happenings, as well as the possibility for virtual participation. This will develop further. (Early and newly) industrialized societies are now more directly confronted with global problems and put pressure on state governments or “world organizations” (e.g. UNO or NGOs) to interfere, whether this regards poverty, war or violation of human rights (Horx, 2007). A recent example for the T/C industry is the aftermath of the collapse of an over-crowded textile factory in Bangladesh, during which more than 1100 people were killed. The news immediately spread globally and customers of the factory (such as KIK, C&A and PRIMARK) were exposed to heavy critics due to non-compliance with human rights (Kazim, 2013). As a result of the public protests, a large number of firms (amongst others H&M, C&A, INDITEX) established an agreement, to improve safety and labor conditions in Bangladesh (Diekmann, 2013).

5.4.3 Networks

Some sources state, the “networks are the organizations of the future” (Horx, 2007). One long-term trend is fusions or acquisitions of companies into global conglomerates (Krippendorf, 2009).

22 „A multipolar world is characterized by more than two centers of power or interest“ (Herolf, 2011)
23 In addition to the US, which will hold its position.
Particularly in the T/C industry, outsourcing, open sourcing etc. is already a common procedure with global conglomerates. This development is expected to go even further thanks to information technology and interconnection through the worldwide web (Horx 2007; Singh et al, 2009).

5.4.4 Safety
On the backside of the medal, a fully interconnected world also increases the severity of safety risks. Increasing international terrorism is only one threat requiring new solutions. The terms “Safety” and “Protection” will become increasingly important, off- and online (See Chapter 5.1.5.1) (Burmeister, 2012). **Mainly offline threats offer chances for T/C firms when it comes to safety and protective wear.** With increasing requirement for safety solutions, the demand for products such as fire-resistant fabrics or UV-protective garments will grow.

5.5 Volatility and Knowledge
As stated by Burmeister (2012): “the future is volatile”. In order to cope with volatility, solid foundations are required to be created by education and shored up by the adequate application of modern technical tools.

5.5.1 Digitalization
The Konrad Adenauer Stiftung sees digitalization as the ultimate prerequisite for globalization (2012). It creates the infrastructure for a global network online, enabling quick and unlimited exchange of information, which played a big role in outsourcing of the T/C industry. Digitalization also erases the boundaries between work and private life, by introducing a shift to forms of work not physically dependent on the traditional workplace. Another significant step ahead will be the **interconnection of on- and offline production in the as yet, less internet-progressive clothing segment** (Gregosz, 2012). Overall, it is likely that investments in immaterial characteristics (such as service and technological interconnectivity) will continue to grow and the physical product will become less important. Along with this trend, many physical skills will be replaced by cognitive skills, which also requires different education systems. (Horx, 2007)

5.5.2 Mobility
On a global level, the impact of the factor “Mobility” will increase, particularly in terms of infrastructure (Deutsche Bank Research, 2011). Traffic is bound to multiply with growing populations and industrialization in developing countries, as well as with increasing demand for quick product delivery (which leads to several “Less than container load” (LCL) shipments instead of few “Full container load” ones (FCL)). **The fast-paced T/C industry is already heavily confronted with high demand for quick product delivery.** In order to avoid a critical increase of traffic emissions (see chapter 5.1.3.2), new kinds of logistical processes and system will have to be created, such as bundling (e.g. Bundling at the Source24), traffic automation and electronic mobility (Burmeister, 2012).

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24 Bundling at the Source is a program initiated by the Dutch fashion and textile organization Modint with the aim to “improve transport flows in terms of efficiency and cost-effectiveness”. It “reduces traffic and
5.5.3 Education

The education system of tomorrow will focus on new skills that can be acquired through virtual learning and independent of location. It will be more difficult to recruit enough skilled T/C employees due to a shrinking graduate rate.

In early-industrialized nations, most schools still provide students with non-contemporary skills from former parts of the globalization, particularly industrial expertise. (Horx, 2007) Slow changes to more contemporary subjects (e.g. sustainability or e-commerce) are already visible in universities and schools. This is development likely to continue on the long term (on various levels for different countries). “Massive Open Online Courses” (MOOCs)\textsuperscript{25} are the next step into globalized and fully democratized virtual learning. Even campus-centered scenarios of future studies include the digitalization of classes and assessments. (McKinsey & Company, 2013, pp. 55)

The T/C industry will have to struggle harder than other industries to compensate a shortage of high skilled workers in the future. Due to the demographic changes, the graduate rate in academic sciences will decrease and competition among enterprises for skilled engineers and managers will become extremely tough. (Deutsche Bank Research, 2011) At the “Textilwirtschaft Young Professionals Day” fair it was announced, this severe development has already started. (2013) Therefore it will be even more crucial to educate and motivate young professionals as thoroughly as possible. (Gesamtverband textile+mode, 2012)

5.6 Individualization

“Individualization” is a contemporary trend that will become even more fundamental with an increasing level of innovation, particularly in terms of digitalization, within the next decades. \textbf{With emphasis on technology and creativity, the current T/C trend mass-customization can be developed into individual customization} for every price class. Furthermore, it will become harder to create products for big target groups, as individualization leads to less uniformity in interests or tastes. (Horx, 2007) Thus borders between branches will blur more to create new product types for the taste of these complex consumers (e.g. symbiosis of medical, nutrition and clothing industries; Burmeister, 2012).

5.7 Conclusion

Defining the future with accuracy is impossible. However, it is feasible to create likely scenarios and trends. One word that returns in almost every megatrend is “Innovation”. This element will surely drive the next few decades and will continue to be in high demand on a global level. And it so happens, that “Innovation” is one of Germany’s main strengths. If used properly, Germany will be able to improve its competitiveness in the T/C industry in a decisive measure.

\textsuperscript{25}MOOCs are free, open online courses taught by amongst others professors from Princeton and Stanford. An indefinite number of mainly international students have free access to these courses, which include lectures as well as group work. A large number of courses are officially accredited (McKinsey & Company, 2013)
Of the two branches here under analysis, the textile industry has the chance to advance even more due to its connection with other, heavily expanding industries. Industries such as health care, building and protection are likely to increase more than others, and expanding mainly through product innovation. Here lie substantial opportunities with technical textiles. But also sustainability offers one of the main opportunities for Germany, as it has already achieved an outstanding position in this area.

Demand for German products is likely to grow in the next decades, if the country can maintain constant progress on a technical level. However, it will shift from Europe to developing and newly industrializing countries. It is safe to say, German demand for products and supply of workers will shrink, whereas other nations develop into the opposite direction. Many countries, which are already actively investing in German T/C products and services, are growing vigorously (e.g. Russia or Brazil).

However, with rising wealth these nations will also shift strategically from Cost leadership to Differentiation and become new competition for Germany in this segment. This is the most serious threat, next to a decrease in supply of skilled personnel, which is vital in order to stand up in the innovation area against countries that can count on significant growth of qualified staff. Measures have to be taken; otherwise the German T/C industry will lose its chance of staying competitive in the next decades.

Concrete recommendations for improvement will be discussed in the separate article "Plan Innovation. How Germany can maintain its competitive status in the global textile and clothing industry".
6. Conclusions

In the previous chapters, several sub-questions have been answered that all lead to the main question: What is the current situation of the German T/C industry and how can it develop in the future?

Contrary to common assumptions, Germany is a strong player in the global T/C industry through outstanding skills in innovation and quality. One of the most fruitful segments are technical textile (applied in work wear as well as other areas such as automobile or medical) and high quality clothing, often with a focus on sustainability. Companies choose the location Germany either because of it high innovation, stimulated by government funds and significant cooperation between manufacturers, institutes and universities, or due to social compliance and availability of local craftsmanship.

These skills currently place the German T/C industry in a competitive position, in the relevant parts. While the country highly competitive in terms of innovation, sustainability, training and productivity, it is of no account regarding the Cost Leadership market. Particularly high wages prevent Germany from entering this market.

But will the country be able to hold this position in the future?

Theoretically, the next decades offer many possibilities for growth and competitiveness for the German T/C industry. Megatrends such as demographic transitions, individualization, sustainability or the third phase of globalization, permit the assumption of changes in priorities and consumer markets. The main emphasis within the next thirty years will lie on innovation, whether in regard of resources, mobility, education or safety. Innovation is one of Germany’s strengths. Wealth and power will be distributed more equally to newly industrialized countries, which will gain importance as consumer markets with emerging economies. Many of these nations have an increasingly strong interest in German T/Cs. On this note, all interviewees shared the opinion that local production will increase in the future.

At the first glance, the future looks bright for Germany. However, in order to put potential success into practice, Germany needs to efficiently act on sustaining opportunities. Foreign competition in the areas where Germany so far is a leader will increase heavily within the next decades, particularly with the increasing power of the emerging countries. While Germany might have a head-start on sustainability and innovation, long-term competitiveness is not guaranteed. It has to
advance quickly through further internal cooperation, investment and education. Furthermore, it needs to quickly focus on new consumer markets.

If it succeeds in these respects, companies focused on product differentiation, particularly in the innovation and superior quality segment, will have a solid, lucrative production basis.
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Michael Rapiau, owner of Rühlmann & Co. Personal interview, 24 April 2013.

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B. Interview with Michael Rapiau
C. Interview with Sofie Mündel
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F. Calculation customs duties
A. Interview with Katrin Wieschenkaemper, owner of Kaethe Maerz

Notes from phone Interview, 26 March 2013.

Produzieren Sie Einzelstücke oder in welcher Auflage?
- 60 Teile werden jeweils 5 – 20 mal produziert

Wo produzieren Sie?
- regional
- neuerdings über Zwischenmeistereien

Was sind Ihre Beweggründe für deutsche Produktion?
- Hauptsächlich die Produktionsbedingungen
- Nostalgische Gründe
- Erhalt von hohem Qualitätsverständnis

Was sind die größten Schwierigkeiten dabei?
- vor allem die Kosten
- daher höhere Preise
- Kunden wissen dies jedoch zu schätzen

Was für Stoffe nutzen Sie und woher sind diese?
- zertifizierte Stoffe aus der Schweiz, Österreich oder Italien

Wie setzt sich Ihr Label von anderen ab?
- durch die hohe Qualität

Wer sind Ihre Kunden?
- komplett gemischt
- überwiegend um die 55+

Gibt es in Deutschland mehr Labels wie Ihres?
- mehrere, aber weniger hochwertig

Was sehen Sie als Chance für die Zukunft, was als Bedrohung?
- Es wird ein großes Umdenken geben.
- Viele Menschen wissen von den schlechten Bedingungen [der Umwelt], aber Ihnen ist es egal. In 5 oder 15 Jahren wird sich das ändern!

Können Sie sich vorstellen, dass wieder mehr lokal produziert wird?
- Ja, auf jeden Fall. Da glaube ich fest daran.
B. Interview with Michael Rapiau, owner of Rühlmann & Co.

Notes from personal interview, 24 April 2013.

Unternehmen
- Unternehmen seit mehreren Jahren, Laden vor 2 Monaten eröffnet
- Kunden: Touristen, die zufällig vorbeikommen, aber auch viele Berufstätige aus Büros in der Nähe
- Hauptsächlich Männerbekleidung, weil diese mehr den Wert des Produkts schätzen, da sie weniger kaufen, gar aus Notwendigkeit. Dafür aber bessere Qualität und nicht aufgrund von Trends.
- Am Anfang hielten alle nicht viel von seinem Konzept, mittlerweile verstehen die meisten es -> hat sich viel getan in den letzten Jahren

Deutsche Produktion
- Produktion in Deutschland, aber nicht in der Nähe vom Unternehmen (Hamburg)
- Keine Zwischenhändler, direkter Kontakt mit Herstellern
- Es gibt noch viele SMEs in Deutschland
- Kleine Mittel sind wichtig
- Jedoch keine Sonderfertigungen aufgrund von Kosten, nur Kleinigkeiten können geändert werden natürlich.
- Trims von anderen Firmen
- Großer Vorteil an deutscher Produktion: Kommunikation
- Viel einfacher, da man deutsche Hersteller einfach kurzerhand besuchen kann, wenn etwas auftkommt
- Auch gute Kommunikation, weil es keine Zwischenhändler gibt

Probleme mit Outsourcing in der T/B Produktion
- Generell negative Einstellung zu den meisten T/B aus Deutschland, die alle outsourceen
- Es geht immer nur ums Geld
- Globalisierung Teil davon
- Großes Problem: Preisdrückerei
- Mögliche Lösung: Zölle wieder Einführen (in Deutschland)
- vor 30 Jahren wurden in Deutschland noch Levi’s Waschungen gemacht
- sowie Lee in Belgien

Zukunft der lokalen Produktion
- In Zukunft wird es allgemein wieder mehr lokale T/B Produktion geben.
- Nur nicht alles wird zurückkommen
- Wenn Rühlmann & Co. mehr Produktionsvolumen hat, können sie auch Preise senken und dadurch mehr Arbeitsplätze haben
C. Interview with Sofie Mündel, Press at Verband der Bayrischen Textil- und Bekleidungsindustrie (Federation of the Bavarian Textile- and Clothing industry).

Notes from phone interview, 26 April 2013.

Was ist Ihre Rolle bei der Förderung der T/B Industrie?
- Unterstützung für arbeitsrechtliche Thematik
- Netzwerk
- Beratung

Was sind die Stärken und Schwächen der bayrischen T/B Industrie?
- Stärken
  o Strukturwandel dauert noch an
  o keine Subventionen, alles selbstständig aufgebaut
  o bestärkt aus den letzten Jahren hervorgegangen
  o kennen sich mit Globalisierung aus
- Schwächen
  o Schwieriger richtigen Zeitpunkt zur Veränderung zu finden
  o Technische Textilien in einigen Segment gut, aber nur wenige haben es speziell geschafft

Arbeiten Sie zusammen mit Hochschulen und Instituten?
- Projekte bezogene Zusammenarbeit
- Stehen in Verbindung

Gibt es genug Nachwuchskräfte?
- unterschiedlich per Region, in München z.B. ja
- individuell per Unternehmen
- noch gibt es genug
- noch viele Nachwuchskräfte in kreativen Berufen, aber der gewerblich/technische Bereich ist noch okay
- viel duale Ausbildung (schulisch mit Firmen)

Was sind zukünftige Chancen oder Bedrohungen?
- Wachsende Bereiche
- Beleidung:
  o gute Qualität, sich abheben und modisch sein
- Textilien:
  o Altenpflege, viel gesundheitliche Hilfe, im Pflegebereich (Inkontinenz z.B.)
  o Baubereich: Textilien als Baumaterial statt z.B. Stahl, die diese leichter sind
  o Renovierungen und Restaurationen
### D. Statistics Clothing Industry

<table>
<thead>
<tr>
<th>Clothing Industry Statistics</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnover</td>
<td>6759227</td>
</tr>
<tr>
<td>Leather wear</td>
<td>15477</td>
</tr>
<tr>
<td>Work wear</td>
<td>302154</td>
</tr>
<tr>
<td>Other overgarments</td>
<td>4589383</td>
</tr>
<tr>
<td>Underwear</td>
<td>909403</td>
</tr>
<tr>
<td>Other clothing and clothing accessories</td>
<td>149586</td>
</tr>
<tr>
<td>Fur</td>
<td>0</td>
</tr>
<tr>
<td>Hosiery</td>
<td>645210</td>
</tr>
<tr>
<td>Other clothing of crotched and knitted fabric</td>
<td>148014</td>
</tr>
<tr>
<td>Employees</td>
<td>28537</td>
</tr>
<tr>
<td>% of total</td>
<td></td>
</tr>
<tr>
<td>Employees/Business</td>
<td>172</td>
</tr>
<tr>
<td>Leath wear</td>
<td>251</td>
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<tr>
<td>Work wear</td>
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<td>Other overgarments</td>
<td>14082</td>
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<td>Underwear</td>
<td>5283</td>
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<td>Other clothing and clothing accessories</td>
<td>2431</td>
</tr>
<tr>
<td>Fur</td>
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<td>Hosiery</td>
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<tr>
<td>Other clothing of crotched and knitted fabric</td>
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<tr>
<td>Businesses</td>
<td>166</td>
</tr>
<tr>
<td>Leath wear</td>
<td>3</td>
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<tr>
<td>Work wear</td>
<td>11</td>
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<td>Other overgarments</td>
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</tr>
<tr>
<td>Underwear</td>
<td>30</td>
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<td>Other clothing and clothing accessories</td>
<td>23</td>
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<td>Fur</td>
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<td>Hosiery</td>
<td>16</td>
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<tr>
<td>Other clothing of crotched and knitted fabric</td>
<td>11</td>
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</table>

Source: GermanFashion Modeverband, 2012
### E. Statistics Textiles Industry

<table>
<thead>
<tr>
<th>Textile Industry Statistics &gt; 20 employees</th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Businesses</td>
<td>722</td>
<td>% of total</td>
</tr>
<tr>
<td>Spinning</td>
<td>40</td>
<td>0,0%</td>
</tr>
<tr>
<td>Weaving</td>
<td>103</td>
<td>0%</td>
</tr>
<tr>
<td>Finishing</td>
<td>108</td>
<td>0%</td>
</tr>
<tr>
<td>Technical textiles</td>
<td>122</td>
<td>0%</td>
</tr>
<tr>
<td>Crocheted and knitted</td>
<td>38</td>
<td>0%</td>
</tr>
<tr>
<td>Other</td>
<td>311</td>
<td>0%</td>
</tr>
<tr>
<td>Employees</td>
<td>64478</td>
<td>% of total</td>
</tr>
<tr>
<td>Spinning</td>
<td>3971</td>
<td>1%</td>
</tr>
<tr>
<td>Weaving</td>
<td>10226</td>
<td>2%</td>
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<tr>
<td>Finishing</td>
<td>7836</td>
<td>1%</td>
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<td>Technical textiles</td>
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<td>2%</td>
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<tr>
<td>Crocheted and knitted</td>
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<td>0%</td>
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<tr>
<td>Other</td>
<td>26310</td>
<td>4%</td>
</tr>
<tr>
<td>Turnover</td>
<td>11320634</td>
<td>% of total</td>
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<tr>
<td>Spinning</td>
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<td>29011%</td>
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<tr>
<td>Weaving</td>
<td>1765577</td>
<td>72628%</td>
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<td>Finishing</td>
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<tr>
<td>Technical textiles</td>
<td>2588126</td>
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<tr>
<td>Crocheted and knitted</td>
<td>573462</td>
<td>23590%</td>
</tr>
<tr>
<td>Other</td>
<td>4755358</td>
<td>195613%</td>
</tr>
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</table>

Source: Statistisches Bundesamt (2012)
### F. Calculation customs duties

<table>
<thead>
<tr>
<th>Schweißer-Jacke</th>
<th>Price</th>
<th>Mark up</th>
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</thead>
<tbody>
<tr>
<td>Welder jackets</td>
<td>51,00 €</td>
<td>2,3</td>
</tr>
<tr>
<td>Wholesaler</td>
<td>20,40 €</td>
<td></td>
</tr>
<tr>
<td>Supplier</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Calculation:

1. **Endproduct at retailer (excl. VAT)**
   - Price: 51,00 €
   - Mark up: 2,3

2. **Wholesaler**
   - Price: 20,40 €

3. **Supplier**
   - Cost: 612,000,00 €

4. **Transportation**
   - Ocean value: 30,000,00 €
   - Ocean rate: 1,07 €

5. **Insurance**
   - Ocean rate: 6,548,40 €

6. **Total Cost Transport + Insurance**
   - Total: 8,848,40 €

7. **Duty**
   - 12,00%

8. **VAT**
   - 19,00%

9. **Total Import Duties & Taxes**
   - Total: 192,463,00 €

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**Data Source:** Duane, Amfi, sea-transport.com, cargoinsurancecenter, Duty Calculator

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