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# **Market Study for Fully Automatic High-Performance Flour Bagging Machines**

Master thesis

Mechanical Engineering and Business Economics

Graz University of Technology

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## STATUTORY DECLARATION

I declare that I have authored this thesis independently, that I have not used other than the declared sources / resources, and that I have explicitly marked all material which has been quoted either literally or by content from the used sources.

Graz, .....

.....

(Signature)

## **Acknowledgement**

I would like to thank my supervisors for their help, support and guidance during the work on this thesis: DI Julia Soos and DI Hans Peter Schnöll from Graz University of Technology as well as Mag. (FH) Günter Haiden and DI Gerhard Steinmayr from Statec Binder.

Furthermore, I want to thank my parents, my brother, my partner and my friends for their moral support.

## **Abstract**

In this thesis an international market study for fully automatic high-performance flour bagging machines was conducted.

The most important criterion for finding out competitors in this field was that competitive products had to be operating fully automatic (no operator is necessary except for supervision and re-stocking the bag magazines). The performance of the machines had to be at least 600 bags per hour with bag capacities from 10 to 50 kg and powdered product. Open mouth bagging machines were preferred in the study.

The customers of such a high-performance machine were identified as large scale flour mills. An international survey for flour mills was carried out in order to determine the demands of the milling industry on flour bagging machines.

The interest of the milling industry in fully automatic flour bagging machines with a performance of either 600 or 1200 bags per hour was apparent. The most used flour bagging solutions at present are manually operated or semi-automatic open mouth bagging machines at present.

Furthermore, grain and flour trade data as well as flour production amounts worldwide were researched and examined. The biggest grain importers, the biggest flour exporters and the biggest flour producers were taken and further analysed to find out details about the milling infrastructures and general market potential.

A quantitative assessment of the chosen countries (which were grouped in geographical regions) was conducted together with five experts.

The highest rated countries in terms of market potential for the new fully automatic high-performance flour bagging carousel by Statec Binder were Turkey and the United States of America.

The second best evaluated category included France, Egypt, Nigeria, Sudan, South Africa, China, Russia, Indonesia, Mexico and Brazil.



## Kurzfassung

In der vorliegenden Masterarbeit wurde eine Marktstudie im Bereich vollautomatischer Hochleistungs-Mehlabsackanlagen durchgeführt.

Im Vorfeld wurden Kriterien festgelegt um die Mitbewerber im Bereich der Hersteller von vollautomatischen Mehlabsackanlagen zu identifizieren. Als Mitbewerber galten Firmen dann, wenn sie Produkte herstellten, welche die folgende Aspekte erfüllten:

- Die Maschine musste vollautomatisch operieren (menschliche Arbeitskraft ist nur beim Nachfüllen der Sackmagazine und Supervision vonnöten).
- Die Maschine musste in der Lage sein, bei Sackgrößen von 10 bis 50 kg und pulvrigem Produkt, mindestens 600 Säcke pro Stunde zu befüllen.
- Offensackanlagen wurden in dieser Studie bevorzugt.

Als Kunden solcher Hochleistungsanlagen wurden großindustriell angelegte Mühlen identifiziert. Aus diesem Grund wurde eine elektronische Umfrage für die entsprechenden Mühlen zusammengestellt und weltweit ausgeschickt. Besonders wichtig war es hierbei, die Anforderungen und Ansprüche der Mühlenindustrie an eine Absackanlage für Weizenmehl herauszufinden.

Aus der Umfrage ging ein offensichtliches Interesse der Mühlen an vollautomatischen Mehlabsackanlagen mit einer Leistung von 600 oder 1200 Säcken pro Stunde hervor. Festgestellt wurde, dass die momentan am häufigsten gewählte Absackmethode für Weizenmehl die Benutzung von manuellen oder semi-automatischen Offensackmaschinen ist.

Im Weiteren wurden der Weizenhandel, der Weizenmehlhandel und Weizenmehlproduktionsmengen weltweit untersucht. Die Länder mit den höchsten Weizenimporten, Weizenmehlexporten und den höchsten Weizenmehlproduktionsmengen wurden genauer analysiert um detailliertere Informationen über Mühleninfrastruktur und generelles Marktpotential der Länder zu erhalten.

Abschließend wurde zusammen mit fünf Experten eine quantitative Bewertung der potentiellen Ländermärkte durchgeführt.

Die höchste Bewertung im Bezug auf Marktpotential für das neue vollautomatische Hochleistungs-Mehlabsackkarussell von Statec Binder bekamen die Türkei und die Vereinigten Staaten von Amerika.

In die zweitbeste Bewertungskategorie fielen Frankreich, Belgien, Ägypten, Nigerien, der Sudan, Südafrika, China, Russland, Indonesien, Mexico und Brasilien.

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# 1 Introduction

In marketing and market research the main focus is to know the marketplace and the customer, as building profitable customer relationships provides an advantage in business.<sup>1</sup>

Developing a new product holds immense risks due to strong competition within industries and because there is always a learning process involved. But if a company neglects developing and introducing new products to the market, the risks it faces are to be threatened by new technologies, changing customer needs and increasing national and international competition.<sup>2</sup>

In order to counter threats of competitors and maintain one's position within an industry, gathering information about the market and the customers is a key feature, especially when operating globally.<sup>3</sup>

This paper focused on the sector of industrial goods marketing. Therefore, the model of business type specific marketing concepts introduced by Backhaus/Voeth is used. This model proposes to segment the business operations of companies which are located in the industrial goods sector into four sections: supplies business, system business, project business and product business.<sup>4</sup>

The information gathered in market research is used to identify marketing chances and problems, to develop, modify and verify marketing measures, to evaluate marketing success and to improve the understanding of the marketing process.<sup>5</sup>

Market research should be conducted in a series of planned steps. The first should be the planning, the second step should formulate goals and hypotheses. After that, the data collection and the data evaluation should take place.<sup>6</sup> In qualitative empirical research it is important to segment the collected data to evaluate it before the final assessment. In this fashion it is possible to take temporary knowledge and test it again in the proceeding research.<sup>7</sup>

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<sup>1</sup> Cf. Kotler/Armstrong (2008), p. 4 et seq.

<sup>2</sup> Cf. Kotler/Bliemel (2011), p. 509

<sup>3</sup> Cf. Backhaus/Voeth (2010b), p. 18 et seq., Kotler/Armstrong (2008) p. 96 et seq., Bauer (1997), p. 62 et seq.

<sup>4</sup> Cf. Backhaus/Voeth (2010a), p. 206 et seq.

<sup>5</sup> Cf. Kuss (2012), p. 2

<sup>6</sup> Cf. Olbrich/Battenfeld/Buhr (2012), p. 45

<sup>7</sup> Cf. Buber/Holzmüller (2007), p. 34

## 1.1 About the Company Statec Binder

Statec Binder has been a joint venture between Binder+Co AG and BT-Wolfgang Binder GmbH since 2008. The company is located in Gleisdorf near Graz in Austria as are the two mother companies.<sup>8</sup>

Statec Binder looks back on a long tradition concerning their mother companies. For more than 35 years, experience in packing technology has been successfully used all over the world. Due to proven technologies which are constantly developed and optimised, Statec Binder has managed to position itself at the forefront with new, innovative packing concepts. Thus, Statec Binder is the global market leader in high-performance open-mouth bag packaging. The company provides highly flexible solutions in the field of high performance packaging and palletizing of free flowing bulk goods.<sup>9</sup>

Statec Binder develops, designs and assembles all machines within its manufacturing plant. Up to the present time, more than 850 packing machines have already been supplied all over the globe and have been successfully installed.<sup>10</sup>

All varieties of packaging systems are offered for polyethylene (PE), polypropylene (PP) and paper bags with bag filling weights of 5 up to 50 kg, starting with the open-mouth bagging systems PRINCIPAC and CERTOPAC, both with high performance in a compact design. These models can also be combined with the bag producing module SYSTEM-R for operating with woven PP reels.<sup>11</sup>

The high-speed FFS (Form, Fill and Seal) bagging machine SYSTEM-T for packaging from tubular PE-film and the vertical FFS bagging machine SYSTEM-F for operating with flat PE-foil complete the high-speed packaging machinery segment.<sup>12</sup>

Fully automatic high-level palletizing systems and robot palletizers from the very latest state-of-the-art PRINCIPAL series round off Statec Binder's product portfolio.<sup>13</sup>

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<sup>8</sup> Cf. Statec Binder company presentation

<sup>9</sup> Ibidem

<sup>10</sup> Ibidem

<sup>11</sup> Ibidem

<sup>12</sup> Ibidem

<sup>13</sup> Ibidem

## 1.2 Current Situation

Statec Binder is currently operating in the field of high speed bagging of granular free flowing bulk products. Now a new field should be made accessible: bagging of flour and other powdery products. A new fully automatic high-performance flour bagging machine, type bagging carousel, was developed by Statec Binder in 2013. The new machine is planned to enter the market in 2014.<sup>14</sup>

Statec Binder has a number of competitors in the field of flour bagging on the worldwide market. Some secondary data about the competitors, the customers and the market exist within the company and are accessible. However, this data is not processed, incomplete and not detailed enough to give specific statements about the market and market potential.<sup>15</sup>

It is presumed within the company that most of the flour bagging worldwide is done manually, but that the market for fully automatic high-performance is growing.<sup>16</sup>

## 1.3 Research Issue

The market potential for fully automatic high-performance flour bagging machines is unknown. It is also not clear how many companies use manual, semi-automatic and fully automatic bagging machines for flour bagging. The competitors (especially in the field of high performance bagging) and the potential customers for buying a fully automatic high-performance flour bagging machine are not sufficiently known. It is also attempted to acquire information about the technical solutions which are used by the competitors and the fields of application of the competitor's products (e.g. is the same machine from a competitor which is sold for flour bagging also sold for other powdery products like milk powder or coffee powder?).<sup>17</sup>

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<sup>14</sup> Cf. Interview with Mag. (FH) Günter Haiden, Statec Binder Marketing and Sales

<sup>15</sup> Cf. Interview with DI Gerhard Steinmayr, Statec Binder Sales

<sup>16</sup> Ibidem

<sup>17</sup> Cf. Interview with Mag. (FH) Günter Haiden and DI Gerhard Steinmayr

## 1.4 Thesis Objectives

The market is to be analysed mainly on the basis of secondary data research. Potential customers should be identified as well as potential competitors. The competitor's technologies are to be researched and categorized.<sup>18</sup>

The company Statec Binder would like to enter the field of bagging flour (and later other powdery products). They would like to have potential customers and competitors especially in the high speed bagging segment mapped out.<sup>19</sup>

Goals of this thesis are:<sup>20</sup>

- Identifying competitors in the field of flour bagging
- Identifying technical solutions used for flour bagging
- Categorising the customers
- Identification of the flour production, demand and consumption in specific regions around the world
- Identifying the transportation and logistics on the flour market (bulk, bags, bags for household use)

Non-targets of this thesis are:<sup>21</sup>

- To create and propose commercial marketing strategies for flour bagging machines
- To develop market entrance strategies for different markets
- To give recommendations regarding specifications and requirements for technical solutions for the Statec Binder flour bagging machine.

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<sup>18</sup> Cf. Interview with Mag. (FH) Günter Haiden, Statec Binder Marketing and Sales

<sup>19</sup> Ibidem

<sup>20</sup> Cf. Interview with Mag. (FH) Günter Haiden and DI Gerhard Steinmayr

<sup>21</sup> Ibidem



## 1.5 Reference Framework

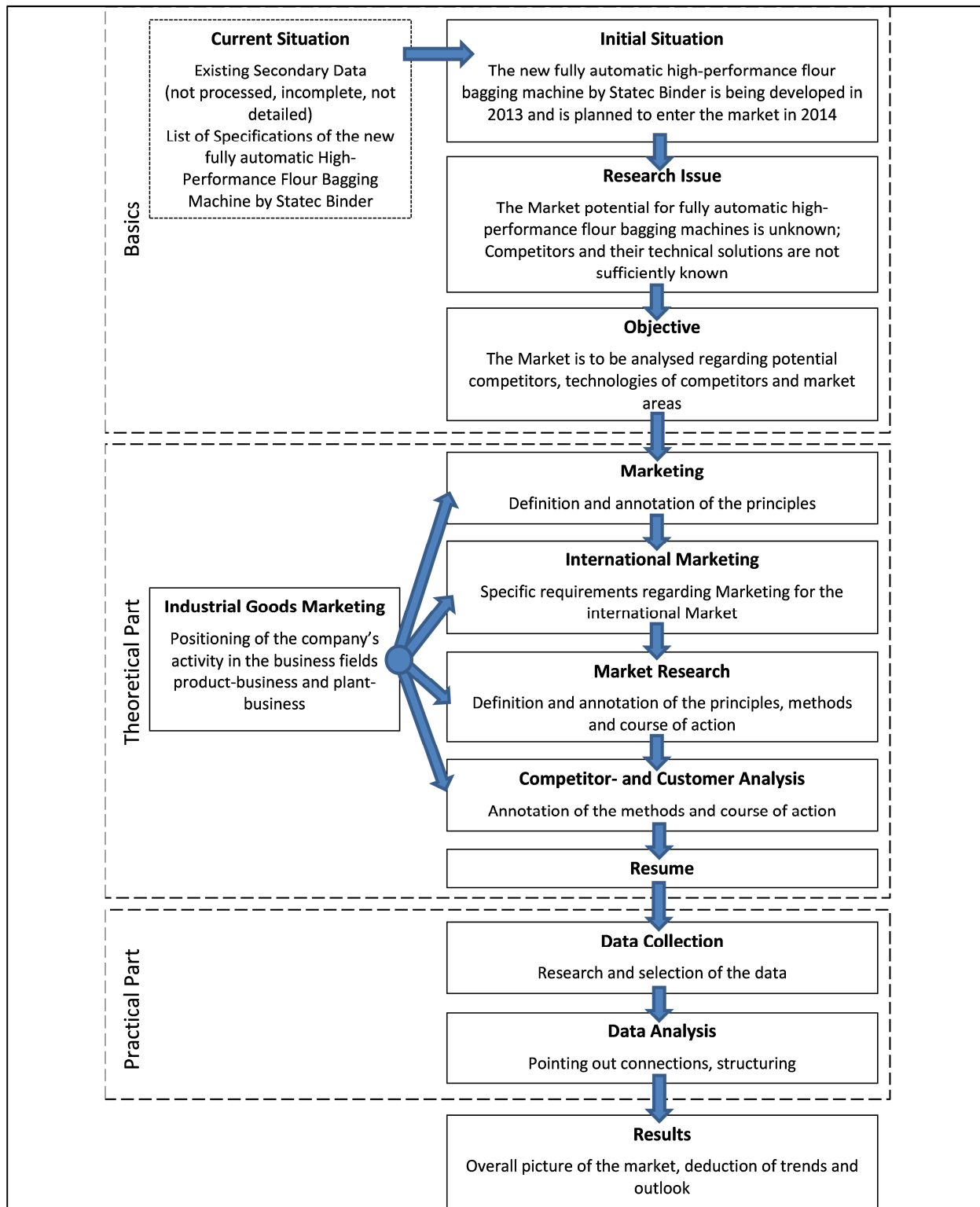


Figure 1: Reference Framework<sup>22</sup>

<sup>22</sup> Own Illustration

## 2 Theoretical Background of Market Research

At the beginning the theoretical principles and basics of marketing and market research are explained. Special focus is laid on the sector of industrial goods marketing and international marketing.

Furthermore, a quick overview of bagging machines and the flour production process is given.

### 2.1 Characteristics of Marketing

There are several definitions of the term marketing. Here a very general definition will be by Albaum et al. who define marketing as a business sector which includes planning, communication, distribution as well as goods and services for which there is an existing demand at both, potential and actual customers.<sup>23</sup> Kotler et al. regard it more important to emphasise the process character of marketing in an economic and social environment which focuses on the wish of the customer and the exchange of goods.<sup>24</sup> This second definition may be more fitting for the service sector and consumer goods marketing. The work in this thesis will focus on the industrial goods sector because the company Statec Binder is only active in this sector. Backhaus/Voeth see marketing as a tool that works across functions and that is defined as something that creates comparative competitive advantages. Comparative competitive advantages put your company in a better position than your competitors in the eyes of the customer. Examples would be better quality of your product (quality advantage), faster delivery of the product (time advantage) or a price advantage.<sup>25</sup>

Albaum et al. also define the fields of activity of marketing. Most important for this work will be the analysis of markets and potential markets<sup>26</sup> – which leads to the area of market research.

The marketing process is divided into three parts: goals, strategies and instruments.<sup>27</sup>

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<sup>23</sup> Cf. Albaum/Strandskov/Duerr (2001), p. 23

<sup>24</sup> Cf. Kotler/Bliemel (2011), p. 12

<sup>25</sup> Cf. Backhaus/Voeth (2010b), p. 10 et seq.

<sup>26</sup> Cf. Albaum/Strandskov/Duerr (2001), p. 23

<sup>27</sup> Cf. Broda (2002), p. 22

### 2.1.1 Marketing Goals

In general it can be said that the whole company should orient itself towards the needs of the market.<sup>28</sup> It can be said that the marketing goals result from the company goals.<sup>29</sup> The marketing goals can be put into two categories: growth targets (increasing the turnover or sales numbers or increase of return on sales) and cost targets (increasing the revenues through minimizing the costs).<sup>30</sup>

Kotler and Armstrong state that one of the main goals of marketing is to ensure the profitable growth of the company. For this purpose the following tasks have to be accomplished:<sup>31</sup>

- Identifying market opportunities
- Evaluating market opportunities
- Selecting market opportunities
- Laying down strategies to captures market opportunities.

One major goal of marketing is to create a strategy which provides guidelines in order to create a certain value in products or services for a group of target customers to obtain value in return.<sup>32</sup>

According to Becker, the main goals of marketing are:<sup>33</sup>

- High market share
- Level of distribution
- Price segmentation
- Image
- Degree of brand awareness

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<sup>28</sup> Cf. Bruhn (2009), p. 13

<sup>29</sup> Cf. Griese/Bröring (2011), p. 10

<sup>30</sup> Cf. Griese/Bröring (2011), p. 10 et seq.

<sup>31</sup> Cf. Kotler/Armstrong (2008), p. 42

<sup>32</sup> Cf. Kotler/Armstrong (2008), p. 53

<sup>33</sup> Cf. Becker (1990), p. 47 et seq.

## 2.1.2 Demarcation and Description of Markets

In economics, the market is the meeting place of supply and demand.<sup>34</sup> So the market consists of all potential customers with wants or demands who can and want to satisfy their needs through an exchange process.<sup>35</sup>

For a marketer a market is not limited to a certain product or product category (as it is in economics), but he differentiates between all sellers within a branch of industry or economic sector. Figure 2 shows a simple marketing system according to Kotler and Bliemel, where the relationships between buyers and sellers are shown. Goods and services are exchanged for money; the outer loop illustrates exchange of information.<sup>36</sup>

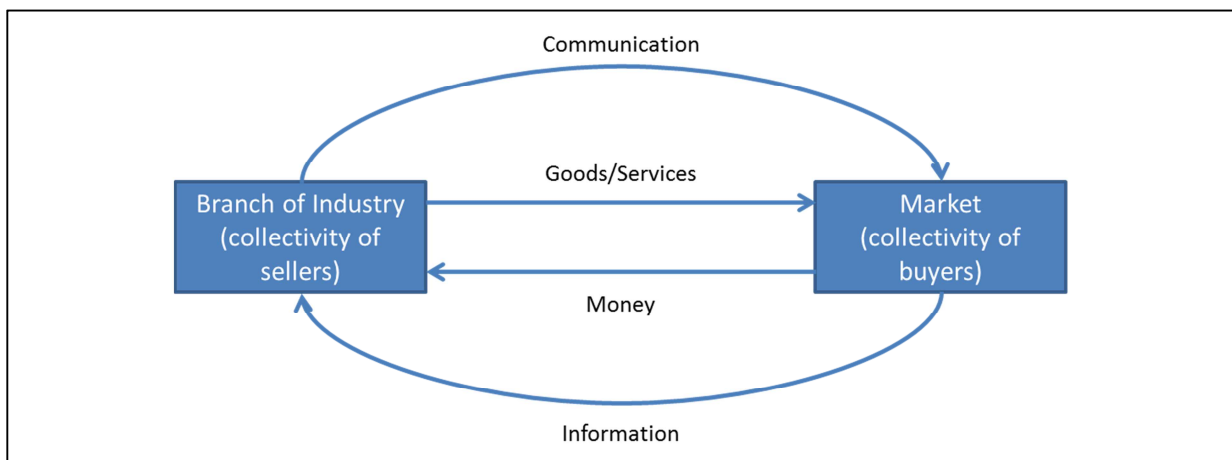


Figure 2: Simple Marketing System<sup>37</sup>

If you take a closer look at the market there are certain sections to demarcate and terms to specify:<sup>38</sup>

**Capacity of the market:** the capacity of the market means the total market for a product. A company has to demarcate the relevant market from the total market.

**Market potential:** the market potential depicts the absorption capacity of the market until market saturation for a specific product (e.g. the global sale of baby formula if all babies got this formula from their parents).

<sup>34</sup> Cf. Bruhn (2009), p. 19

<sup>35</sup> Cf. Kotler/Bliemel (2011), p. 19

<sup>36</sup> Cf. Kotler/Bliemel (2011), p. 20

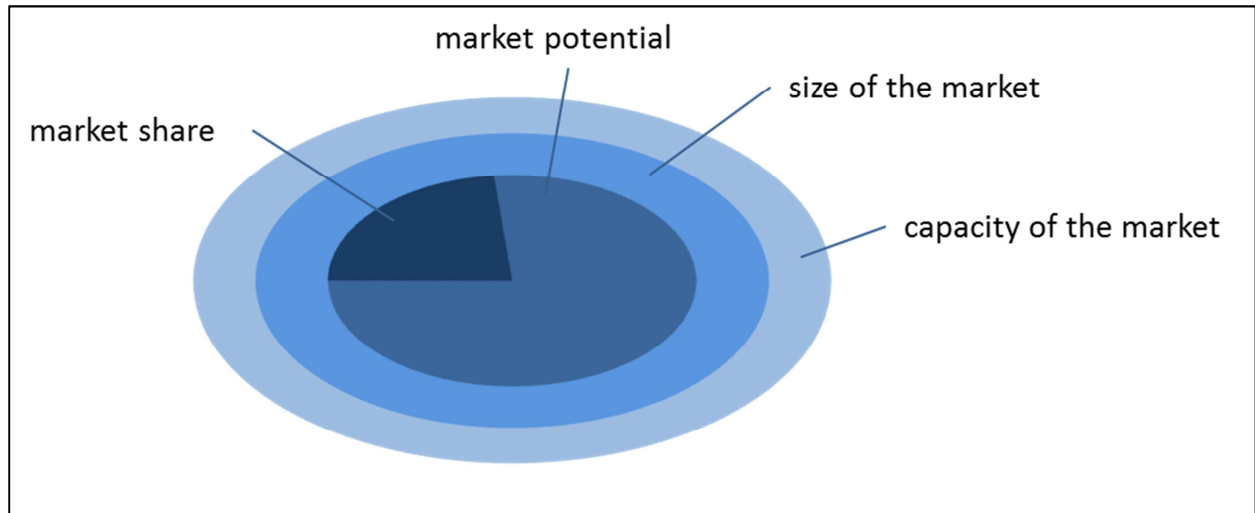
<sup>37</sup> Kotler/Bliemel (2011), p. 20, own illustration

<sup>38</sup> Cf. Giese/Bröring (2011), p. 19 et seq.

**Size of the Market (market volume):** the size of the market describes the total sales or turnover within an industry. All competitors are included, a key date is needed.

**Market Share:** the market share of a company expresses the ratio of the company's sales or turnover to the market volume.

Figure 3 depicts the different sections of a market.



**Figure 3: Size of the Market and Market Share<sup>39</sup>**

Kotler and Bliemel describe a method for dividing a market into segments. For the segmentation variables are needed. The segmentation process has three phases:<sup>40</sup>

### 1. Data collection

First, explorative interviews with users should be conducted. The results from the interviews should be used to create a questionnaire to gather more information about the product, how it is perceived by the customer and the prominence of the product and brand. This questionnaire is used in a survey which should be conducted with a representative sample of participants.

### 2. Analysis

A factor analysis is used to eliminate highly interdependent variables (the represent the same impact factor).

Afterwards the identified impact factors undergo a cluster analysis to identify a predetermined number of segments among the sample of participants.

<sup>39</sup> Cf. Michel/Michel-Oberholzer (2007), p.28, own illustration

<sup>40</sup> Cf. Kotler/Bliemel (2011), p. 428

### 3. Profile Building

Every cluster, which was found in the previous analysis must be described concerning different attitudes, behaviour patterns and demographic and psychographic characteristics. Every segment can be named after its most prominent characteristic.

Sometimes such a process has to be executed after certain periods of time, because the market segments can change with time.<sup>41</sup>

#### 2.1.3 Marketing Tools

The most commonly used tools in marketing and market analysis are shown in this chapter, including the four P's of marketing and the SWOT analysis.

The most important instruments of Marketing are the four P's of the Marketing-Mix:<sup>42</sup>

- Product
- Price
- Place
- Promotion

The product is the most basic element of the Marketing-Mix. It can be an actual material product (consumer good, industrial good) as well as a service. The term "product" also encloses packaging, brand image and customer service. The price has to feel adequate to the customer. This is an important factor on the market because of possible rivalry with products of competitors. Place encloses the means to make the product easily accessible to the customer. Methods for convincing the customer to actually buy the offered product (e.g. advertisements, online presence...) are found in the element promotion.<sup>43</sup>

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<sup>41</sup> Cf. Kotler/Bliemel (2011), p. 428

<sup>42</sup> Cf. Kotler/Bliemel (2011), p. 150

<sup>43</sup> Cf. Kotler/Bliemel (2011), p. 151 et seq.

Figure 4 shows the four P's of the marketing mix in a graphic illustration. They are important because the various combinations of the Marketing-Mix are the main strategy tools to reach the marketing goals on the target market.<sup>44</sup>



**Figure 4: The four P's of the Marketing Mix**<sup>45</sup>

For successful marketing it is important that the marketer begins with an analysis of the company's situation. This can be managed through conducting a SWOT analysis. The SWOT analysis identifies the company's strengths (S), weaknesses (W), opportunities (O) and threats (T) can be found out.<sup>46</sup>

In Figure 5 a graphic interpretation of the SWOT analysis is depicted.

<sup>44</sup> Cf. Kotler/Bliemel (2011), p. 149

<sup>45</sup> Kotler/Armstrong (2008), p. 51, own illustration

<sup>46</sup> Cf. Kotler/Armstrong (2008), p. 52

Internal	<b>Strengths</b> Internal capabilities that may help a company reach its objectives	<b>Weaknesses</b> Internal limitations that may interfere with a company's ability to achieve its objectives
	<b>Opportunities</b> External factors that the company may be able to exploit to its advantage	<b>Threats</b> Current and emerging external factors that may challenge the company's performance
External	Positive	Negative

Figure 5: SWOT Analysis<sup>47</sup>

The factors which occur can be internal, external, positive or negative. The combination is shown in the graphic above. The terms can be defined as follows:<sup>48</sup>

**Strengths** are positive factors that help the company in their business activities to achieve their strategic goals like resources and internal capabilities.

**Weaknesses** can be described as negative factors which hinder the company in following their business goals like internal limitations.

**Opportunities** are beneficial factors or trends provided by the external environment which the company can use to its success.

**Threats** are negative factors or trends provided by the external environment which may inhibit the company's activities and present challenges to its performance.

#### 2.1.4 Marketing Strategies

In this chapter some of the most popular marketing strategies and tools are introduced. They include the Boston Consulting Group (BCG) approach with their growth/share matrix and the matrix concerning product/market expansion by H. Igor Ansoff.<sup>49</sup> More strategies focusing on competitors can be found in the chapter "Competitive Strategies".

<sup>47</sup> Kotler/Armstrong (2008), p. 53, own illustration

<sup>48</sup> Cf. Kotler/Armstrong (2008), p. 52

<sup>49</sup> Cf. Ansoff (1957) p. 113-124 in Kotler/Armstrong (2008), p. 43



The BCG growth-share matrix plots the market growth rate on the axis of ordinates. This shows market attractiveness. On the axis of abscissae the relative market share is depicted. This shows the company's strength in the respective market. Figure 6 depicts the growth-share matrix introduced by BCG.<sup>50</sup>

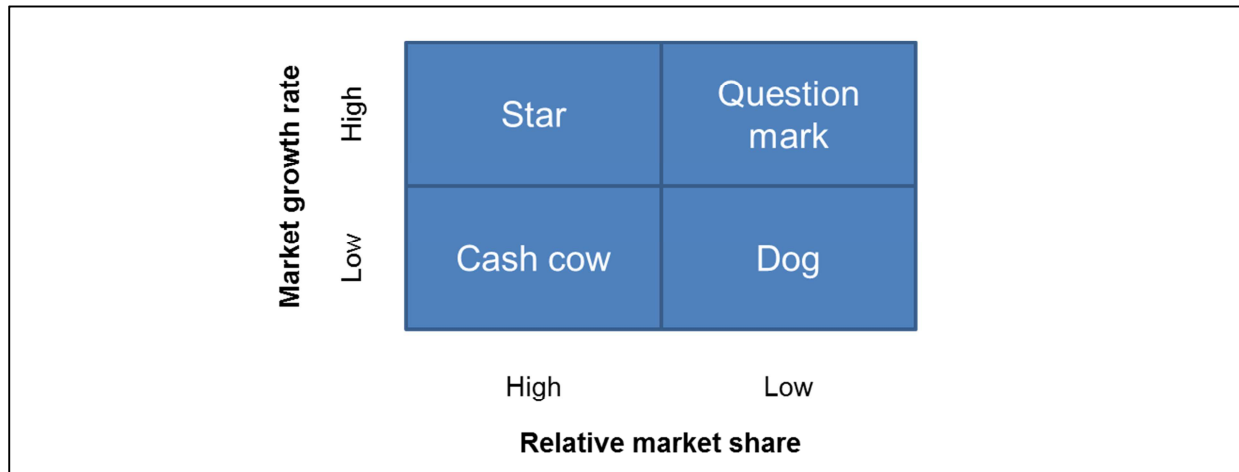


Figure 6: BCG growth-share Matrix<sup>51</sup>

The matrix is divided into four quarters which are called “Strategic Business Units” (SBUs). They are characterised as follows:<sup>52</sup>

**Stars** are positioned in the sector of high market growth rate and high relative market share. It can be the case that a lot of financing is necessary to sustain their rapid growth. In the end the growth rate should slow down and they turn into cash cows.

**Cash cows** are characterised through low growth and high relative market share. They are the most established and stable SBUs which can hold their market share without a lot of financial support. They usually provide the most cash for the company to pay bills and provide funds for investments.

**Question marks** are in the high market growth and low relative market share section. The future of a question mark is often unclear. A lot of cash is needed to support question marks. The management has to decide carefully which question marks to support to turn them into stars and which ones to dismiss.

**Dogs** are characterised through low market growth rate and low relative market share. Those products sometimes generate enough cash to support themselves but they are not very promising sources of income.

<sup>50</sup> Cf. Kotler/Armstrong (2008), p. 39 et seq.

<sup>51</sup> Cf. Kotler/Armstrong (2008), p. 40, own illustration

<sup>52</sup> Cf. Kotler/Armstrong (2008), p. 39 et seq.

The positions of products or services can shift over time within the four SBUs.<sup>53</sup>

In order to develop and choose strategies to achieve profitable growth of a company a useful tool is the product/market expansion grid introduced by Ansoff. It can be characterized as a portfolio planning tool for products.<sup>54</sup>

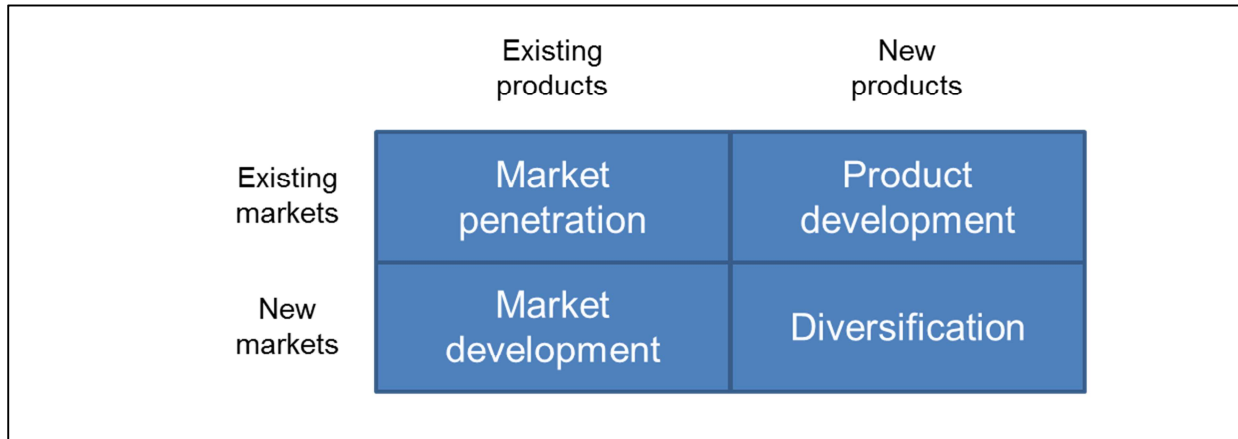


Figure 7: Product/Market Expansion Matrix by Ansoff<sup>55</sup>

The four growth strategies depicted in Figure 7 can be explained as following:<sup>56</sup>

**Market penetration:** to achieve higher market penetration a company has to sell more existing products to the currently existing market segment (e.g. selling more of the existing unchanged product to already established customers).

**Market development:** also in this strategy the product stays unchanged, but the company tries to access and develop new market segments (e.g. new geographical markets or demographic markets).

**Product development:** the management could decide to develop new products (or modify old products) and sell them on current markets.

**Diversification:** in this strategy the company acquires completely new businesses which have nothing in common with their current markets and products. It is also a possibility to start up a new business in order to achieve predictable growth. In this way new products in new market segments can be sold.

A company should not only concentrate on growing strategies, but also on **downsizing**. Unprofitable or no longer strategically fitting products or markets are abandoned.<sup>57</sup>

<sup>53</sup> Cf. Kotler/Armstrong (2008), p. 40

<sup>54</sup> Cf. Kotler/Armstrong (2008), p. 42

<sup>55</sup> Ansoff (1957) p. 113-124 in Kotler/Armstrong (2008), p. 43, own illustration

<sup>56</sup> Cf. Kotler/Armstrong (2008), p. 43 et seq.

## 2.2 Characteristics of International Marketing

The difference in definition from marketing to international marketing is that in international marketing services and goods are marketed across political borders. This difference influences the marketing management, the solving of marketing problems and using of marketing tactics.<sup>58</sup> When going international, a company has to deal with a different sociocultural, political and legal and economic and competitive environment.<sup>59</sup>

There is interdependence between international marketing and the “multinational enterprise”, in which the multinational enterprise is categorised by the fact that it has a certain level of foreign portion of products, turnover, investments and assets.<sup>60</sup> Therefore the definition by Meffert and Bolz is the following:<sup>61</sup>

International marketing is analysis, planning, execution, coordination and control of market-based company activities when there is business activity in more than one country.

Opening up new markets in other countries requires much more additional information because of unknown market conditions and different frame conditions. In addition to that, it might be difficult to get the information because the sources are unknown and have to be obtained.<sup>62</sup>

In an international operating organization a rather complex information process takes place. Teams, employees and facilities are often physically separated and several cultural and technical aspects may play a role. Therefore some means can help to optimize the information management. For example having a single uniform corporate language or using innovative software and communication technologies.<sup>63</sup>

### 2.2.1 Ethical Considerations in International Marketing

In international operating organisations it is possible to use a standardised Marketing-Mix worldwide. One has also the option of adapting the Marketing-Mix for foreign markets. Every company has to decide to what extent they are going to change their

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<sup>57</sup> Cf. Kotler/Armstrong (2008), p. 44

<sup>58</sup> Cf. Albaum/Strandskov/Duerr (2001), p. 23

<sup>59</sup> Cf. Albaum/Strandskov/Duerr (2001), p. 24

<sup>60</sup> Cf. Meffert/Bolz (1994), p. 24

<sup>61</sup> Ibidem

<sup>62</sup> Cf. Kutschker/Schmid (2008), p. 940 et seq.

<sup>63</sup> Cf. Neubert (2006), p. 65 et seq.

usage of marketing tools.<sup>64</sup> In addition some ethical aspects have to be considered concerning the Marketing-Mix when working internationally. In order to check the ethical risks there are certain questions which can be applied in the respective Marketing-Mix sections:<sup>65</sup>

- Product: could the product be harmful for the population or the environment of the target market country? Does it improve quality of living of the people?
- Price: is the price for the product fair? Is there a danger of being seen as dumping price?
- Place: is there a lot of corruption in the target market country?
- Promotion: could the home country or target market country interpret the promoting measures as bribery?

The American Marketing Association (AMA) demands the following ethical values when exerting international operations in international marketing.<sup>66</sup>

1. Honesty (be truthful in all situations and times, offer products of value, stand behind the products, honour commitments and promises)
2. Responsibility (serve needs of customers, acknowledge social obligations, commitment to vulnerable market segments)
3. Fairness (avoid false, misleading and deceptive promotion, reject manipulations, refuse to engage in price fixing, avoid participation in conflicts of interest, protect private information of customers, employees and partners)
4. Respect (value individual differences, listen to needs of customers, respectfully treat suppliers and buyers)
5. Transparency (openness in marketing operations, clear communication, explain risks that could affect customers)
6. Citizenship (fulfil economic, legal philanthropic and social responsibilities that serve stakeholders).

Furthermore, not only the demand for information increases when a company goes international, but also the need for coordination can be higher and there can be more uncertainty. All in all, the level of complexity rises. All these points result in a higher demand on marketing management on an international level.<sup>67</sup>

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<sup>64</sup> Cf. Kotler/Bliemel (2011), p. 634

<sup>65</sup> Cf. Albaum/Strandskov/Duerr (2001), p. 38 et seq.

<sup>66</sup> Cf. Griese/Bröring (2011), p. 21 et seq.

<sup>67</sup> Cf. Meffert/Bolz (1994), p. 22 et seq.

The goals in international marketing are the same as in national marketing: market goals, revenue goals, performance goals; but these goals must be specified and adjusted for every foreign country.<sup>68</sup>

The political and legal environment, sociocultural differences and international competition have to be taken into account when dealing with international marketing as well.<sup>69</sup>

### 2.2.2 Selection of Foreign Markets

In the beginning one has to define the market in order to be able to do the market segmentation. The analysis of the market should be done in steps. Geographic dimensions as well as distribution channels or customer segments can therefore be taken into account.<sup>70</sup>

There are a number of important questions a company has to ask when selecting new foreign markets:<sup>71</sup>

- Who buys our product?
- Who doesn't buy our product?
- Which benefit or function does our product have?
- Which problems are solved by our product?
- Which product is bought by the customers right now to satisfy the needs our product would address?
- Which price do the customers pay for that?
- When do they buy our product?
- Where do they buy our product?
- Why do they buy our product?

The answers to these questions should help to give a good picture over the situation.

In a next step the analysed markets can be categorised, in order to find the really attractive markets. A possible categorisation in core markets, promising markets, second-hand markets and abstinence markets is depicted in Figure 8.<sup>72</sup>

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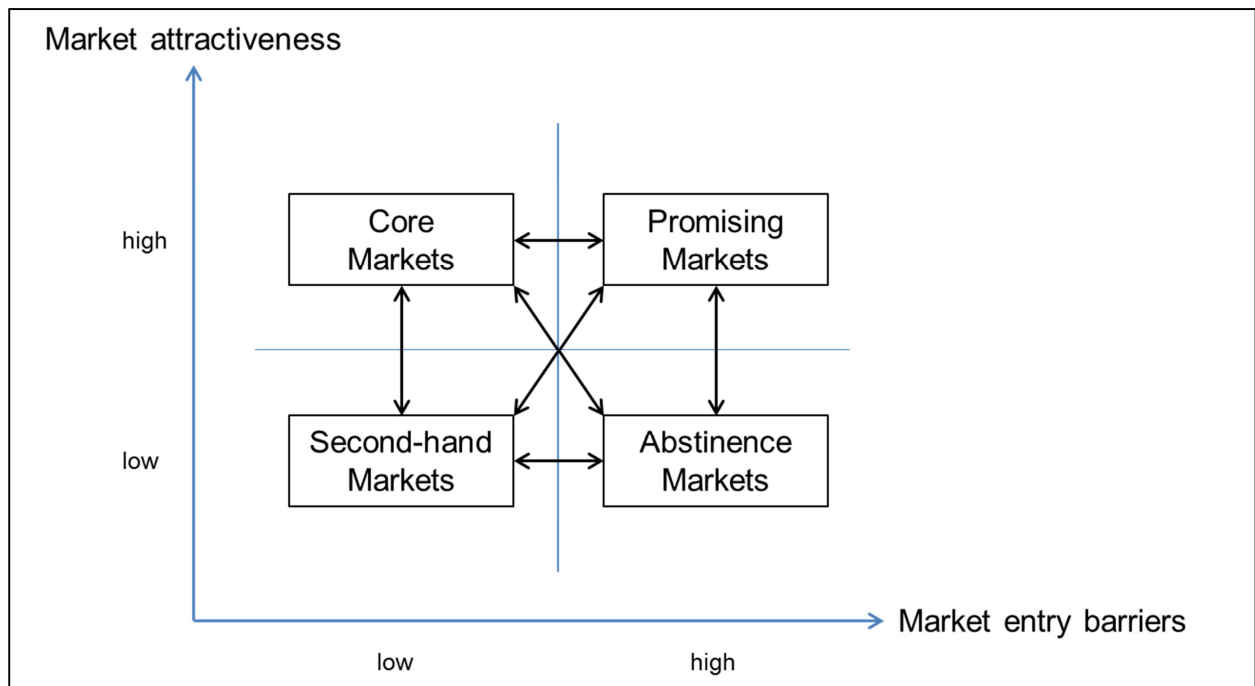
<sup>68</sup> Cf. Neubert (2006), p. 18

<sup>69</sup> Cf. Albaum/Strandskov/Duerr (2001), p. 89-119

<sup>70</sup> Cf. Albaum/Strandskov/Duerr (2001), p. 146

<sup>71</sup> Cf. Neubert (2006), p. 38

<sup>72</sup> Cf. Neubert (2006), p. 39



**Figure 8: Possible Market Categorisation**<sup>73</sup>

When selecting and classifying foreign markets the socio-cultural aspects of different countries have to be taken into account because the socio-cultural environment influences buyer decisions.<sup>74</sup>

The aspects of a socio-cultural environment concerning international business are listed below:<sup>75</sup>

- Language (spoken, written, official language, diversity, mass media, etc.)
- Religion (holy objects, philosophical systems, beliefs, prayers, taboos, holidays, rituals, etc.)
- Values and attitudes regarding:
  - Time
  - Performance
  - Work
  - Wealth
  - Scientific methods
  - Readiness to take risks
  - etc.

<sup>73</sup> Neubert (2006), p.39, own illustration

<sup>74</sup> Cf. Albaum/Strandskov/Duerr (2001), p. 89

<sup>75</sup> Cf. Terpstra (1978) in Albaum/Strandskov/Duerr (2001), p. 94

- Laws (written laws, laws for foreigners and residents, international laws, regulations, etc.)
- Education (professional education, primary and secondary education, higher education, illiteracy, etc.)
- Politics (national interests, ideologies, political risks, etc.)
- Technology and material culture (transport routes, energy systems, tools and objects, communication, urbanization, science, etc.)
- Social Organisation (social facilities, social mobility, social categories, authority structures, etc.)

In addition to the socio-cultural environment there is a political and legal environment which can influence business on international markets. The roles of the government and local laws have to be taken into account.<sup>76</sup>

### **2.3 Industrial Goods Marketing**

There are two different kinds of goods: consumer goods, where the end user is the private customer, and industrial goods, where the customer is an organization. Therefore, it can be distinguished between consumer goods marketing and industrial goods marketing. One of the characteristics of industrial goods marketing is that the demand is derivative. The customer is not a person but an organization. Very often it is not possible for a single supplier to realise a project, so a couple of suppliers join forces and form supplier communities.<sup>77</sup> Another point to take into consideration is that industrial goods marketing does not cover the same area and does not always cater to the same customers as business-to-business marketing.<sup>78</sup>

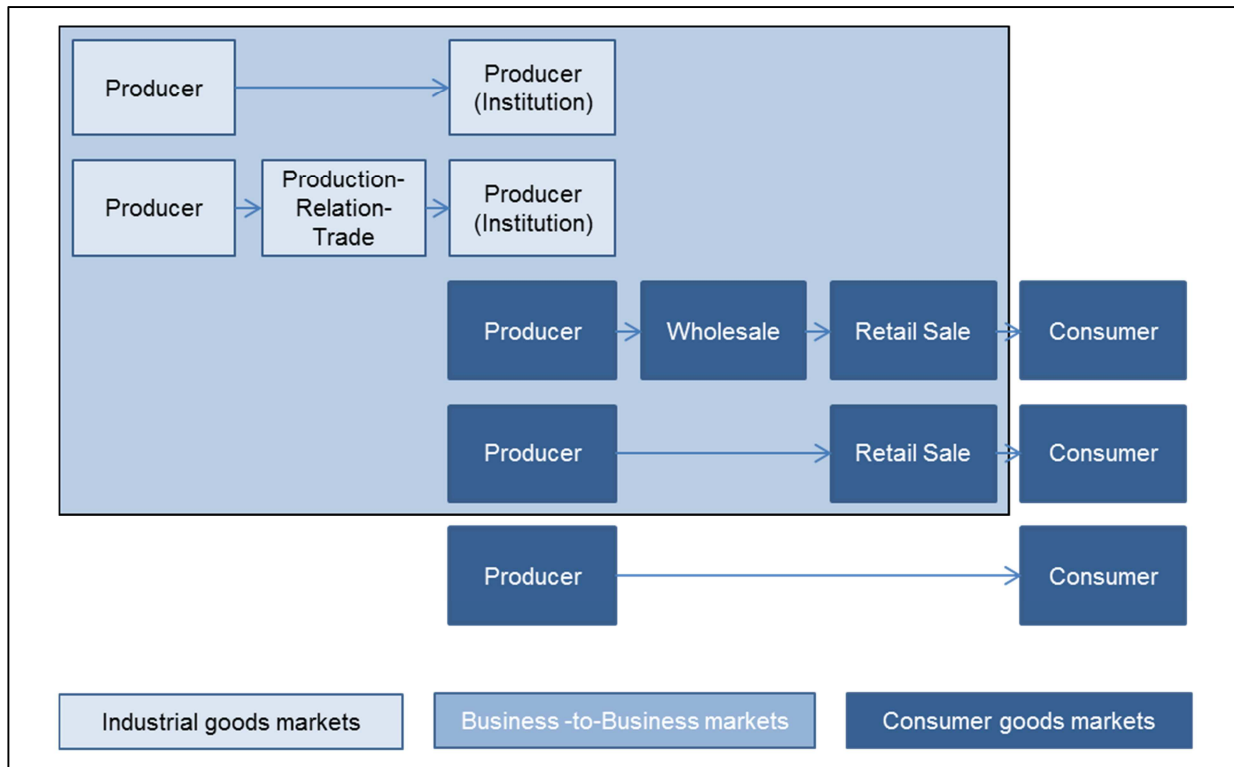
Figure 9 shows the differences between the two types of marketing with the help of the structured path from producer to customer.

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<sup>76</sup> Cf. Albaum/Strandskov/Duerr (2001), p. 101

<sup>77</sup> Cf. Backhaus/Voeth (2010a), p. 8 et seq.

<sup>78</sup> Cf. Backhaus/Voeth (2010a), p. 3-5



**Figure 9: Demarcation of Industrial Goods Markets**<sup>79</sup>

Backhaus and Voeth introduce the concept of business type specific marketing concepts. There are business transactions without dependencies after the conclusion of the contract. The uncertainty can be decreased by acquisition of enough information about the price-performance ratio of the supplier. This is the traditional assignment of marketing in these kinds of business transactions which hold no ex-post uncertainty. In reality there are also business transactions with ex-post uncertainty. Ex-post uncertainty occurs after the transaction when one contracting party depends on the other due to specific investments. It can also be the case that both parties depend on each other and are tied up in their business relation. For example, the customer depends on the supplier after the first business transaction: the customer wants to install a Computer Integrated Manufacturing System (CIM System) so he chooses a supplier and first only buys a Computer Aided Design System (CAD-System). Now the customer's employees are educated to use this CAD system. If the customer later wants to buy another piece of software later (a second module – or in this case a Production Planning System (PPS)) he will most likely use the same supplier from whom he bought the CAD-System because this guarantees an uncomplicated use and is the most productive solution. The new piece of software will have similar properties to one that is already in operation, so

<sup>79</sup> Cf. Plinke (2009) in Backhaus/Voeth (2010a), p. 5, own illustration



it is easier for the employees to operate. Thus the communication between the two modules will not be a problem.<sup>80</sup>

The following situation describes an example for a business type specific marketing concept: the supplier creates a very specific solution for the customer's problem. On the one hand he increases productivity because the customer will be willing to pay more for his customer-specific solution. On the other hand it's not possible for the supplier to use this very specific solution or asset on another customer. This means the revenues for this asset sink for some other application (opportunity). This deviation is called quasi-rent. The more specific a product, the higher the potential revenue, but the potential revenue for other applications is smaller. This leads to the situation that for a very specific product there are high tied up costs (for initial investments: sunk costs). The quasi-rent is the revenue on these tied up capital. The quasi-rent shows the rise of risk potential with increased specificity.<sup>81</sup>

On the customer side the quasi-rent functions as a tie-up beyond a single transaction. If the customer made a specific investment he is dependent on follow-up transactions.<sup>82</sup>

On the supplier side a specific investment is only existent if the asset can't be sold to another customer or at a later point in time.<sup>83</sup>

A quasi-rent either exists concerning a certain transaction on the customer side, on the supplier side or on both sides. This leads to the differentiation between the four basic business types:<sup>84</sup>

- Product business
- System business
- Project business
- Supplies business

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<sup>80</sup> Cf. Backhaus/Voeth (2010a), p.198

<sup>81</sup> Cf. Backhaus/Voeth (2010a), p. 199 et seq.

<sup>82</sup> Cf. Backhaus/Voeth (2010a), p. 201 et seq.

<sup>83</sup> Cf. Backhaus/Voeth (2010a), p. 203

<sup>84</sup> Cf. Backhaus/Voeth (2010a), p. 204 et seq.

Figure 10 shows an overview about the four business types in industrial goods marketing. It also depicts the interdependencies concerning quasi-rent, customer focus and level of tie-up in the purchase.

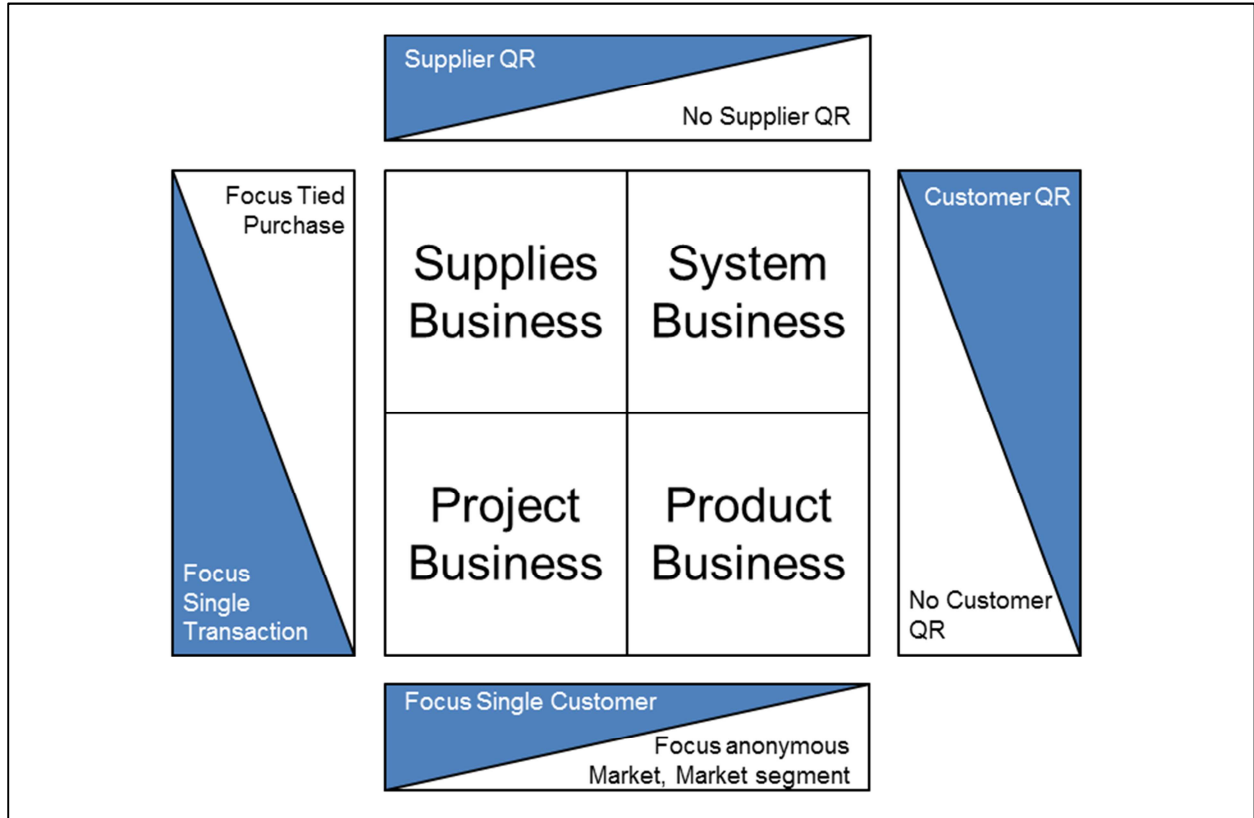


Figure 10: Demarcation of Business Types in Industrial Goods Marketing<sup>85</sup>

The company Statec Binder operates in two sections: the product business and the project business section. Their product is a combination of both. On the one hand their product is standardised and can be sold to various customers (roughly estimated around 70% of the transactions), on the other hand sometimes it is necessary to develop new plant solutions or completely customize the product (roughly estimated around 30% of the transactions).<sup>86</sup>

<sup>85</sup> Cf. Backhaus/Voeth (2010a), p. 206, own illustration

<sup>86</sup> Information provided by Mag. (FH) Günter Haiden, Statec Binder Sales

### 2.3.1 Characteristics of Marketing in the Product Business Section

Specific for the product business is that there is no focus on single customers. Products are produced for an anonymous market or for a group of customers. The purchase does not tie the customer to the supplier. On the contrary, single transactions with no ties in the purchase are characteristic for the product business. Due to this fact, in product business the “classic marketing approach”, which is known from the consumer goods markets, can be used.<sup>87</sup>

The market in the product business splits up into two sub sections: so called “Commodity Markets” and “Specialty Markets”. The main differences which characterise these sub sections are product- and price policies.<sup>88</sup>

Whether a market can be categorised as specialty or commodity market also depends on the positioning of the respective market in the market life cycle. The market life cycle represents an aggregation of the product life cycle on market level<sup>89</sup>. Kotler and Bliemel use the term “market evolution”. Market evolution is divided into four stages: development stage, growth stage, maturity stage and recession stage.<sup>90</sup>

#### Specialty Markets

Specialty markets are characterised by high level of innovation and low comparability of different technical solutions by different suppliers. Therefore producers on specialty markets strongly use the comparative competitive advantage by focusing on the needs of the customer and developing services adjusted to the customer’s needs. Referring to product policies on specialty markets the development of new products plays a very important role. Together with the product life cycles getting shorter and there being a lot of different services (problem solutions) by different suppliers on the market determines the price policies. This means that there are no fixed “market prices” but every supplier has to find out what the customers are willing to pay.<sup>91</sup>

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<sup>87</sup> Cf. Backhaus/Voeth (2010a), p. 209 et seq.

<sup>88</sup> Cf. Backhaus/Voeth (2010a), p. 211 et seq.

<sup>89</sup> Cf. Backhaus/Voeth (2010a), p. 213

<sup>90</sup> Cf. Kotler/Bliemel (2011), p. 606

<sup>91</sup> Cf. Backhaus/Voeth (2010a), p. 215

Figure 11 shows a graphic overview over the two market types in the product business.

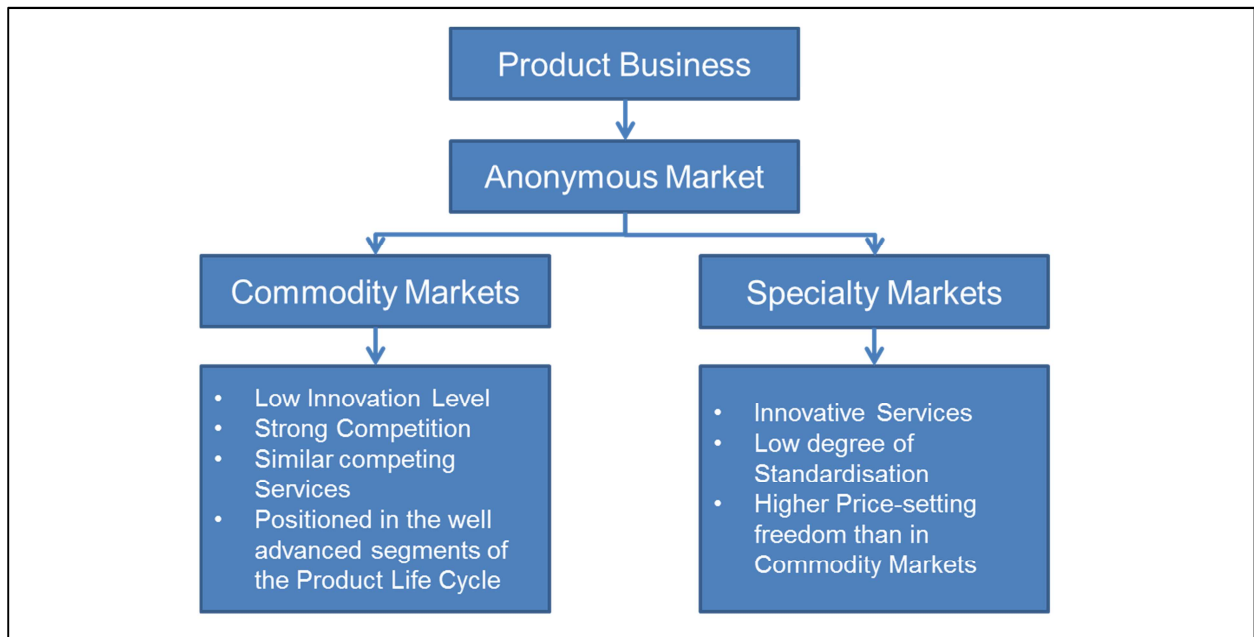


Figure 11: Markets in the Product Business<sup>92</sup>

### Commodity Markets

Commodity markets are characterised through a low level of innovation. These markets are positioned in the more advanced segments of the product life cycle. That means that almost all the suppliers offer similar services and the customer cannot see the differences. The result of this situation is strong price competition. Suppliers who cannot compete by offering their products at a low price have to differentiate themselves through better performance or more additional customer services.<sup>93</sup>

An important factor in competitive strategy on commodity markets is the market share, because a big market share can give a supplier a comparative position of advantage. If there is no established market leader this can lead to instable competitive relationships and to fights over the leading position. Normally this fight shows itself in aggressive price policies. Certain pricing measures have to be taken depending on the position one has (cost leader, cost follower).<sup>94</sup>

<sup>92</sup> Own Illustration, based on Backhaus/Voeth (2010a), p. 212 et seq.

<sup>93</sup> Cf. Backhaus/Voeth (2010a), p. 255

<sup>94</sup> Cf. Backhaus/Voeth (2010a), p. 260 et seq.

### 2.3.2 Characteristics of Marketing in the Project Business Section

In contrast to the product business sector, the market in the project business sector is not anonymous but focused on a single customer. The services put on the market are demarcated and fitted to one customer. There are no ties to other services in the transaction. The customer's buying decision has no influence on further transactions. Another difference to the product and system business is that the marketing is done before the producing process because the service is so individual that production before sale is not possible. Single assignments cannot be compared among each other.<sup>95</sup>

There are several risks in the product business sector for both, customers and suppliers. For example: the contents of the assignment. They can change continuously during the assignment acquisition phase. Furthermore there can be different solutions to a problem known to the supplier. Another difficulty presents itself when there is no known solution available for the customer's problem and there is a high research and development effort to render.<sup>96</sup>

Backhaus and Voeth introduce a marketing approach for the project business sector which is segmented into phases. These phases are:<sup>97</sup>

- Preliminary Inquiry
- Proposal Preparation
- Negotiation with the Customer
- Processing / Transaction Phase
- Warranty
- Service

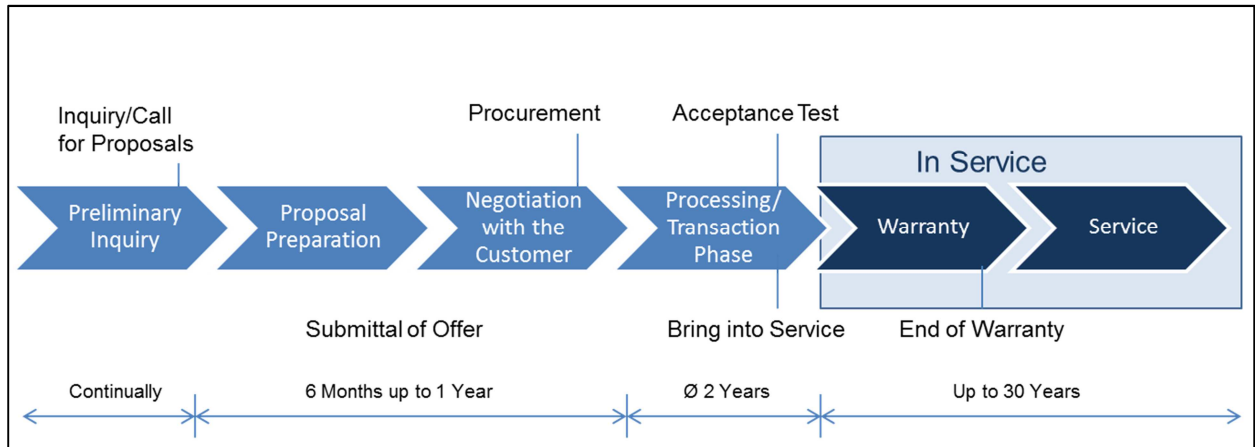
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<sup>95</sup> Cf. Backhaus/Voeth (2010a), p. 325

<sup>96</sup> Cf. Backhaus/Voeth (2010a), p. 327

<sup>97</sup> Cf. Backhaus/Voeth (2010a), p. 329 et seq.

Figure 12 depicts project business marketing process, segmented in phases.



**Figure 12: Phases in Project Business Marketing<sup>98</sup>**

The marketing process in project business can stretch out over a long period in time. It begins with the preliminary inquiry which is when the acquisition process takes place. A preliminary study can be conducted. After that, a proposal is prepared in which the supplier has to show that he is capable of conducting the project. In addition, technical solutions have to be found, the financing has to be figured out and a price offer has to be made. In the “Negotiation with the Customer” the core of the negotiations with the customer on the basis of the offers takes place. In the processing phase, the warranty and service phase implementing decisions, procurement, manufacturing etc. are conducted.<sup>99</sup>

## 2.4 Market Research

First a distinction must be made between marketing research and market research. Marketing research uses internal information and covers the sales market. In market research external information is used to cover most importantly the procurement market and in second priority the sales market. In this thesis the focus is on market research and only this term will be used in further execution.<sup>100</sup>

Furthermore the definition by Weis/Steinmetz concerning market research will be used:<sup>101</sup>

<sup>98</sup> Cf. Backhaus/Günter (1976), p. 255-270, Cf. Königshausen/Spannagel (2004), p. 1128, own illustration

<sup>99</sup> Cf. Backhaus/Voeth (2010a), p. 329 et seq.

<sup>100</sup> Cf. Weis/Steinmetz (2005), p. 16

<sup>101</sup> Ibidem

The term market research should cover the systematic collection, analysis and interpretation of information about characteristics and developments on markets for the purpose of providing relevant information for marketing decisions.

Market research is becoming more important over time because companies need more and more specific information.<sup>102</sup> This is important because companies are always confronted with decisions between two or more alternatives.<sup>103</sup>

As information is the key factor in market research, the information acquiring process should be examined more accurately. Backhaus and Voeth see the provision of information as a loop. The first three steps concern the acquisition of information. The last two steps apply to information utilisation.<sup>104</sup>

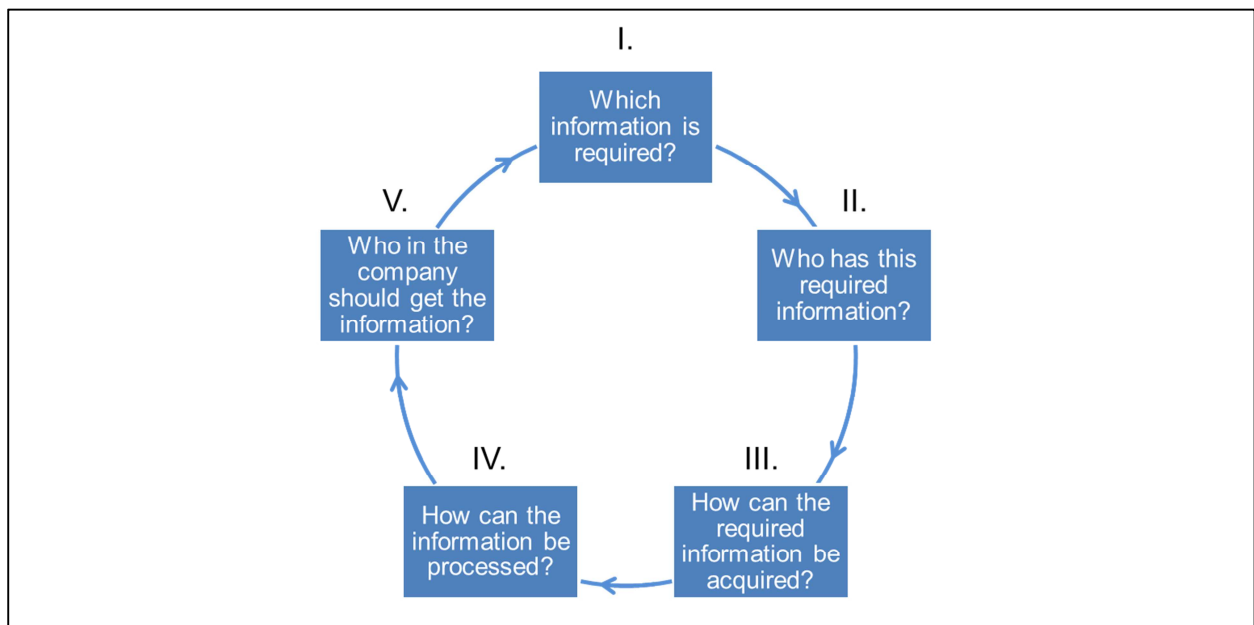


Figure 13: Basic Questions of Information Provision<sup>105</sup>

It begins with the identification of the required information. The complexity and extent of information is determined according to the initial problem. This means that the problem has to be defined very specifically. Important factors here are regular quantitative statements about size, structure and development of the market. Then the comparative competitive position has to be determined.<sup>106</sup>

<sup>102</sup> Cf. Krämer/Wilger (1999), p. 9

<sup>103</sup> Cf. Weis/Steinmetz (2005), p. 15

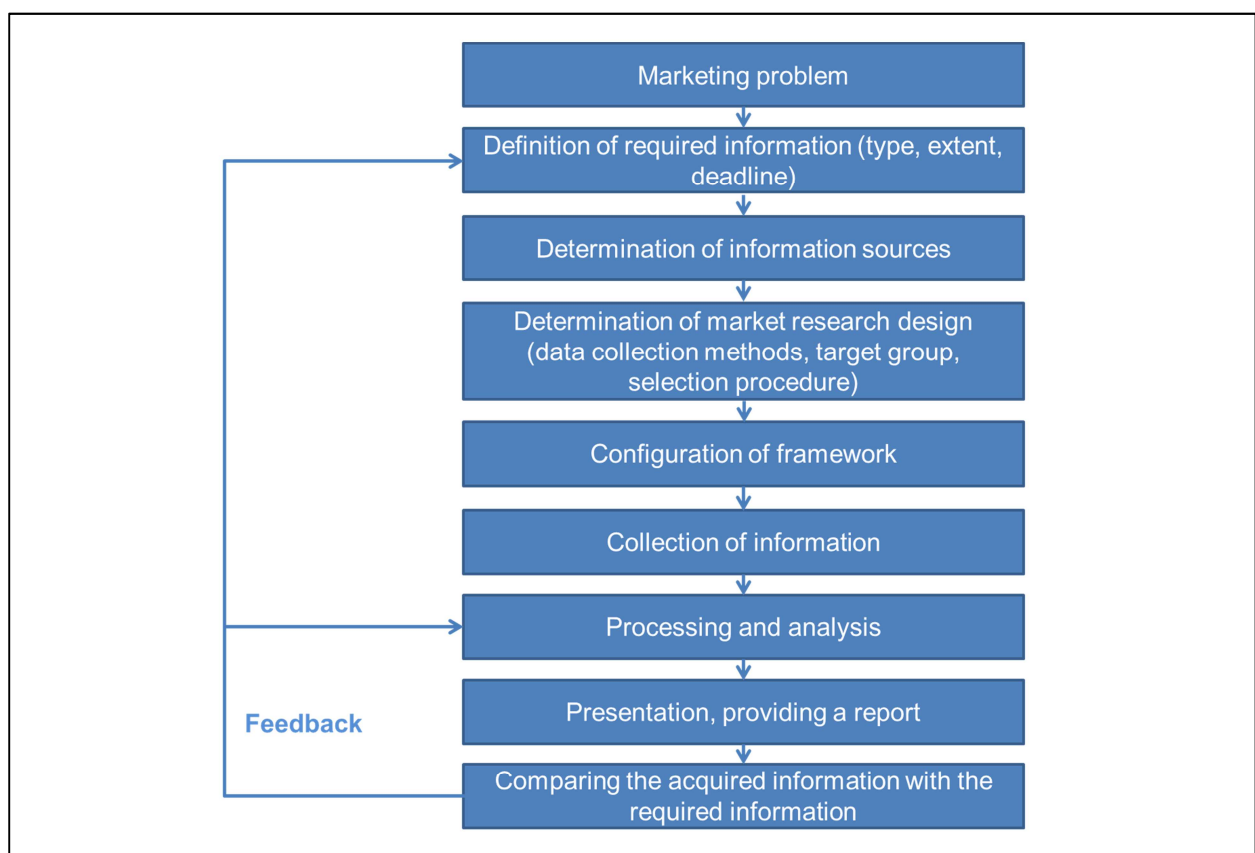
<sup>104</sup> Cf. Backhaus/Voeth (2010a), p. 158

<sup>105</sup> Backhaus/Voeth (2010a), p. 159, own illustration

<sup>106</sup> Cf. Backhaus/Voeth (2010a), p. 158

The second step concerns the identification of the information carrier. Sources within the company or external sources can be used. The sources can also be distinguished after the collection method (secondary sources, primary sources). The third step describes the methods of data collection. Important parameters concerning step three are: how much information should be acquired (framework)? Which tools, technique and variables should be used? The fourth and fifth step applies to data processing and analysis.<sup>107</sup>

Figure 14 depicts the ideal course of the market research process according to Berekoven et al.



**Figure 14: Ideal Course of the Market Research Process<sup>108</sup>**

First the research issue has to be made concrete. The research goal and object are deduced from a defined issue. A catalogue of problems should be compiled, afterwards the information sources are determined. Those can be sources of secondary information or primary information. The decision about the type of sources according to expenditure of money, time, the quality of the results and human resources has to be

<sup>107</sup> Cf. Backhaus/Voeth (2010a), p. 159-165

<sup>108</sup> Cf. Berekoven/Eckert/Ellenrieder (2003), p. 32, own illustration



made. Then the used method for acquiring information has to be chosen. In the next step the framework has to be configured. This means composition of a questionnaire or the process of observing the experiment. Analysis and interpretation follows last which forms the basis for the solution of the initial problem. In practice modifications can occur and some feedbacks and parallel running processes have to be taken into account.<sup>109</sup>

The application area of market research can vary. A distinction can be made regarding different criteria like type of data acquisition, time period or market players. The two types of data acquisition are primary and secondary data collection. Time period means that the market research can provide historical, current or forecast data. The market research in the field of market players can be divided in categories like competitor reconnaissance, research about suppliers or customers et cetera.<sup>110</sup>

What is important for market research is that the market is examined systematically, tactically and scientifically.<sup>111</sup>

#### **2.4.1 Methods for Data Collection in Market Research**

In this chapter the used methods for the data collection are explained. The focus in this thesis is on qualitative research as the research issue falls into an area of difficult accessibility of hard facts.

Specifying the research goal and choosing a suitable research strategy are crucial in market research.<sup>112</sup>

There are three different main types of research strategies:<sup>113</sup>

- **Explorative Research**

Explorative research is characterized through the lack of substantial information. Normally explorative research precedes descriptive or causal research because the targets are not sufficiently known and fixed during the planning phase. Research is conducted in a very wide field to get an overview of the topic. Interviews with experts are beneficial and are performed very openly to discover structures of the topic and relevant variables.

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<sup>109</sup> Cf. Berekoven/Eckert/Ellenrieder (2003), p. 32 et seq.

<sup>110</sup> Cf. Weis/Steinmetz (2005), p.18 et seq.

<sup>111</sup> Cf. Weis/Steinmetz (2005), p. 21

<sup>112</sup> Cf. Griese/Bröring (2011), p. 97

<sup>113</sup> Cf. Olbrich/Battenfeld/Buhr (2012), p. 50 et seq., Griese/Bröring (2011), p. 97 et seq.

- **Descriptive Research**

Descriptive market research describes variables and questions which were agreed on in advance. Frequency data and descriptive statistics are paramount. An example for descriptive research would be a market observation where competitor prices and market shares are identified.

- **Causal Research**

In causal research a hypothesis which was formulated in the beginning is tested. The hypothesis concerns an issue with a cause-and-effect connection (e.g. is the buying behaviour of customers interdependent with the price of the product?). This research requires large samples because procedures which use Gaussian distribution cannot be applied here.

A very common method to acquire data and information is to use a survey. There are some important rules for assembling a questionnaire which is used for the survey:<sup>114</sup>

- The required information has to be ranked because there is always more information needed than can be acquired. One has to determine which information has the highest priority.
- There should be an appropriate introduction to help the people who participate in the survey to understand the topic better.
- At the beginning of the questionnaire very general questions should be used to slowly let the participants become familiar with the topic (ice-breaker questions).
- The questionnaire should have a logical structure.
- Several different kinds of questions should be used to provide enough variety to keep the participants motivated.
- The questions should be clear, precise and self-explanatory. Incomprehensible technical terms and filler words should be avoided.
- Thorough tests of the survey before starting it are essential.

Negligence within the compiling process of a questionnaire is often the cause of mistakes. It can happen that questions are chosen which cannot be answered or where participants don not want to give an answer. Sometimes questions are asked where the answer holds no valuable information. On the other hand it can happen that questions

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<sup>114</sup> Cf. Krämer/Wilger (1999), p.92-95

are left out where the information taken from the answers would be very important. The question type can also have an influence on the answer.<sup>115</sup>

In case of a written survey the questions have to be particularly simple and clearly formulated.<sup>116</sup>

There are some significant differences between Business markets and consumer good markets, and some criteria for market research in the respective field. Table 1 shows an overview.<sup>117</sup>

**Table 1: Differences between Business- and Consumer Goods Markets<sup>118</sup>**

<b>Criterion</b>	<b>Business-Markets</b>	<b>Consumer Goods Markets</b>
Number of Customers	Small	Large
Extent of a Survey	Full-survey possible	Samples
Selection of the Participants	Very difficult (Buying Center)	Relatively easy
Degree of Difficulty of a Survey	Very difficult	Relatively easy
“Honest” Answers	Problematic	Probable
Experiments	Easy	Possible, but complex (Test markets)
Target Group	Single industry branches	Geographic/- demographic
Dependence of Demand	Economic situation of the industry	Income development, season, trends
Type of Demand	Derived demand, low possibility of influence	Constant new demand, strongly influenceable

### 2.4.2 Methods for Data Analysis in Market Research

There is a wide range of data analysis methods. Most rely on statistics and multiple variables.<sup>119</sup> These were not relevant for this specific research. What could be used in the thesis is the Cluster Analysis, which is explained below. Furthermore, instead of quantitative assessment methods, qualitative methods were used to evaluate the respective countries.

<sup>115</sup> Cf. Kotler/Bliemel (2011), p. 213

<sup>116</sup> Cf. Kotler/Bliemel (2011), p. 216

<sup>117</sup> Cf. Godefroid (2000), p. 116 et seq.

<sup>118</sup> Godefroid (2000), p. 117

<sup>119</sup> Cf. Kotler/Bliemel (2011), p. 263 et seq.

## Cluster Analysis

An often encountered problem in marketing is to categorize products, individuals or geographical units into sub-groups or clusters after certain features. Often these features are not evident in the beginning. The goal is to form groups where e.g. products within one group have very similar features but the groups themselves are very different to one another.<sup>120</sup>

It can be concluded that products within one group compete the most among each other. Now it is possible to create market segments in this fashion. The precondition for this analysis is that every assessed element can be described by a number of criteria.<sup>121</sup>

There are several different methods to conduct a cluster analysis.<sup>122</sup> Countries can for example be clustered after sociocultural aspects.<sup>123</sup>

### 2.4.3 Competitive Analysis

In order to create a competitive advantage one has to offer something to one's customer, which has a greater value in the eye of the customer than a competitor's product.<sup>124</sup>

Observing competitors is an important task of market research in business-to-business-marketing. Insights gained from that observation can be used for short term or long term marketing measures within the own company.<sup>125</sup>

In a first step the relevant competitors on different markets have to be identified. This measure is relatively easy to implement on established markets, but on dynamic, fast growing High-Tech markets this can be difficult. Sources of information can be found in customers and interested parties.<sup>126</sup>

After the identification of the competitors more information has to be acquired about the companies. The goal is to create a company profile and compare it to the profile of the own company. If they are very similar, the respective competitor is to be taken seriously because he obviously operates in the same field as the own company. If there are a lot

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<sup>120</sup> Cf. Kotler/Bliemel (2011), p. 264

<sup>121</sup> Cf. Kotler/Bliemel (2011), p. 264 et seq.

<sup>122</sup> Cf. Kotler/Bliemel (2011), p. 265

<sup>123</sup> Cf. Albaum/Strandskov/Duerr (2001), p. 96

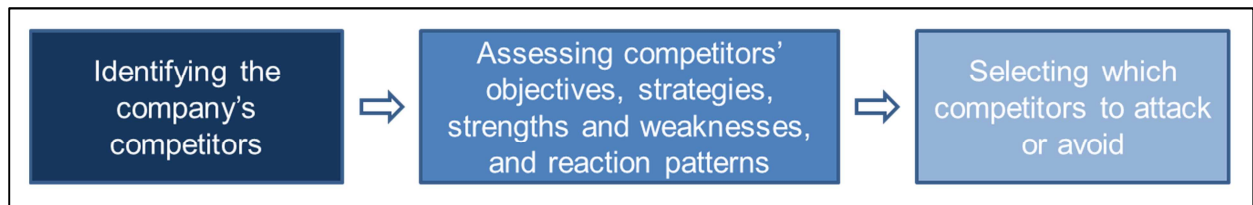
<sup>124</sup> Cf. Kotler/Armstrong (2008), p. 516

<sup>125</sup> Cf. Godefroid (2000), p. 129 et seq.

<sup>126</sup> Cf. Godefroid (2000), p. 130

of differences, they have to be analysed more accurately. Certain strengths of the competitor may lie within these differences.<sup>127</sup>

Figure 15 depicts the competitor analysis process. The three depicted steps are: Identifying competitors, assessing competitors and selecting competitors to attack and avoid.<sup>128</sup> These steps are now explained further.



**Figure 15: Steps in Analysing Competitors<sup>129</sup>**

### Identifying Competitors

A company can take two points of view. From the industry's point of view, the competitors are those companies, which operate in the same field. The other point of view would be the market's point of view. In this perspective the competitors are the companies, which cater to the needs of the same group of customers or build relationships with them.<sup>130</sup>

Porter adopts the working definition for the term "industry" in the sense that it consists of a group of companies which produce products or services which are close substitutes to each other.<sup>131</sup>

In addition Porter gives the following statement:<sup>132</sup>

"Structural analysis, by focusing broadly on competition well beyond existing rivals, should reduce the need for debates on where to draw the industry boundaries."

Elucidations on structural analysis of industries and assessing competitors follow in the chapter "Competition within an Industry".

Setting demarcation lines in order to identify competitors can also present problems if the lines are set too narrow or too wide.<sup>133</sup>

<sup>127</sup> Cf. Godefroid (2000), p. 130

<sup>128</sup> Cf. Kotler/Armstrong (2008), p. 517

<sup>129</sup> Kotler/Armstrong (2008), p.517, own illustration

<sup>130</sup> Cf. Kotler/Armstrong (2008), p.517

<sup>131</sup> Cf. Porter (2004), p. 5

<sup>132</sup> Porter (2004), p. 32

A too narrow field of competitor observation can lead to involuntarily neglecting relevant competitors. This, in consequence, can lead to rating the own company and the own competitive advantage too high.<sup>134</sup>

A too wide range of observed competitors takes too many competitors into account. The costs get higher and in order to keep the limit of a budget, single companies are often not examined thoroughly enough. Potential threats and opportunities could be recognized too late.<sup>135</sup>

### **Assessing Competitors**

When the competitors are identified it is important for developing a marketing management strategy to identify the competitor's objectives, strategies, strengths and weaknesses in order to estimate possible reactions of competitors. Depending on the different mix of objectives a company reacts to various competitive actions, e.g. a company with the objective to be a cost leader will react stronger to a competitor lowering his prices than to him increasing his advertising activity. It is very important to be able to estimate the competitor's reaction to certain measures in order to be able to react quickly and adapt.<sup>136</sup>

Kotler and Armstrong state that the more one's company strategy resembles another's, the higher will be the competition between those two. In that way companies can be divided into strategic groups within an industry. These strategic groups have to be identified.<sup>137</sup>

For assessing competitor's strengths and weaknesses, benchmarking is becoming a more and more important tool. Other ways would be acquiring secondary data, conducting primary marketing research or using personal experience.<sup>138</sup>

### **Selecting Competitors to Attack and Avoid**

Kotler and Armstrong offer a classification of competitors and examples whom to attack and avoid. A company can choose rather to attack strong or weak competitors. By attacking strong ones they can improve their abilities and the reward can be higher than when attacking weak competitors. Competing with weak competitors is far less time

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<sup>133</sup> Cf. Brezski (1992), p. 27

<sup>134</sup> Ibidem

<sup>135</sup> Ibidem

<sup>136</sup> Cf. Kotler/Armstrong (2008), p. 518 et seq.

<sup>137</sup> Ibidem, p. 518 et seq.

<sup>138</sup> Cf. Kotler/Armstrong (2008), p. 519

consuming and resource-intensive. A tool to find out about strengths and weaknesses of a competitor is the customer value analysis.<sup>139</sup>

Close competitors are companies which are very similar to each other. Distant competitors differ from each other. Most companies choose to compete against close competitors (e.g. Nike competes rather against Adidas than against Timberland).<sup>140</sup>

Competitors can also bring strategic benefits. They can help to increase the total demand of a product, share development and research costs or provide product differentiation. This is how the terms of “good” and “bad” competitors within an industry came up. Good competitors play by the rules and are viewed as beneficial, while bad competitors break the rules at the expense of the other companies within an industry. Bad competitors, for example, take large risks or try to buy share rather than earn it (e.g. Apple would be a bad competitor in the digital music download industry, good competitors would be Yahoo! Music Unlimited, Napster or AOL Music). A company might support good competitors in order to compete together against a bad competitor to push him out of the market.<sup>141</sup>

#### **2.4.4 Competition within an Industry**

In order to create a competitive advantage, not only the strategies of one single competitor make a difference. Identifying the profitability within an industry and find a profitable position are a necessary task which makes assessment of the whole structure of the industry inevitable.<sup>142</sup>

In order to analyse the structure of an industry one can use the five competitive forces defined by Porter. Figure 16 depicts these forces.

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<sup>139</sup> Cf. Kotler/Armstrong (2008), p. 520

<sup>140</sup> Ibidem

<sup>141</sup> Cf. Kotler/Armstrong (2008), p. 521

<sup>142</sup> Cf. Porter (2004), p. 4

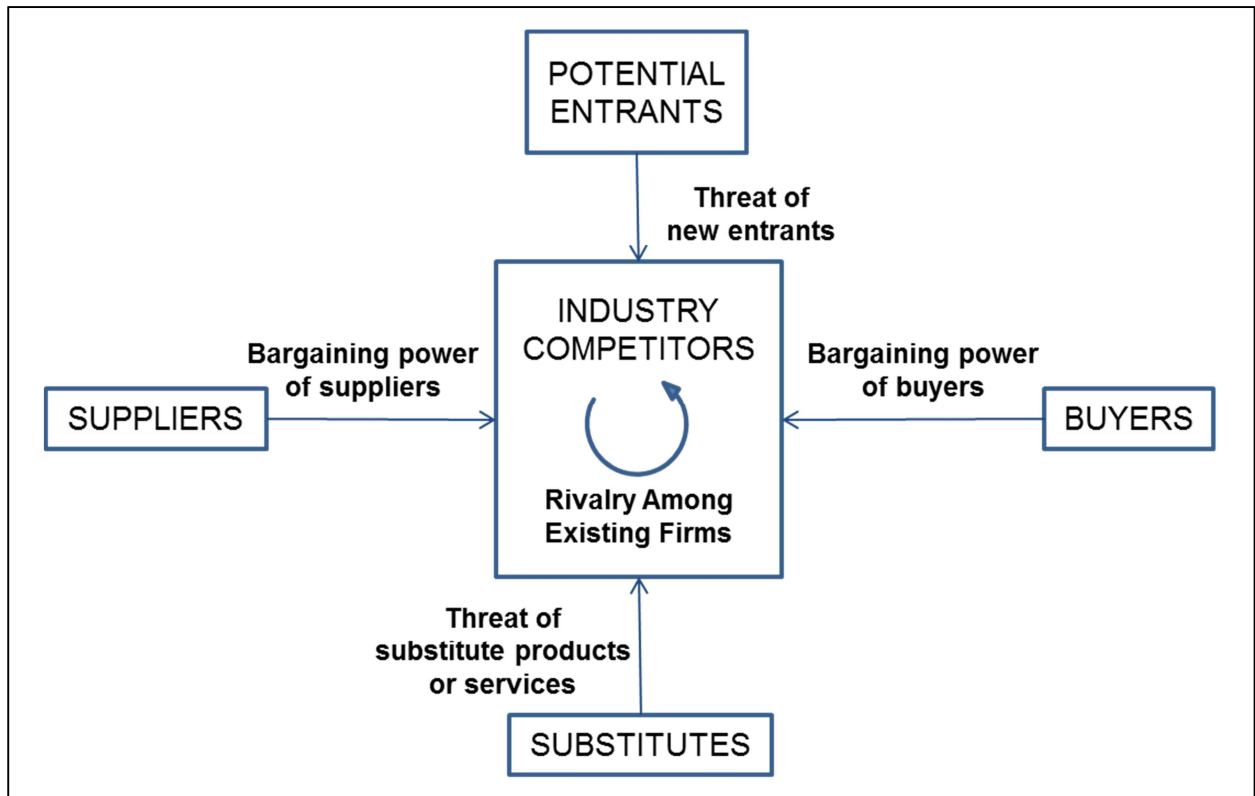


Figure 16: Forces Driving Industry Competition<sup>143</sup>

Porter's model of the five forces within an industry clearly shows that a company not only has to compete with other established competitors, but that a certain rivalry originating from the bargaining powers of buyers, suppliers, the threat from substitute products and potential entrants also have to be taken into account.<sup>144</sup>

These factors provide "competition in a broader sense".<sup>145</sup> They are described below.

### Threat of new entrants

The threat of possible new entrants in an industry is higher, the lower the entrance barriers and the less sharp the reactions of the companies within the industry.<sup>146</sup> Six potential factors can be distinguished which might create an entrance barrier:<sup>147</sup>

1. Economies of scale: when the cost of a product decreases with increasing number of produced number of pieces and the entrant faces high risk in entering the market at a large scale or has to put up with a cost disadvantage.

<sup>143</sup> Porter (2004), p. 4, own illustration

<sup>144</sup> Cf. Porter (2004), p. 6

<sup>145</sup> Ibidem

<sup>146</sup> Cf. Porter (2004), p. 7

<sup>147</sup> Ibidem



2. Product differentiation: established companies within an industry have well recognized brands and customer relationships, new entrants have to cope with that and face existing customer loyalties.<sup>148</sup>
3. Capital requirements: high capital requirements can create an entrance barrier, e.g. if the entrant needs a lot of financial means for research and development, inventory or advertising.<sup>149</sup>
4. Switching costs: if a buyer switches supplier he can face one-time nonrecurring costs, e.g. for training his personnel to use new equipment.<sup>150</sup>
5. Access to distribution channels: a new entrant might have to secure distribution channels in order to sell his product. The more the existing channels are tied up by already established companies within the industry the higher the entrance barrier becomes. Sometimes the distribution channels are so limited that the new entrant has to create his own ways of distribution.<sup>151</sup>
6. Cost disadvantages independent of scale: not every cost advantage is connected to scale. Existing firms in the industry can have cost advantages through know-how, patents, tied up resources, favourable locations, government subsidies etc.<sup>152</sup>

### **Intensity of rivalry among existing firms**

Competition among firms within an industry is executed through price competition, advertising, competing in offering the best customer services or longest warranties or product introductions. Every company fights for the best position and reacts to felt threats or opportunities which might present themselves. It can happen that rivalries become unstable and leave the competitors worse off than before (e.g. price competition). The kind of competition or rivalry which takes place depends on the state and structure of the industry.<sup>153</sup>

### **Threat of substitute products or services**

The companies within an industry are bound to compete with companies which fabricate products which can perform the same function as their products. The question is: which potential substitute products or services cater to the same customer needs as

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<sup>148</sup> Cf. Porter (2004), p. 9

<sup>149</sup> Cf. Porter (2004), p. 9 et seq.

<sup>150</sup> Cf. Porter (2004), p. 10

<sup>151</sup> Ibidem, p. 10 et seq.

<sup>152</sup> Cf. Porter (2004), p. 11

<sup>153</sup> Cf. Porter (2004), p. 17

the own products? These potential substitutes for the own product place a lid on the prices a company can charge for their own products and can be a threat for potential revenues. An important factor is the price-performance rate.<sup>154</sup>

### **Bargaining power of suppliers**

There are several factors which can make suppliers of an industry powerful. The suppliers can exert a lot of power and pressure when there is only a small group of suppliers catering to an industry. They will be able to drive prices up and negotiate favourable terms for them.<sup>155</sup>

Another advantage for a group of suppliers is, when they don't face threats from substitute products which the industry could use.<sup>156</sup>

Furthermore, the suppliers are powerful when they cater to more than one industry and are not fully dependant on a small group of buyers or the product is very important for their customer's manufacturing process.<sup>157</sup>

### **Bargaining power of buyers**

A group of buyers hold power if the following circumstances apply:<sup>158</sup>

- The group of buyers purchase a large percentage relative to the sale of suppliers.
- The costs of purchase from one industry make up a large percentage of the buyer's total cost. Then a group of buyers will invest more resources to make sure they shop for a reasonable price. This also applies if the supplied product earns low profits or if it is unimportant to the quality of the buyer's products.
- If the products the buyers shop are standardized products, it is easier to find suppliers.
- If the buyers would be able to produce the product in switching to a self-manufacturing process.
- When a buyer holds a lot of information about the market (demand, prices, supplier costs).

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<sup>154</sup> Cf. Porter (2004), p. 24

<sup>155</sup> Cf. Porter (2004), p. 27

<sup>156</sup> Ibidem

<sup>157</sup> Cf. Porter (2004), 27 et seq.

<sup>158</sup> Ibidem

### 2.4.5 Competitive Strategies

Porter proposes three generic strategies in order to face the five forces within an industry which were introduced in the chapter “Competition within an Industry”. These strategies should help a company to create a defensible position on the market and outperform competitors as long as effectively implemented.<sup>159</sup>

The three strategies are the following:<sup>160</sup>

1. Overall Cost Leadership
2. Differentiation
3. Focus

Figure 17 shows an illustration where to place these 3 strategies.

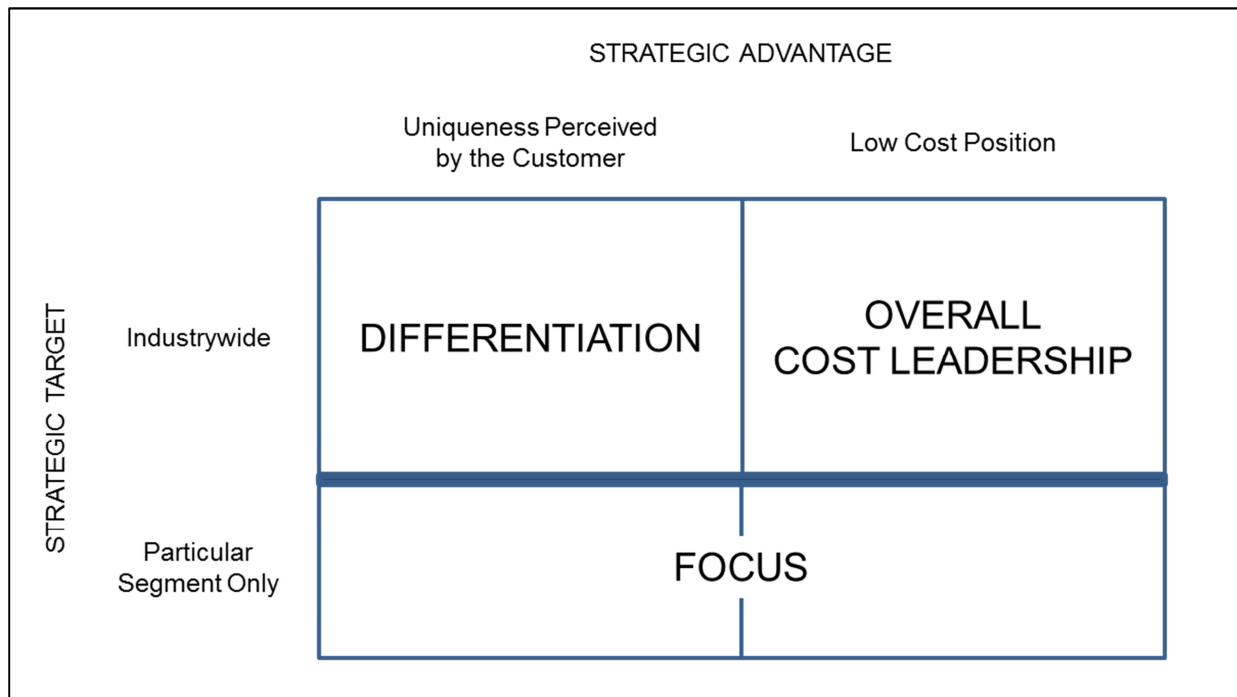


Figure 17: Three Generic Competitive Strategies according to Porter<sup>161</sup>

#### Overall Cost Leadership

This strategy requires cost minimisation in every possible part from research and development over production to sales and advertising. Large scales are inevitable. When effectively following a low cost strategy, the company is in a position where the

<sup>159</sup> Cf. Porter (2004), p. 34 et seq.

<sup>160</sup> Porter (2004), p. 35

<sup>161</sup> Porter (2004), p. 39, own illustration

revenues are above average in spite of strongly competitive environments. Effectively establishing this strategy often requires a high relative market share or other non-scale-related advantages like favourable access to resources.<sup>162</sup>

### **Differentiation**

When following this strategy the company has to differentiate its product so it's perceived as something special or unique in the whole industry. The product can be differentiated in many ways, e.g. technology, design, features, but also a special customer service or excellent dealer network are possible. This strategy, when effectively implemented, creates a cost advantage through higher margins and brand loyalty by costumers. Perception of exclusivity is often necessary.<sup>163</sup>

### **Focus**

Companies which use this strategy have settled for operating in one special segment, they only cater to the needs of a specific group (e.g. a regional market, a certain buyer group). These companies rely on the assumption that when they focus their energies they might not be cost leaders or "unique" industrywide, but they can satisfy the needs of their target group better and are more efficient than all the other companies. This puts such a company in a good position and they have the possibility to earn above average returns.<sup>164</sup>

A company can take different competitive positions within a market. The position can depend on objectives, resources, size of the company, if it is an old or a new firm and their general strategy concerning profits.<sup>165</sup>

These roles are available in a target market.<sup>166</sup>

**Market leader:** This is the company with the largest market share.

**Market challenger:** Market challengers are companies which fight hard to increase their market share.

**Market follower:** Usually companies which just want to hold their share.

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<sup>162</sup> Cf. Porter (2004), p. 35 et seq.

<sup>163</sup> Cf. Porter (2004), p. 37 et seq.

<sup>164</sup> Cf. Porter (2004), p. 38 et seq.

<sup>165</sup> Cf. Kotler/Armstrong (2008) p. 527

<sup>166</sup> Ibidem

**Market nicher:** Firms which cater to the needs of small special market segments in order to be overlooked or ignored by competitors and not be pursued.

Figure 18 shows an overview about the possible market positions of a company and the corresponding available strategies.

Market Leader Strategies	Market Challenger Strategies	Market Follower Strategies	Market Nicher Strategies
Expand total market Protect market share Expand market share	Full frontal attack Indirect attack	Follow closely Follow at a distance	By customer, market, quality-price, service, Multiple niching

**Figure 18: Strategies for Market Leader, Challengers, Followers and Nichers according to Kotler<sup>167</sup>**

When considering these positions and strategies, it is important that this classification does normally not apply to the company itself, but to its position in a certain target market. A certain company can be a market leader in one target market and a nicher in another.<sup>168</sup>

<sup>167</sup> Kotler/Armstrong (2008), p. 527, own illustration

<sup>168</sup> Cf. Kotler/Armstrong (2008), p. 527

### 3 Basic Conditions for the Operation of Bagging Machines

This chapter should give a quick and simple overview on operations of bagging machines and the environment and service conditions the machines have to cope with. First, the bagging process is described. This description helps to categorize the bagging machines into fully-automatic machines and manually operated and semi-automatic machines later. Second, the common bagging methods which determine the machine types are explained. Third, the possible bag types and bag materials which are currently used in bagging free flowing and powdery products are shown. Finally the flour production process is explained. It provides insight into the milling industry where one major field of application of the new Statec Binder bagging carousel should lie in the future.

#### 3.1 The Bagging Process

The bagging process can roughly be divided into 5 steps. In order to understand the background for bagging bulk goods and the principle of bagging machines, Figure 19 depicts the process chain.<sup>169</sup>

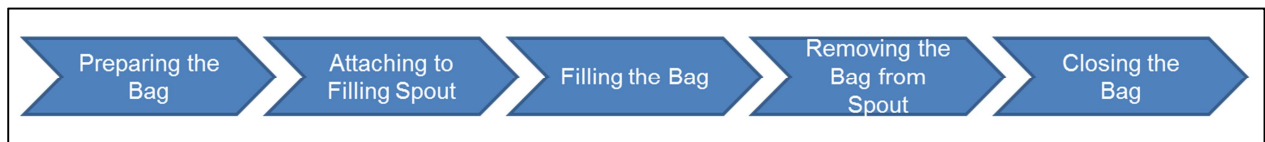


Figure 19: Bagging Process in 5 Steps<sup>170</sup>

Preparation of the bag means that first the bag must be supplied from a stock. This can happen automatically from a magazine that only has to be stocked up from time to time. The bags must be separated; only one bag at a time should reach the spout. The bag must also be opened. When manually operated the first and the second step are combined into one. In this case the operator just takes a single bag from a stock and opens it.<sup>171</sup>

<sup>169</sup> Cf. Interview with Mag (FH) Günter Haiden and DI Gerhard Steinmayr, Statec Binder Sales

<sup>170</sup> Own illustration

<sup>171</sup> Cf. Interview with Mag (FH) Günter Haiden and DI Gerhard Steinmayr, Statec Binder Sales

Secondly the bag must be attached to the filling spout. This can happen manually which means an operator attaches the bag to the filling spout or automatically when the machine fetches the bag and attaches it.<sup>172</sup>

The third step is the filling of the bag. Usually this happens automatically. A scale weighs the goods which are disposed into the bag. Depending on the machine type two different weighing and filling concepts can be used; the gross bagging or net weighing concept. This will be explained later.<sup>173</sup>

After the filling process, the full bag has to be removed from the spout. This can be done manually by an operator or fully automatic.<sup>174</sup>

The last step is the closing of the bag. Usually the bag is placed on a conveyor belt and then sewn up by a sewing machine or closed by heat sealing, depending on the bag material.<sup>175</sup>

### 3.2 Machine Types

When looking at the bagging process, one can see that the distinction between a manually operated and a semi-automatic bagging machine is not easy to make. There is no clear border between the two concepts because every user can use a slightly different combination of automatized and manual steps. So the two machine types “Manually Operated” and “Semi-automatic” are combined in one group in this work.<sup>176</sup>

A fully-automatic bagging machine is easy to distinguish because all of the steps in the bagging process are automated and require no manual working operator.<sup>177</sup>

Further classification of bagging machine types involves high-speed and low-speed solutions. The machines can have one or more spouts (line bagging) or they can be designed as a carousel.<sup>178</sup>

Furthermore, the machine types are categorised by the bag type: open mouth baggers, valve baggers, FFS (Form, Fill and Seal) baggers or VFFS (Vertical Form, Fill and Seal) baggers.<sup>179</sup>

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<sup>172</sup> Cf. Interview with Mag (FH) Günter Haiden and DI Gerhard Steinmayr, Statec Binder Sales

<sup>173</sup> Ibidem

<sup>174</sup> Ibidem

<sup>175</sup> Ibidem

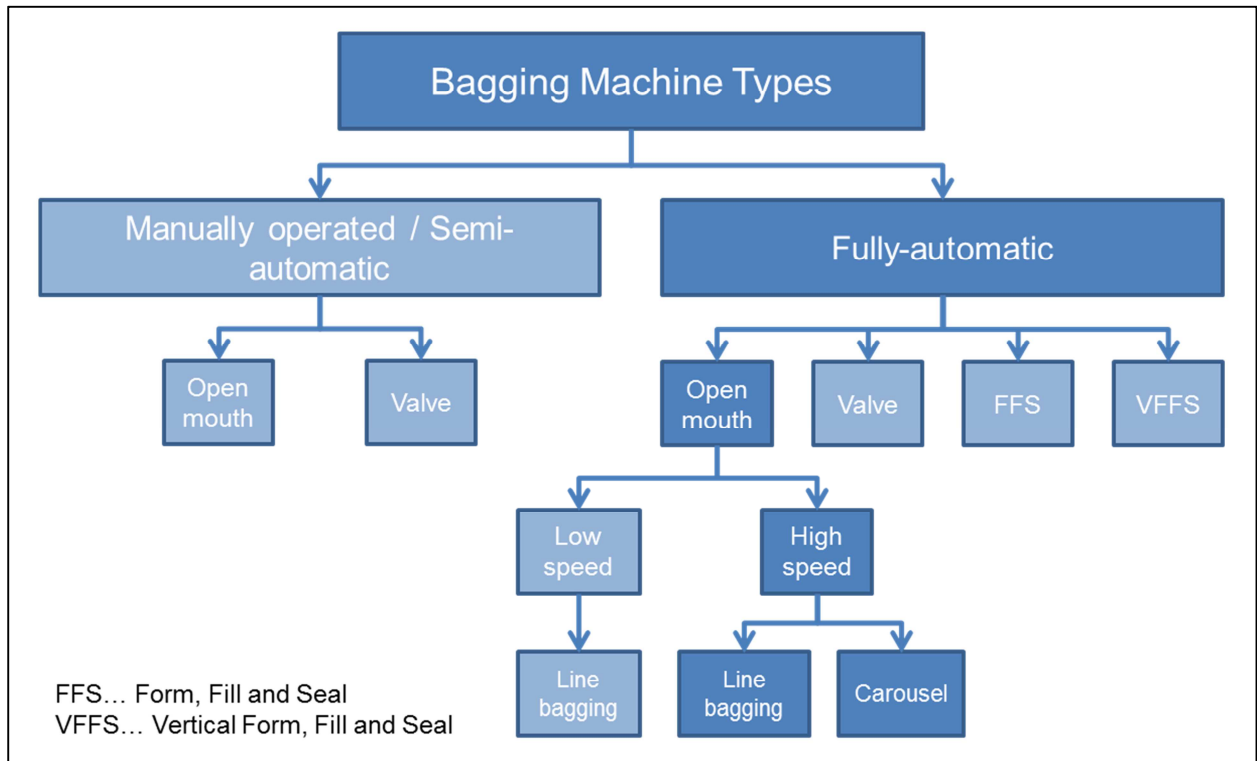
<sup>176</sup> Cf. Interview with Mag (FH) Günter Haiden, Statec Binder Sales

<sup>177</sup> Ibidem

<sup>178</sup> Ibidem

<sup>179</sup> Ibidem

Figure 20 shows an overview for a possible classification of bagging machine types.



**Figure 20: Overview Classification of Bagging Machines**<sup>180</sup>

High-speed flour bagging machines can handle up to 1200 bags per hour (depending on the bag size). In Figure 20 the variant of a high speed open mouth bagger (organised as a line bagger or carousel) is emphasized because this is the specific field of the market which is the most interesting for the company Statec Binder.<sup>181</sup>

Moreover, there are two different weighing concepts, gross bagging and net weighing. The difference is that the gross bagger weighs and bags in a single step. The weight of the bag is included in the total weight. This variant is normally used for bagging less valuable goods (e.g. sand, crushed rock, earth). This work will focus on net bagging because it is more frequently used nowadays. In almost every country there are laws regarding the accuracy of the filling weight. These cannot be met with a gross bagging system. In the net weighing system the scale weighs the goods and afterwards

<sup>180</sup> Own illustration

<sup>181</sup> Information provided by DI Gerhard Steinmayr, Statec Binder Sales



disposes them into a discharge chute and into the bag. So there are two separate steps: the weighing and the bagging.<sup>182</sup>

Figure 21 shows a simple depiction of the difference between the gross bagger and the net weigher concept.

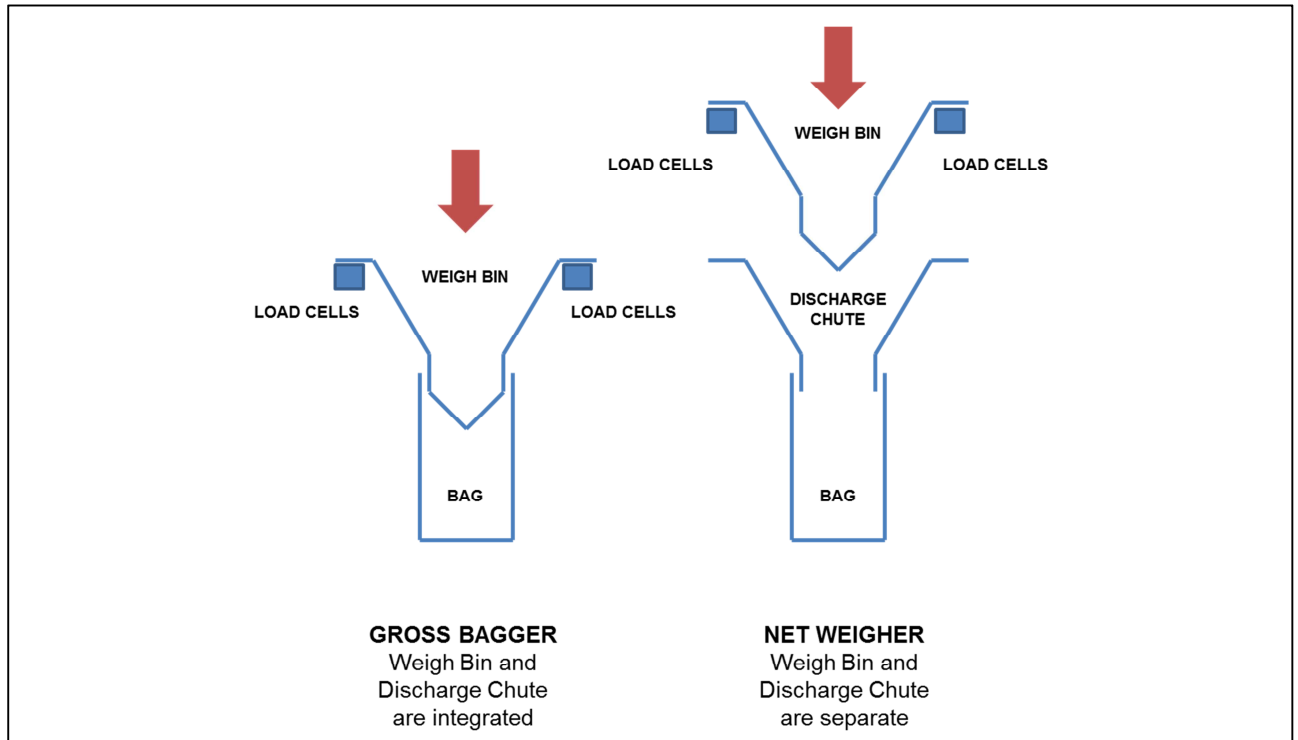


Figure 21: Difference between Gross Bagger and Net Bagger<sup>183</sup>

### 3.3 Bag Types

Regarding which bagging technology is used, there are several different bag types to match. The most important are:<sup>184</sup>

- Open mouth bags
- Valve bags
- FFS for tubular film
- VFFS for flat film

The new flour bagging machine by Statec Binder is a fully automatic open mouth bagging machine. Therefore, the focus of this thesis will be on open mouth bags.

<sup>182</sup> Information provided by Mag (FH) Günter Haiden, Statec Binder Sales

<sup>183</sup> Cf. <http://www.bud-pak.com.au/products/bagging-and-filling-equipment/net-weighing-machines.html>, date of access: 06.08.20013, own illustration

<sup>184</sup> Interview with Mag (FH) Günter Haiden, Statec Binder Sales

Open mouth bags can be used for manually operated bagging machines as well as for semi- and fully automatic operating machines. The used bag materials are:<sup>185</sup>

- Paper (single or multi-layer)
- Polyethylene (PE)
- Woven polypropylene (PP); Laminated or unlaminated
- Jute (mainly used in India. Jute bags can only be used for manually operated bagging machines.)
- Cotton (very common in the flour industry. Not suitable for automated bagging.)

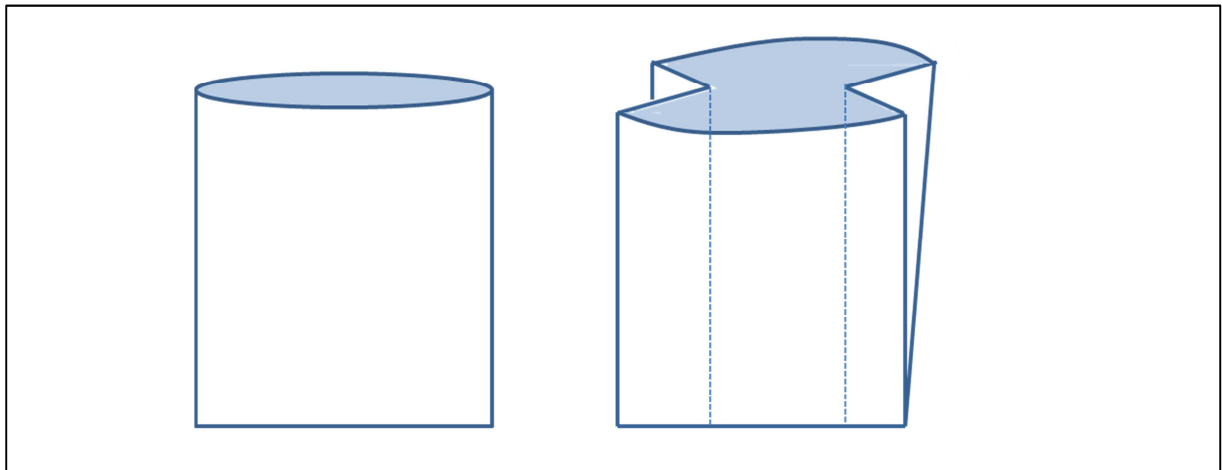
There are different forms how to close the bag for different bag materials. Paper bags and woven PP bags are sewed up (the top of the bag can be folded beforehand if this is requested), PE bags are closed by heat sealing.<sup>186</sup>

Furthermore, there is the possibility of bags with layers from a different material. These can be paper or PP bags with a PE Inliner.<sup>187</sup>

The bag types in the open mouth bag section are:<sup>188</sup>

- Pillow bags
- Gusseted bags

A schematic illustration of a pillow bag and a gusseted bag is shown in Figure 22.



**Figure 22: Schematic Illustration of a Pillow Bag (left) and a Gusseted Bag (right)**<sup>189</sup>

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<sup>185</sup> Cf. Interview with DI Gerhard Steinmayr from Statec Binder

<sup>186</sup> Ibidem

<sup>187</sup> Ibidem

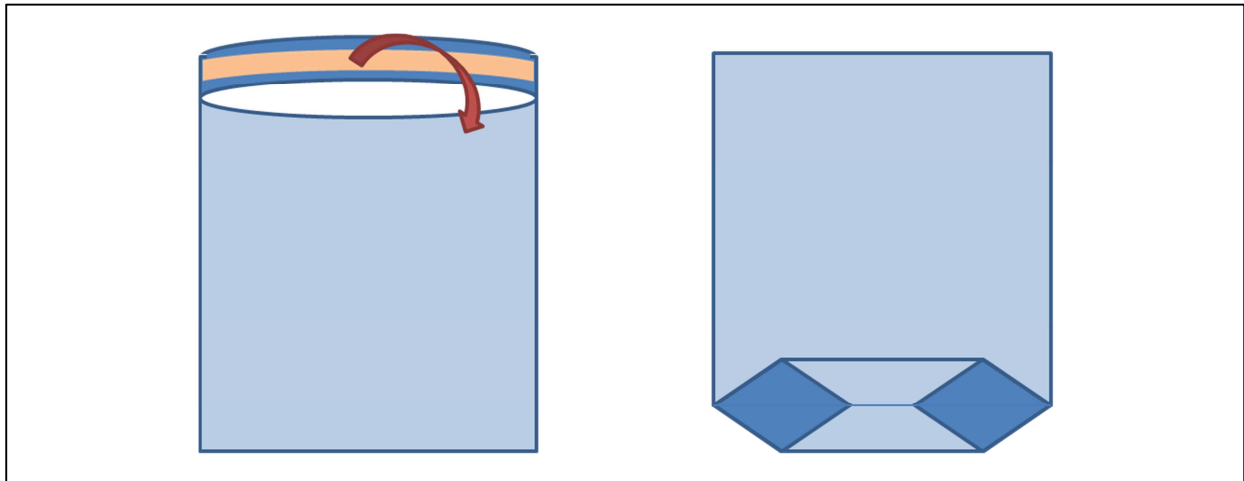
<sup>188</sup> Ibidem

<sup>189</sup> Own Illustration

The advantage of a gusseted bag is that the final form (after filling) resembles a rectangular solid more closely than a pillow bag. Rectangular shapes are better suited for palletising. This can be a criterion for choosing a gusseted bag.<sup>190</sup>

For a fully automatic bagging machine the requirements in handling pillow bags and gusseted bags differ. When handling gusseted bags the automatic bag attaching device has to be a special construction which can assure that the side gussets do not open before the filling process is complete.<sup>191</sup>

For better palletising properties for pillow bags there is the option of block bottom bags.<sup>192</sup> A schematic illustration of a block bottom pillow bag and a pinch top bag can be seen in Figure 23.



**Figure 23: Pinch Top Bag (left) and Pillow Bag with Block Bottom (right)**<sup>193</sup>

Both bag types, pillow and gusseted, can be designed as pinch top bags. That means they have a special strip at the top which can be easily closed by heat sealing.<sup>194</sup>

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<sup>190</sup> Cf. Interview with Mag (FH) Günter Haiden, Statec Binder Sales

<sup>191</sup> Ibidem

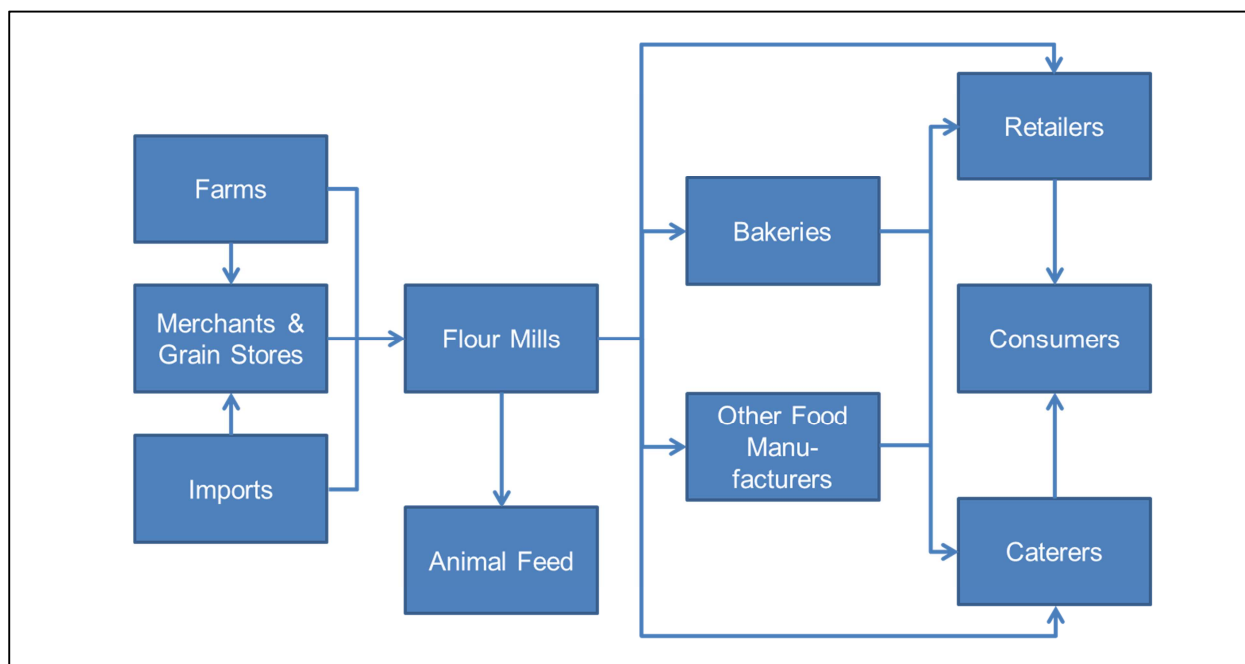
<sup>192</sup> Ibidem

<sup>193</sup> Own Illustration

<sup>194</sup> Information provided by Mag (FH) Günter Haiden, Statec Binder Sales

### 3.4 Flour Production

This chapter should give an overview on the flour production process within the limits of the grain supply chain and the milling process. Figure 24 shows the flow within the cereal supply chain:



**Figure 24: Cereals Supply Chain**<sup>195</sup>

The Food and Agriculture Organization of the United Nations state in their “Handbook of Agribusiness – Wheat Flour” that the most important cereal grains for the milling industry are wheat and rye.<sup>196</sup> The use of maize, oat, barley and rice for flour milling are significantly lower.<sup>197</sup> Most of the global rye production is centred in Europe, Belarus, the Russian Federation and Ukraine. Wheat flour production takes place in countries all over the world.<sup>198</sup>

The information about produced quantities of rye flour worldwide is taken from the FAO Database. It can be found in the Appendix in Table 5.

<sup>195</sup> [www.flourmillers.eu](http://www.flourmillers.eu), date of access: 06.08.2013, own illustration

<sup>196</sup> Cf. FAO Agribusiness Handbook – Wheat Flour (2009), p. 23

<sup>197</sup> Ibidem

<sup>198</sup> Cf. <http://faostat.fao.org>, date of access: 13.08.2013

Figure 25 shows the biggest rye producers worldwide in 2012.

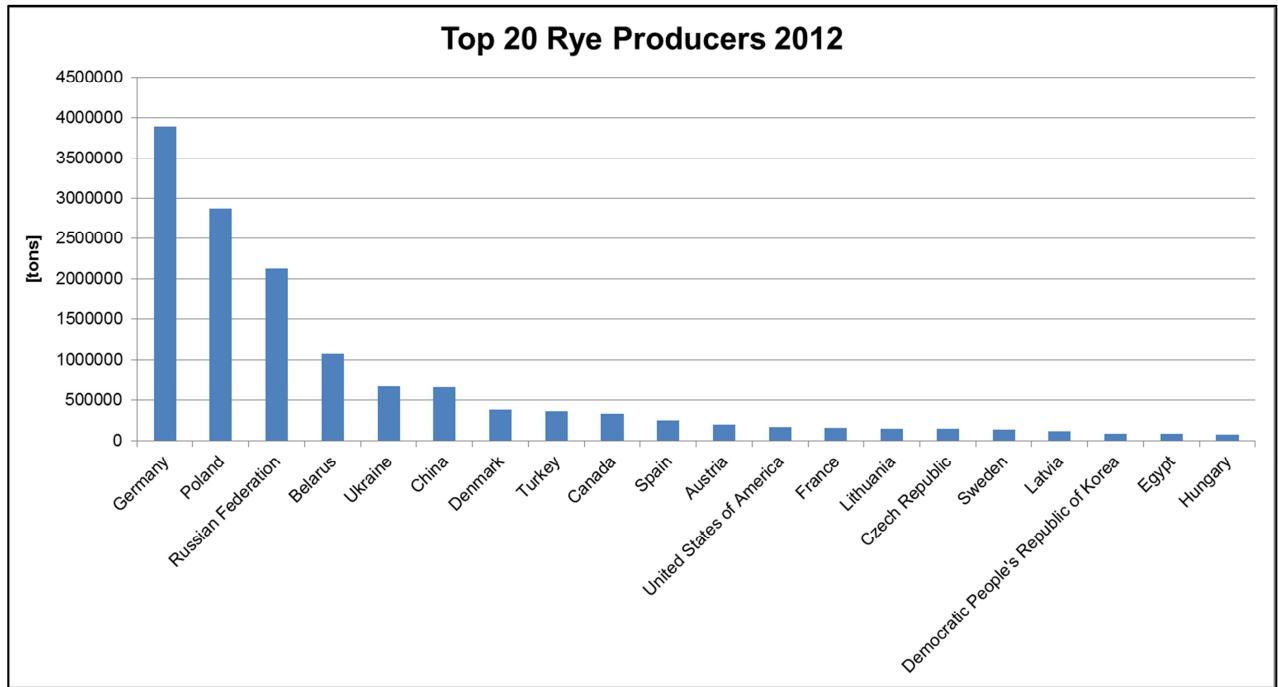


Figure 25: Worldwide Rye Production 2012<sup>199</sup>

Wheat is one of the most commonly farmed grains worldwide and it is produced all over the world<sup>200</sup>. This is why the Statec Binder representatives made the decision for this thesis and for the sales market of the new high performance flour bagging machine by Statec Binder that only the wheat flour market will be taken into account.

<sup>199</sup> Diagram based on FAO Data, <http://faostat.fao.org>, date of access: 13.08.2013

<sup>200</sup> Cf. FAO Agribusiness Handbook – Wheat Flour (2009), p. 23

Figure 26 depicts the steps the grains go through within a modern roller mill:

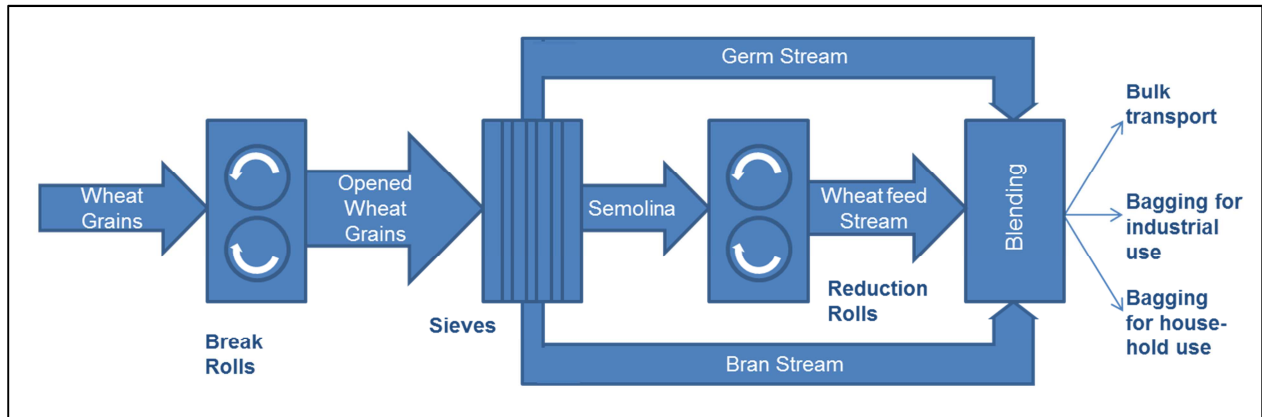


Figure 26: Milling Process<sup>201</sup>

Before the grain is milled it has to be cleaned in the mill.<sup>202</sup> After that the wheat grains pass through a small slit between two cast iron rollers (break rolls) and are opened up there without destroying the endosperm (semolina).<sup>203</sup> Now the opened up grains pass a complicated network of sieves and are separated into three streams: the germ stream, the bran stream and the endosperm stream.<sup>204</sup> The endosperm is now grinded to flour. Afterwards the three streams are combined again in the blending process which determines the properties of the end production.<sup>205</sup>

In big sized industrial mills the flour output reaches 75% - 78% of wheat weight. Big sized mills are categorised as mills with daily grain processing capacity of more than 100 tons. Small sized mills can reach a flour output with approximately 70% - 72% of wheat weight.<sup>206</sup>

The reasons for the smaller percentages of wheat flour output in smaller mills are not explicitly explained by the European Flour Millers Association. It was assumed that smaller mills often lack the necessary modern equipment to achieve very high flour output percentages.<sup>207</sup>

<sup>201</sup> Own illustration based on the description of the milling process from [www.flourmillers.eu](http://www.flourmillers.eu)

<sup>202</sup> Cf. FAO Agribusiness Handbook – Wheat Flour (2009), p. 25

<sup>203</sup> Cf. [www.flourmillers.eu](http://www.flourmillers.eu), date of access: 06.08.2013

<sup>204</sup> Ibidem

<sup>205</sup> Ibidem

<sup>206</sup> Cf. FAO Agribusiness Handbook – Wheat Flour (2009), p. 26

<sup>207</sup> Cf. Interview with Josef Lorger, CEO of Statec Binder

## 4 Data Collection

Most of the data is secondary data acquired through web research and information taken from specialist journals and web databases. According to the research issue and thesis objectives, the collected data is organized in three groups:

- Wheat Flour Market
- Customers
- Competitors

First the collected data about the wheat flour market is presented. It focuses on flour logistics, flour trade and wheat flour production. Afterwards the infrastructure of several potential markets is discussed.

The potential customers of the new high performance flour bagging machine by Statec Binder are flour mills. In chapter 4.1 Customers of High-Performance Flour Bagging Machines, the requirements for a flour bagging machine are collected, for this purpose an interview with the CEO of an Austrian flour mill was conducted and an international mill survey has been composed and launched.

### 4.1 Customers of High-Performance Flour Bagging Machines

The customers for high-performance flour bagging machines were identified as flour mills. No other type of company could be found which bags flour in bags ranging from 10 kg to 50 kg (industrial quantities).

Bagging machines in the high performance sector for bagging industrial quantities of flour are only usefully applicable for mills of a certain size. Assuming a desired running time of 8 hours per day for a bagging machine which can handle 600 bags per hour (25 kg bag capacity), the mill needs to produce 120 tons of wheat flour daily.

In order to identify the important countries or regions which could be interesting as future markets, the structure of the milling industry has to be analysed. The following questions can be asked:

- Are a lot of very small flour mills common in a certain country?
- Is most of the flour which is milled there still ground with stone hand mills?
- Is the country building a lot of new big mills?

The answers to these questions hold information about the flour market and will be combined with data about the infrastructure.

In addition, the CEO of an Austrian flour mill was interviewed to get more insight into the milling process and the milling industry.

#### 4.1.1 Interview with Mr Andreas Seidl

On 3<sup>rd</sup> of October, 2013 a two hour interview and a company tour was conducted at the Farina mill in Raaba, Austria. The interview partner was Mr Andreas Seidl, CEO of the mill.

The Farina mill in Raaba mills 90.000 tons of grains per year. About 50.000 tons are soft wheat and 35.0000 tons are durum (hard wheat). The received percentage of flour when milling soft wheat is 80% to 83% of the grain. The outcome when milling durum wheat is 71% to 75%. These unusually high percentages are achieved due to usage of the most advanced milling equipment. The mill operates 2 separate milling systems, one for the soft wheat which is capable of milling 166 tons in 24 hours and one for Durum which can mill 135 tons in 24 hours.<sup>208</sup>

The grain which is milled for the Austrian market comes solely from Austria, but the mill also imports grain from the Czech Republic, Hungary and Italy. It is milled, packed and transported back to the countries of origin.<sup>209</sup>

The milling process:<sup>210</sup>

- After the delivery of the grain, a sample is taken out of every charge. The grain is pre-cleaned, even before it is deposed into the grain silo. The samples are examined in the laboratory and the quality of the wheat is determined (using parameters as humidity, starch and protein contents). The grain silo has several different compartments where the different qualities of wheat grains can be stored. They are mixed together afterwards in a manner to provide a constant quality and composition of the later produced flour.
- The grains are taken from the silo and pass through several cleaning steps in which the peel is taken of the grain to get the highest semolina amount possible. The Farina mill uses roller mills to break the grain.
- Afterwards the semolina has to be cleaned again in several steps and then ground into the desired grain size (powder fineness). The different parts of the grain are also mixed together in order to get the various flour types (the darker the flour is the more from the outer layers of the grain is used, the brighter the

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<sup>208</sup> Cf. Interview with Mr Andreas Seidl, CEO at the Farina Mill in Raaba (Austria), date 03.10.2013

<sup>209</sup> Ibidem

<sup>210</sup> Ibidem



flour, the more from the innermost of the grain is used). Darker flours have a higher type number.

- The fill level in the flour silos is measured with ultrasound.

From the flour silos the flour is either transported to be packed or to be mixed with other ingredients like egg powder, milk powder, spices, seeds, etc. to become a baking pre-mix for retail or whole sale. Mr Seidl stated that the trend shows that sales numbers of these baking mixes are rising.<sup>211</sup>

The milling equipment is supplied by the company Bühler (Switzerland).<sup>212</sup>

Farina's customers are bakeries, warehouses, gastronomies and retail stores. They transport 60% of the flour in silo trucks, 20% are packed in bags in industrial quantities (10-30 kg) and 25% are packed in small bags for retail sale (250g – 2500g).<sup>213</sup>

The bran which is produced during the milling process is bagged and sold as animal feed.<sup>214</sup>

As said before and stated by the FAO, the percentage of the trade in wheat flour is very small (6-8%) among other reasons because of the much lower shelf life of wheat flour compared to the wheat grain. Mr Seidl states that after you mill the wheat and pack it, you have to put an expiration date on it. Wheat flour has a maximum shelf life of 12 months, the shelf life of whole grain flour is only 6 – 8 months, whereas the wheat grain can last for years when properly stored (cool and dry) and pest free.<sup>215</sup>

Concerning the bagging of the wheat flour:<sup>216</sup>

Approximately 60% of the flour is transported in silo trucks directly to the customers. 25% are bagged in small bags for household use (250g – 2500g). 20% are bagged in industrial quantities, which means in bags ranging from 10kg to 30kg.

Because the mill is always working and milling approximately the same amount of flour, also the bagging is constantly done. Usually the packaging is done in 2 shifts, except for the months August to December when they operate 3 shifts. For Christmas much more flour is needed than in other seasons.<sup>217</sup>

The bagging of industrial quantities in the Farina mill in Raaba is solely done in paper valve bags (only special, nonstandard products are occasionally bagged in paper open

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<sup>211</sup> Cf. Interview with Mr Andreas Seidl, CEO at the Farina Mill in Raaba (Austria), date 03.10.2013

<sup>212</sup> Ibidem

<sup>213</sup> Ibidem

<sup>214</sup> Ibidem

<sup>215</sup> Ibidem

<sup>216</sup> Ibidem

<sup>217</sup> Ibidem

mouth bags, but these can be neglected in this case). The bags have two layers when containing animal feed and three layers when containing flour.<sup>218</sup>

Three bagging machines are in use.<sup>219</sup>

- A valve bagger produced by the company Greif with 3 filling spouts, auger feed who can manage 700 bags per hour. The bags have to be manually attached to the filling spouts.
- A valve bagger by the company Behn & Bates which operates fully automatic and is used for the semolina products. This machine has one filling spout and can handle 160 bags per hour.
- A valve bagger by the company Paglierani with 2 filling spouts which can handle 250 bags per hour and is manually operated. This machine is used for bagging animal feed.

The maximum weight which is bagged is 30 kg due to legal regulations.<sup>220</sup>

The whole group “Good Mills” where Farina is a part of uses paper valve bags in their production. Mr Seidl states this is because this kind of bag can be operated dust free and highly hygienic. Woven Propylene open mouth bags would be cheaper than paper valve bags, but according to Mr Seidl the dust and the closing of these bags (sewing) are a liability. Furthermore, valve bags have the best form for palletizing.<sup>221</sup>

After the flour is bagged, every bag has to pass a control scale and afterwards a metal detector before the bag is fit to be palletized. In some sectors in the food industry X-Ray detectors are already used, but according to Mr Seidl there are no such detectors currently on the market for the milling industry which work appropriately. If there are finally X-Ray detectors available which work appropriate Mr Seidl thinks such a detectors will be a requirement. These detectors could save a lot of work because they could detect pieces of glass or wood in the flour bags, which a metal detector cannot detect. Currently a lot of efforts are made to control the milling equipment for missing parts and wood or glass abrasion.<sup>222</sup>

From every packed charge of flour samples are taken and checked in the laboratory.<sup>223</sup>

Problems in the bagging process can be badly shut bags or varying air humidity.<sup>224</sup>

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<sup>218</sup> Cf. Interview with Mr Andreas Seidl, CEO at the Farina Mill in Raaba (Austria), date 03.10.2013

<sup>219</sup> Ibidem

<sup>220</sup> Ibidem

<sup>221</sup> Ibidem

<sup>222</sup> Ibidem

<sup>223</sup> Ibidem

<sup>224</sup> Ibidem

What are important features for a bagging machine that the Farina mill would use?

Mr Seidl states that on the Austrian flour market the amount of flour that is bagged decreases from year to year. The bakeries build their own silos and buy the flour as bulk goods. The trend is also towards smaller bags.<sup>225</sup>

The flour trends are shifting towards whole grain flour, spelt flour and other special products. So for a mill it is important that the bagging machine is as flexible as possible and can be converted very fast and easily to bag a lot of different products. Cleaning it should be easy as well.<sup>226</sup>

The demand for a fully automatic operating machine is strong. It is not important how fast the machine works. If it is operating fully automatic it can be left nearly unattended.<sup>227</sup>

The Farina mill is one of the biggest in Austria, but comparatively small in the European sector. There are mills with four times the performance, for example, in Germany. In the international sector there are also mills which are a lot bigger (e.g. USA, South America). Therefore, a high performance bagging machine is not needed because it would only run maybe one or two days a week.<sup>228</sup>

Another important factor for bagging machines in a European mill: the bagging lines are almost always subsequently built into the mill, so space is an issue. Often there is no space for a big high performance machine (e.g. a carousel). Space is definitely a criterion in Europe for buying a bagging machine.<sup>229</sup>

Information about milling equipment, bagging machines and the whole industry are found in the German magazine "Mühlen und Mischfutter" and on various exhibitions according to Mr Seidl.<sup>230</sup>

#### **4.1.2 Conducting an International Survey for Flour Mills**

A survey was conducted in order to get information about the global milling industry. The survey was named "Questionnaire for Flour Mills". What was considered important for the survey was that it should be as short as possible and as simple as possible. People with weak English skills should be able to understand the questions. The topics

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<sup>225</sup> Cf. Interview with Mr Andreas Seidl, CEO at the Farina Mill in Raaba (Austria), date 03.10.2013

<sup>226</sup> Ibidem

<sup>227</sup> Ibidem

<sup>228</sup> Ibidem

<sup>229</sup> Ibidem

<sup>230</sup> Ibidem

of the survey were: wheat flour output, percentage of wheat flour bagged in industrial quantities ( $\geq 10$  kg), percentage transported as bulk goods, bag material for flour bagging, bag type (open mouth, valve,...) bag form (pillow, gusseted) and used machines. The full questionnaire can be found in the Appendix.

The survey was started on the 10<sup>th</sup> of September, 2013 and was initially sent out to 188 email addresses. It included 40 addresses from milling associations all over the world with the request to forward the link of the survey to their members. In addition, the sales team of Statec Binder sent the link to their contacts and representatives in several countries.

During the following three weeks the number of email addresses the survey link was sent to increased to 367. From this number of addresses 76 were associations representing the flour industry of a whole country. 56 addresses were out of order or did not work for various reasons.

The crucial criterion for flour mills in order to be chosen to participate was if the mill bagged and sold wheat flour in bags with quantities between 10 and 50 kg. Sometimes this information could not be acquired beforehand, but it could be seen if a mill which did not bag wheat flour in large quantities had participated. These mills would not be considered for the results in the analysis later.

The questionnaire was divided into four groups: General Information, Flour, Bags and Machine type.

In the group "General Information" the name of the milling company and its country of origin was asked.

The "Flour" group held questions regarding the yearly wheat flour output, if the company transported wheat flour in bulk shipments and if they bag wheat flour in industrial quantities. If the company stated that they did not fill wheat flour in bags with quantities between 10 and 50 kg, the survey was terminated at this point.

In the group "Bags" questions were asked concerning bag capacities, bag materials and bag types which are used by the mills to bag wheat flour. It was important to find out how many mills use open mouth bags, valve bags, etc. It was also asked if pillow or gusseted bags were used. The bag dimensions (width and length) presented an optional question.

In the last group, "Machine types", the mills were asked if they use manually or semi-automatic machines, fully automatic line baggers or bagging carousels. There was also a question only for the mills which currently use manual/semi-automatic solutions if they would like to change to a fully automatic solution with maximum performance of 600 bags/hour or 1200 bags/hour.

The language of the survey was English, later on the questionnaire was translated to Turkish and sent to mills in Turkey, but there was no response.

#### **4.1.3 Selection of Regions which present a Potential Market**

Regions and countries which present possible interesting markets for the new bagging machine by Statec Binder were chosen. In a first step the top five in each of the previous mentioned categories (Wheat Flour Exporters, Wheat Grain Importers and Wheat Flour Producers) were being investigated. Later on these regions were analysed and assessed. In the analysis other regions were studied because various reasons (e.g. expanding wheat milling sector).

The regions and countries were segmented in groups after geographic criteria.

### **4.2 Competitors on the Market for High-Performance Flour Bagging Machines**

Data about competitors could only be acquired through web research. The most important key parameter of the search was which machines could handle up to 1200 bags per hour in flour bagging or bagging of powdery products.

First, companies producing bagging machines which can bag flour or powdery products in industrial quantities were examined.

Then the focus was on the open mouth baggers among the identified machines. The question was: which of these could really be categorized as high performance machines? Which of them could be operated fully automatic?

Afterwards the competitors who produce bagging carousels were singled out. It was important to find out about the technical concepts, the possibility of running fully automatic and the speed of bagging.

In order to find competitors and competitive products 28 companies were assessed. The whole list of these companies can be found in the Appendix.

The technologies used by the competitors were also researched.

Most companies offer open mouth baggers or valve baggers for bagging flour and powdery products. In rare cases FFS (Form, Fill and Seal) machines are offered. However, these machines are usually employed when filling smaller “pouches” and are

not very often offered for bagging industrial quantities of powdered product. These findings were backed up by the results of the flour mill survey.

Summarised, the most frequent solutions used by competitors for bagging flour are:

- Semi-automatic Machines
- No high performance Machines (a range up to 500 bags/hour)
- No FFS Machines.

Furthermore, it has to be said that for assessing competitive products the stated maximum bag per hour rate for machines which can bag granular and powdered product will always refer to granular, free flowing products. With such products much higher bagging rates are possible than with powder. This fact was taken into account in the analysis.

## 5 Data Analysis and Assessment

In this chapter the data analysis and data aggregation takes place. As found through data collection there are some countries which present possible promising target markets. A lot of factors have to be taken into account and where it is possible to present those in the analysis.

For the analysis the countries are clustered into groups. Each group consists of countries where the markets have similar features, either cultural or economical. The potential markets which have been found like described in the data collection will be analysed in order to find the relevant markets.

For some countries information concerning the milling industry and infrastructure was provided by milling associations of the respective countries or scientific papers and articles. These countries could, because of this information, be identified as a potential market or could be dismissed as such.

After the analysis of countries the assessed competitors are analysed and the selected competitors are listed and their products described.

### 5.1 The Wheat and Wheat Flour Market

This chapter should give an overview on the data acquired regarding the global wheat and wheat flour market including trade and specific features of countries. Furthermore, the biggest wheat grain and wheat flour importers and exporters are listed.

#### 5.1.1 Wheat Trade

The FAO states that the world trade in wheat flour is only 6 – 8% from the whole wheat trade. The percentage of trade in wheat grain is much higher because of lower import tariffs on wheat grains compared to wheat flour. Second, the grain has a much longer shelf life and fewer difficulties when it comes to in transportation.<sup>231</sup>

When the flour is already milled and packed, the flour producer has to print an expiration date on the package. The shelf life of white wheat flour is about 12 months.

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<sup>231</sup> Cf. FAO Agribusiness Handbook – Wheat Flour (2009), p. 29

Whole grain flours expire after 6 to 8 months. In contrast, wheat grain can last for years when it is properly stored (cool and dry) and pest free.<sup>232</sup>

The reason for analysing the wheat grain trade is that we can assume that countries which import a lot of wheat grain will mill the grains in their local facilities and bag the flour there.

Another very interesting group of countries were the biggest wheat flour exporters. The assumption was that if flour is transported over long distances it would most certainly be filled in bags.

These two assumptions were backed up by Andreas Seidl, CEO of the Farina mill in Raaba, in an interview.

A good example would be the milling group Grandi Molini in Italy which mainly operates in ports or at railway terminals. The wheat grain is imported on big silo ships. Then it is milled in the milling facilities of Grandi Molini. Afterwards the flour is bagged and loaded on ships or trains again for export.<sup>233</sup>

### **5.1.2 Wheat Grain Importers**

With data from the database ran by the FAO the structures of the wheat grain import and export could be identified very well. Very detailed data was available. Below in Figure 27 the 20 biggest importers of wheat grain worldwide are shown.

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<sup>232</sup> Cf. Interview with Andreas Seidl, CEO Farina Mill Raaba, Austria

<sup>233</sup> Ibidem



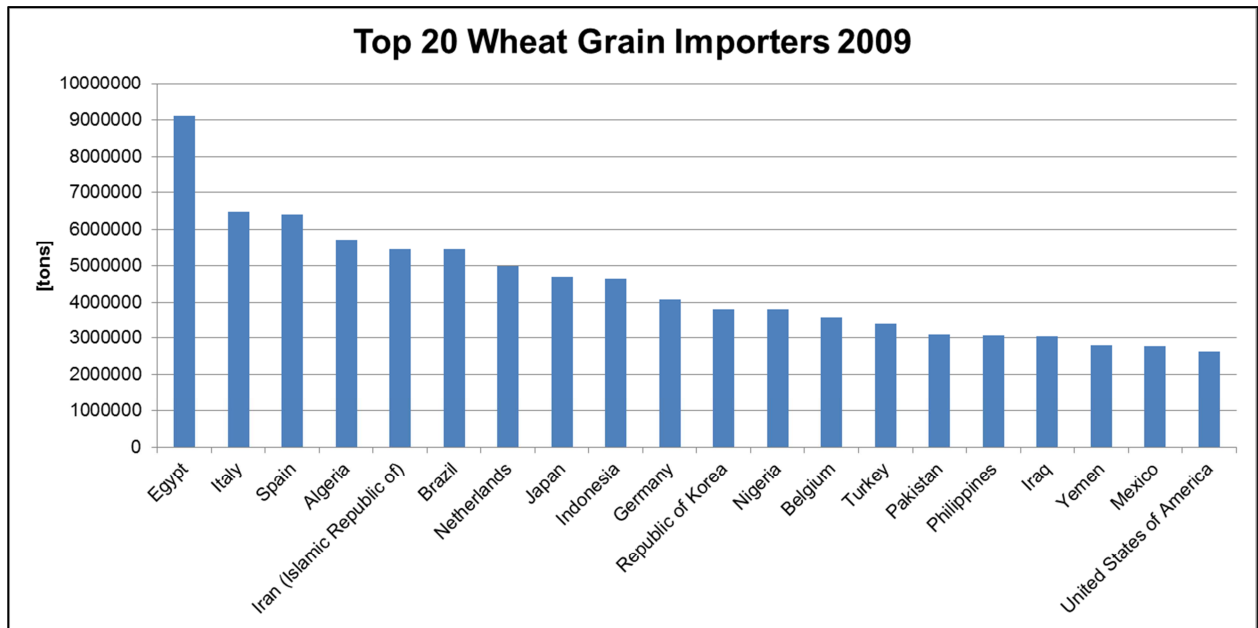


Figure 27: Top 20 Wheat Grain Importers 2009<sup>234</sup>

The top importer of wheat grain is Egypt with a quantity of 9.120.779 metric tons import in 2009.<sup>235</sup> In 2010 Egypt imported even more wheat: 10.593.506 tons.<sup>236</sup> In 2011 the quantity of imported wheat grain decreased slightly to 9.800.061 tons.<sup>237</sup>

A list of the top 20 wheat grain importers and the imported grain amounts can be found in the Appendix in Table 6.

### 5.1.3 Wheat Flour Exporters

The import and export data for wheat flour are very well documented and available on the FAO database. In Figure 28 the 20 biggest wheat flour exporters from the year 2009 are shown.

<sup>234</sup> Diagram based on FAO Data, <http://faostat.fao.org>, date of access: 13.08.2013

<sup>235</sup> Cf. [faostat.fao.org](http://faostat.fao.org), date of access: 19.08.2013

<sup>236</sup> Ibidem

<sup>237</sup> Ibidem

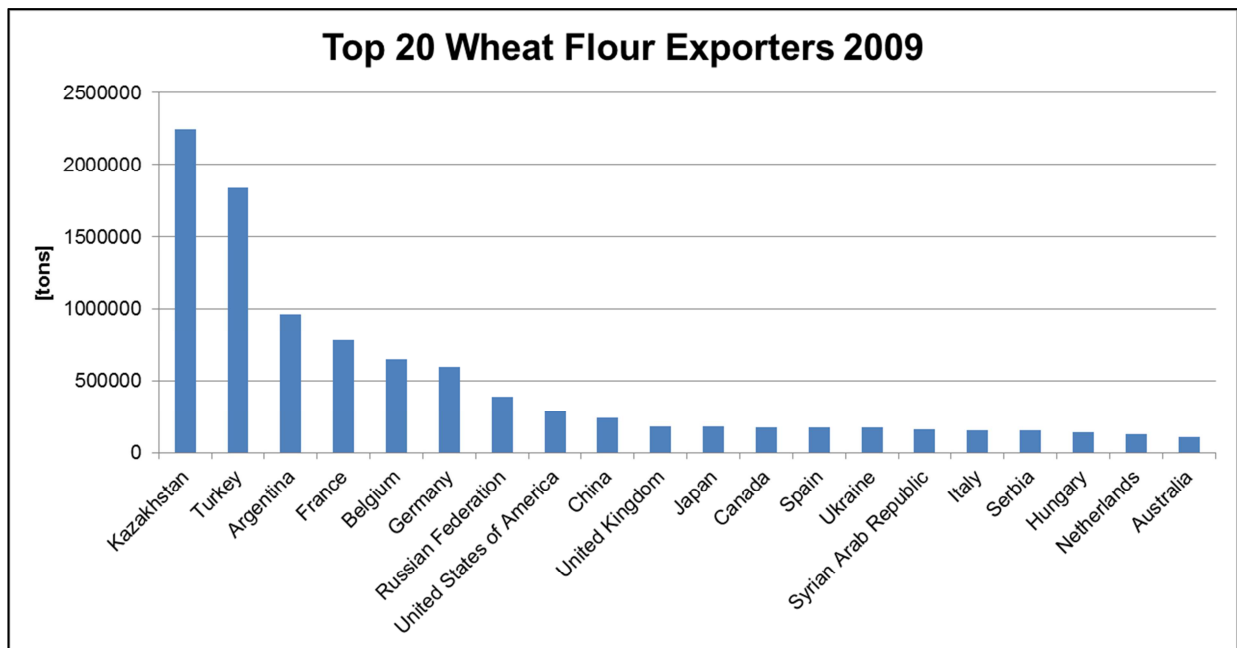


Figure 28: Top 20 Wheat Flour Exporters 2009<sup>238</sup>

Kazakhstan was the world leader in wheat flour export in 2009 with an export amount of 2.248.035 tons. It was closely followed by Turkey with an export of 1.837.835 tons.

The whole table listing amounts and values can be found in the Appendix in Table 7.

#### 5.1.4 Wheat Flour Producers

There are no databases accessible which provide data about wheat flour production worldwide. Four different sources had to be used to assemble a list. In Figure 29 the biggest wheat flour producing countries are shown. It should be noted in the diagram that the wheat flour production data from China were taken from the year 2008. For the year 2009 no data was available for Chinese wheat flour production.

The data for China, Brazil, United Kingdom and Indonesia were taken from information provided by the International Grains Council (IGC). The data for the United States, Egypt, France, Germany, Pakistan, Argentina, Japan and Mexico can be found in the UN Stat Division database. The data for Russia, Turkey, Azerbaijan, Turkmenistan, Kazakhstan, Ukraine, Uzbekistan and Poland were taken from the FAO.

<sup>238</sup> Diagram based on FAO Data, [faostat.fao.org](http://faostat.fao.org), date of access: 13.08.2013

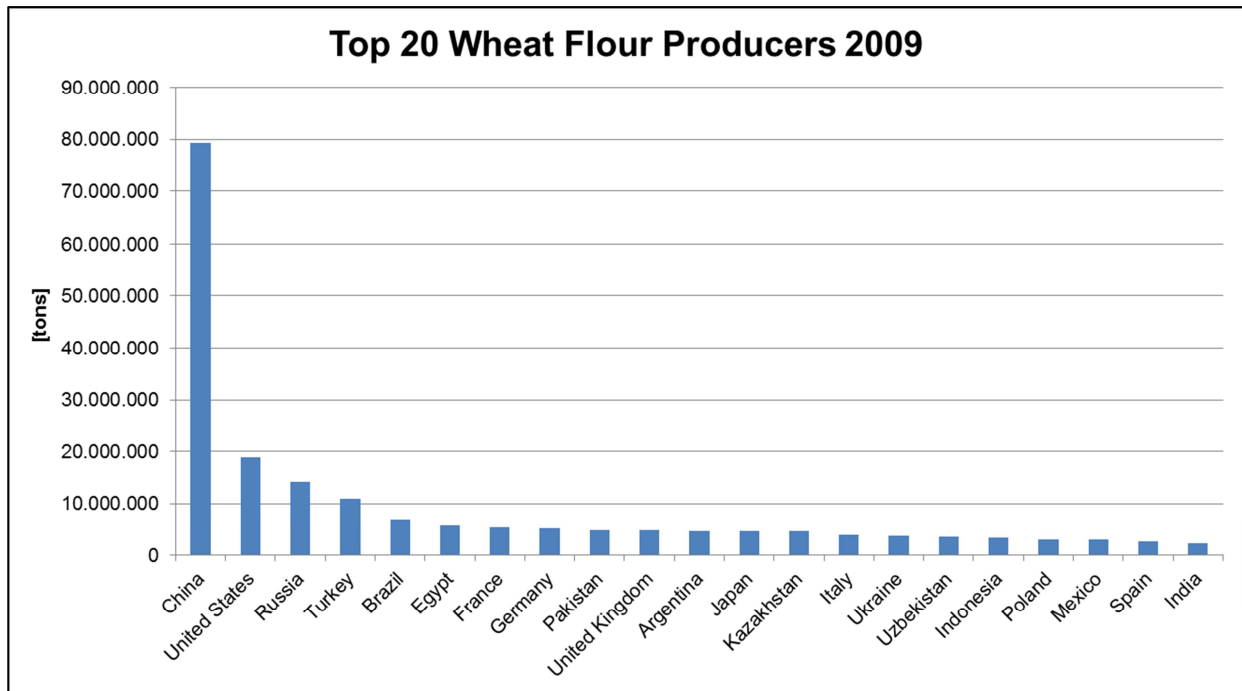


Figure 29: Top 20 Wheat Flour Producers 2009<sup>239</sup>

As can easily be seen in Figure 29, China is by far the biggest wheat flour producer worldwide producing 79.371.000 tons of wheat flour in the year 2008.<sup>240</sup>

A table with all countries where the produced of wheat flour production could be found is available in the Appendix in Table 8.

### 5.1.5 Wheat Grain Import and Wheat Flour Export Trends

The flour and grain trade data in a first step have been taken from the year 2009, because in this year most flour production data was available and more current data was impossible to come by. Trade data was also available up to the year 2011. The trends have been pointed out in diagrams to find out if the top grain importers and flour exporters changed over the last years and to find out where stability in the trade habits of countries can be found.

<sup>239</sup> Diagram based on Data from FAO, <http://faostat.fao.org>, date of access: 19.08.2013, UN Stat Division database, Date of access: 07.09.2013 and information from the IGC on [www.world-grain.com](http://www.world-grain.com), Date of access: 10.08.2013

<sup>240</sup> Cf. [www.world-grain.com](http://www.world-grain.com), date of access: 10.08.2013

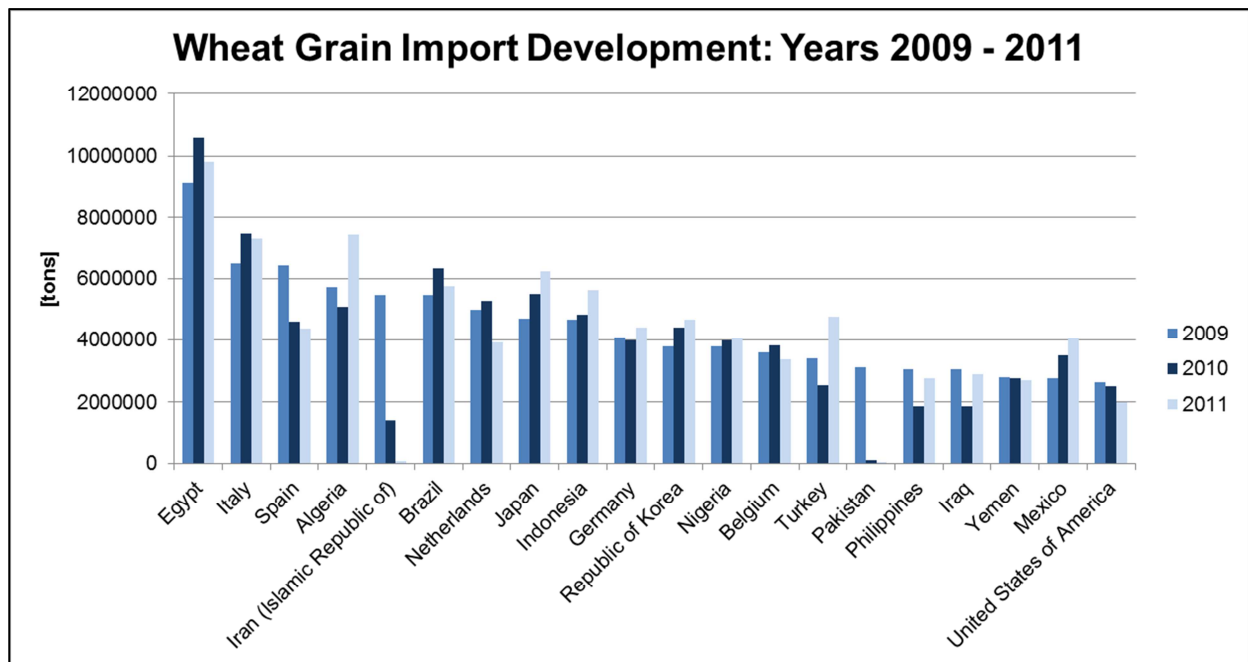


Figure 30: Wheat Grain Import Development in the Years 2009 to 2011<sup>241</sup>

As can be seen in Figure 30, Egypt remains the biggest wheat grain importer during the examined years. The imports of Italy, in 2009 the second biggest wheat grain importer remain relatively stable. Spain imports far less grain in 2010 and 2011 than in 2009 (4.595.206 tons in 2010 and 4.355.655 tons in 2011 instead of 6.413.488 tons in 2009). Algeria's wheat grain import rises up to 7.454.603 tons in 2011 from 5.719.728 tons in 2009 which makes it the second biggest importer of wheat grain in 2011. Iran dramatically decreases its grain imports from 5.460.218 tons in 2009 to 71.005 tons in 2011. The reason for the rapid drop in Iranian grain imports may be found in the fact that Iran became a nearly self-sufficient wheat producer during 2010.<sup>242</sup>

A significant and abrupt rise in grain imports can be seen in Turkey. In the countries Japan, Indonesia and Mexico the rise of grain imports shows a rather steady progress.

The data which Figure 30 is based on can be found in the Appendix in Table 10.

<sup>241</sup> Own Diagram, based on data from <http://faostat.org>, date of access: 21.10.2013

<sup>242</sup> Cf. [www.world-grain.org](http://www.world-grain.org), date of access: 12.08.2013

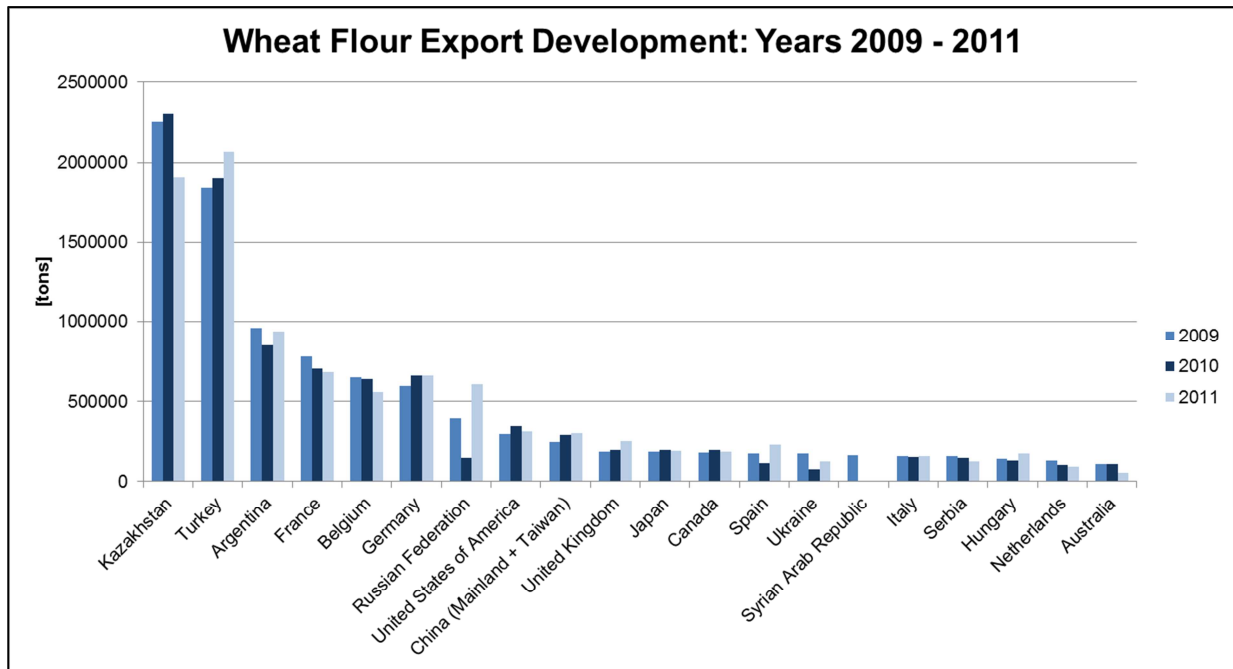


Figure 31: Wheat Flour Export Development in the Years 2009 to 2011<sup>243</sup>

As can be seen in Figure 31, Kazakhstan and Turkey take turns in leading the list of wheat flour exporters worldwide. Their export is relatively stable. Argentina, France, Belgium and Germany occupy the ranks three to six. Also their export levels are quite steady and they operate closely at the same scale. The flour exports of the Russian Federation decreased very much in 2010 and increased steeply up in 2011 and ranked on the same level as Germany and Belgium.

The amounts and numbers which Figure 31 is based on can be found in the Appendix in

Table 11.

## 5.2 Results of the Flour Mill Survey

The survey was completed on 25<sup>th</sup> of October, 2013 with a total of 65 complete answers and 132 unfinished answers.

Answers came from mills from 31 different countries. The names of the mills will not be published, but the distribution of countries of the participating mills can be seen in Figure 32.

<sup>243</sup> Own Diagram, based on data from <http://faostat.org>, date of access: 21.10.2013

One can see that the most answers (21) came from the U.S.A. The second most came from Iran with four response submissions. Then follow Pakistan and Austria with three answers. The rest of the countries gave only one or two answers each.

In the case of Brazil, Mexico, Saudi Arabia and Morocco the questionnaire was filled out by the respective Milling Association and thus gave an overview on the whole industry (the members of the mentioned associations).

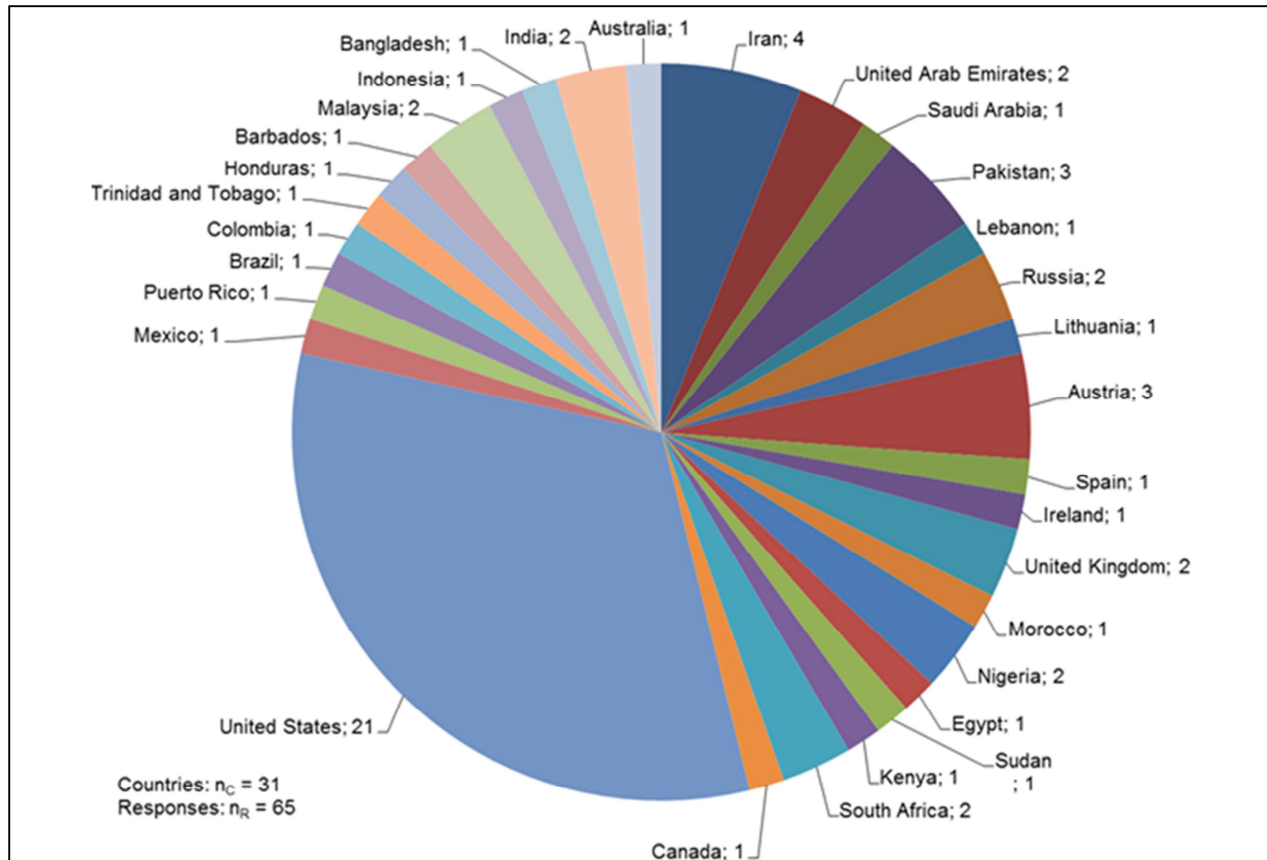


Figure 32: 31 Countries where Response Submissions in the Mill Survey could be obtained<sup>244</sup>

From the original 65 responses only 48 could be taken for the assessment. Four answers were given by milling associations which did represent either a whole country or a milling group. 13 of the mills did not bag wheat flour in industrial quantities.<sup>245</sup>

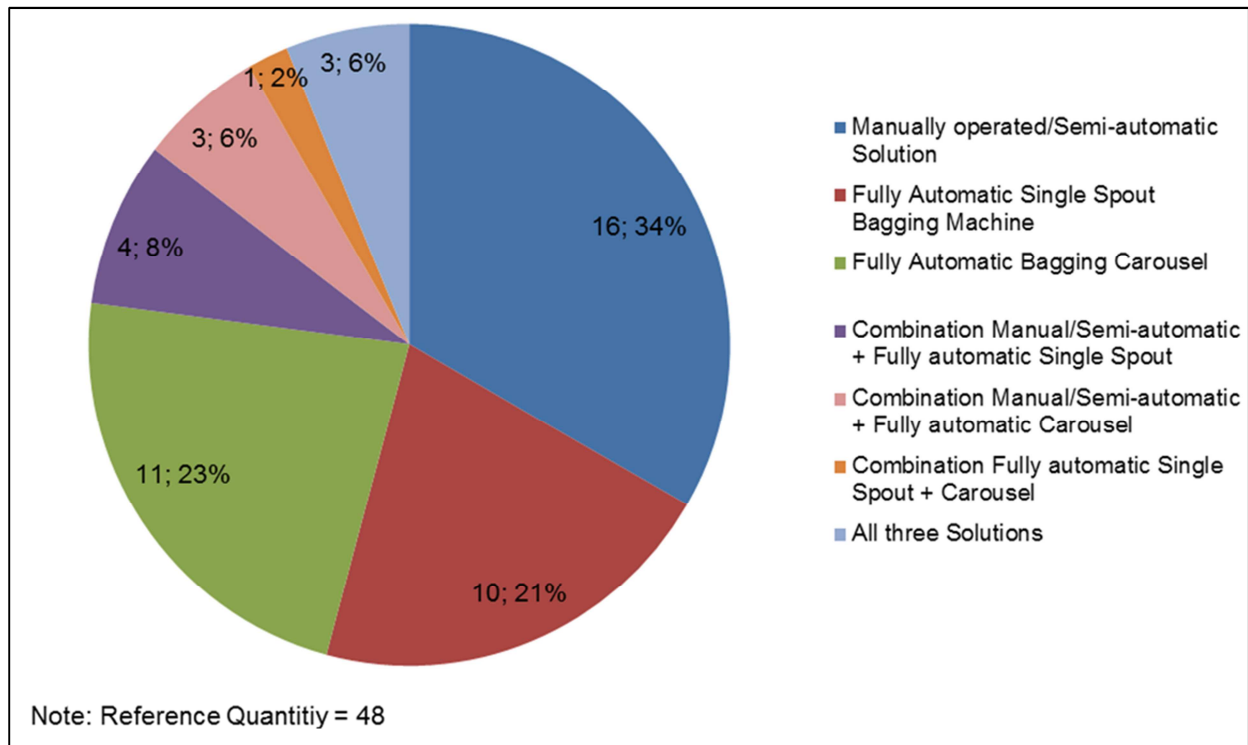
In the survey 16 mills declared that they use manually or semi-automatically operated machines. Ten mills use a fully automatic single spout bagging machine. Eleven mills use a fully automatic bagging carousel and eleven mills use a combination.<sup>246</sup>

<sup>244</sup> Own Illustration

<sup>245</sup> Cf. Results of the Flour Mill Survey "Questionnaire for Flour Mills"

<sup>246</sup> Ibidem

In Figure 33 these findings are illustrated in a diagram.



**Figure 33: Distribution of the used Machine Types by the Participants of the Mill Survey<sup>247</sup>**

Another group of questions aimed at receiving information about the demand for fully automatic high performance bagging machines. Therefore the participants who stated that they only use a manually operated or semi-automatic bagging solution were asked if they were interested in a fully automatic bagging machine, either with a performance of up to 600 bags/hour or up to 1200 bags/hour.

The number of mills which now use a manual or semi-automatic bagging solution and would like to have a fully automatic bagging machine which can handle up to 600 bags/hour was eight.<sup>248</sup>

The number of mills which use a manual or semi-automatic bagging solution now and would like to have a fully automatic bagging machine which can handle up to 1200 bags/hour was six.<sup>249</sup>

Only two mills stated that they were satisfied with their current manual or semi-automatic solution and did not have the wish to change anything.<sup>250</sup>

<sup>247</sup> Own Illustration

<sup>248</sup> Cf. Results of the Flour Mill Survey "Questionnaire for Flour Mills"

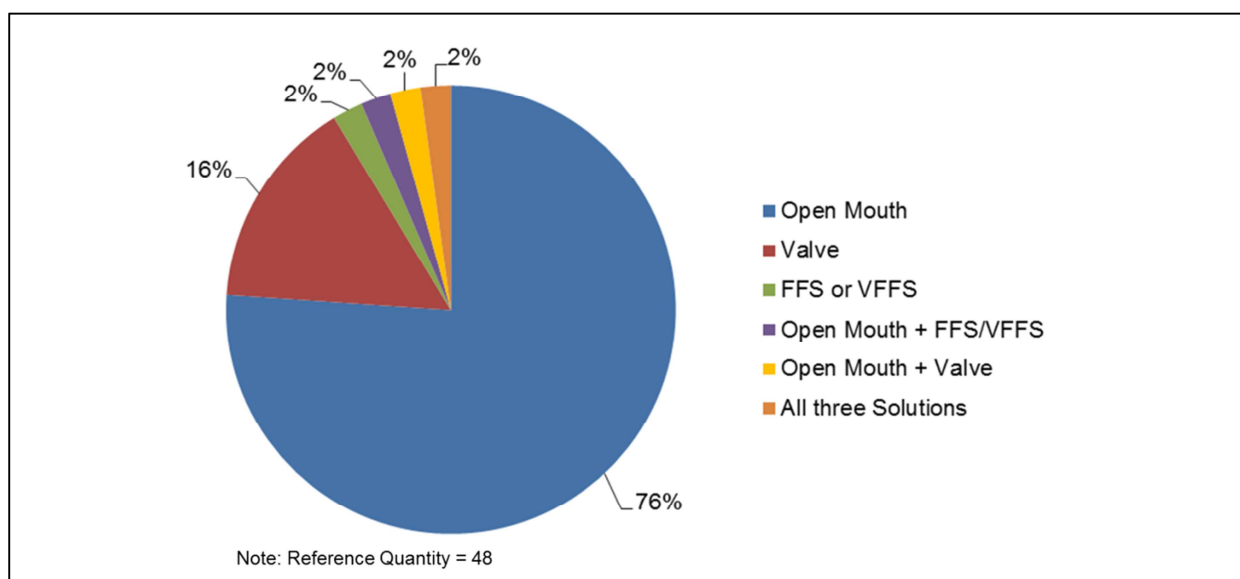
<sup>249</sup> Ibidem

In the question category of used bag types it was important to find out which bag types and materials are currently used to bag wheat flour.

35 of the evaluated 48 mills use open mouth bagging machines for bagging wheat flour. Seven mills use valve baggers for bagging wheat flour. Only one mill uses a FFS machine (and simultaneously a VFFS machine).<sup>251</sup>

There were also three participants who use a combination: one uses both, open mouth and FFS/VFFS machines, one uses open mouth and valve baggers and again one participant stated that they use all three bagging solutions.<sup>252</sup>

In Figure 34 the distribution of bag and machine types is illustrated. It is obvious that most of the evaluated mills use open mouth bags for bagging wheat flour.



**Figure 34: Distribution of the Bag Types used by the Participants of the Mill Survey<sup>253</sup>**

An important point for the development of the new Statec Binder high performance flour bagging machine was to determine what the distribution of users of gusseted and pillow bags looks like.

<sup>250</sup> Cf. Results of the Flour Mill Survey "Questionnaire for Flour Mills"

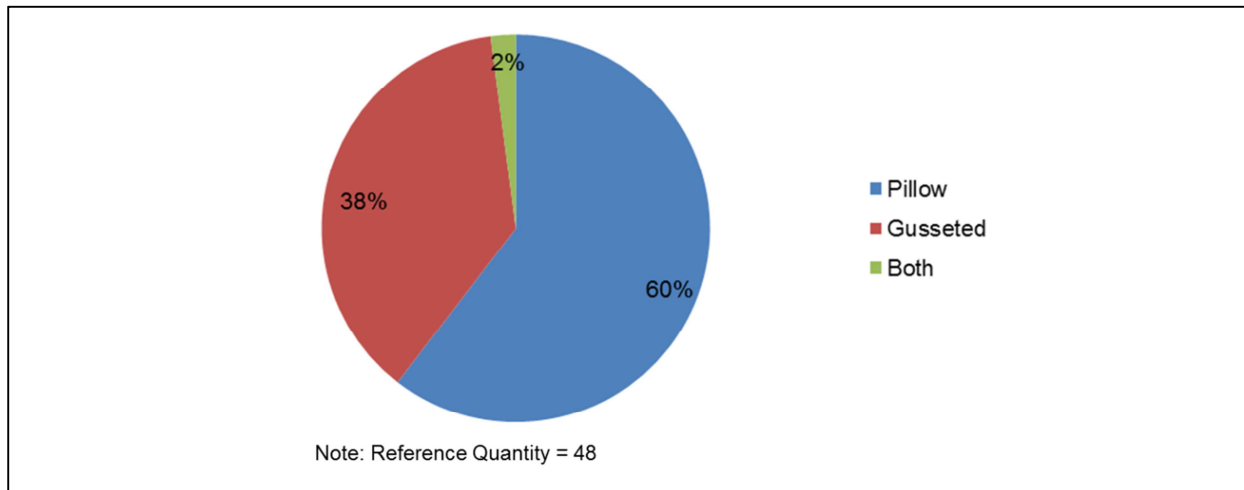
<sup>251</sup> Ibidem

<sup>252</sup> Ibidem

<sup>253</sup> Own Illustration



Figure 35 shows the distribution of the use of pillow bags and gusseted bags in a graphic.



**Figure 35: Distribution of the Bag Types used in the Open Mouth Section<sup>254</sup>**

This means that the Statec Binder machine has to be able to handle pillow bags and gusseted bags in every case. However, the results also show that it is not necessary that one machine has to be convertible to handle both bag types because there is only one mill which uses both bag types. This is a mill in Austria.<sup>255</sup>

### **5.3 Geographic Segmentation of the Worldwide Market for High-Performance Flour Bagging Machines**

First, the segmentation was done in groups regarding wheat grain import, wheat flour export and flour production. Now a geographic segmentation is conducted, in order to get a more holistic picture of the potential markets for fully automatic high-performance flour bagging machines.

The geographic segmentation is done mostly in conformity with continents, but some continents are also divided in sub sections.

The first geographic region which is analysed and assessed is Europe, followed by Africa, the Middle East and the Far East. The Asian continent is split up into the Russian Federation, Central Asia, South Asia and Southeast Asia. Afterwards follow

<sup>254</sup> Own Illustration

<sup>255</sup> Cf. Results of the Flour Mill Survey "Questionnaire for Flour Mills"

Australia and the American continent, which is split into North America and South America.

### 5.3.1 Europe

Some countries in Europe were found to be potential markets during the data collection. Not every single country in Europe could be evaluated. The countries which were finally analysed were: Austria, Germany, Belgium, France, Spain and Italy.

#### **Austria:**

Due to facts gained from an interview with the CEO of the Farina mill in Raaba (Styria) Austria could be dismissed as market for the new bagging carousel by Statec Binder. According to Mr Seidl the trend in Austria and other European countries goes to smaller and fewer flour bags. The biggest part of flour is transported as bulk goods. Moreover, most mills do not have the space and the flour output to successfully use a high performance flour bagging carousel.<sup>256</sup>

#### **Germany:**

In the interview conducted with Andreas Seidl, CEO of the Farina mill in Raaba (Styria), Germany was rated similar to Austria in milling infrastructure and flour logistics.<sup>257</sup>

Furthermore, a representative of the German Millers Association "Verband deutscher Mühlen" states that 75 to 80 percent of flour and other milling products are transported as bulk goods.<sup>258</sup>

#### **Belgium:**

Belgium appears in the acquired statistics as one of the biggest wheat flour exporters worldwide. According to a representative of the Belgian Miller's Association Belgium is not as big of an exporter as it once was.<sup>259</sup>

The trade flow in the year 2009 can be seen in Figure 36.

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<sup>256</sup> Cf. Interview with Andreas Seidl, CEO of the Farina mill in Raaba (Austria), conducted on 03.10.2013

<sup>257</sup> Ibidem

<sup>258</sup> Cf. Information provided by the German Millers Association

<sup>259</sup> Cf. Information provided by the Belgian Millers Association

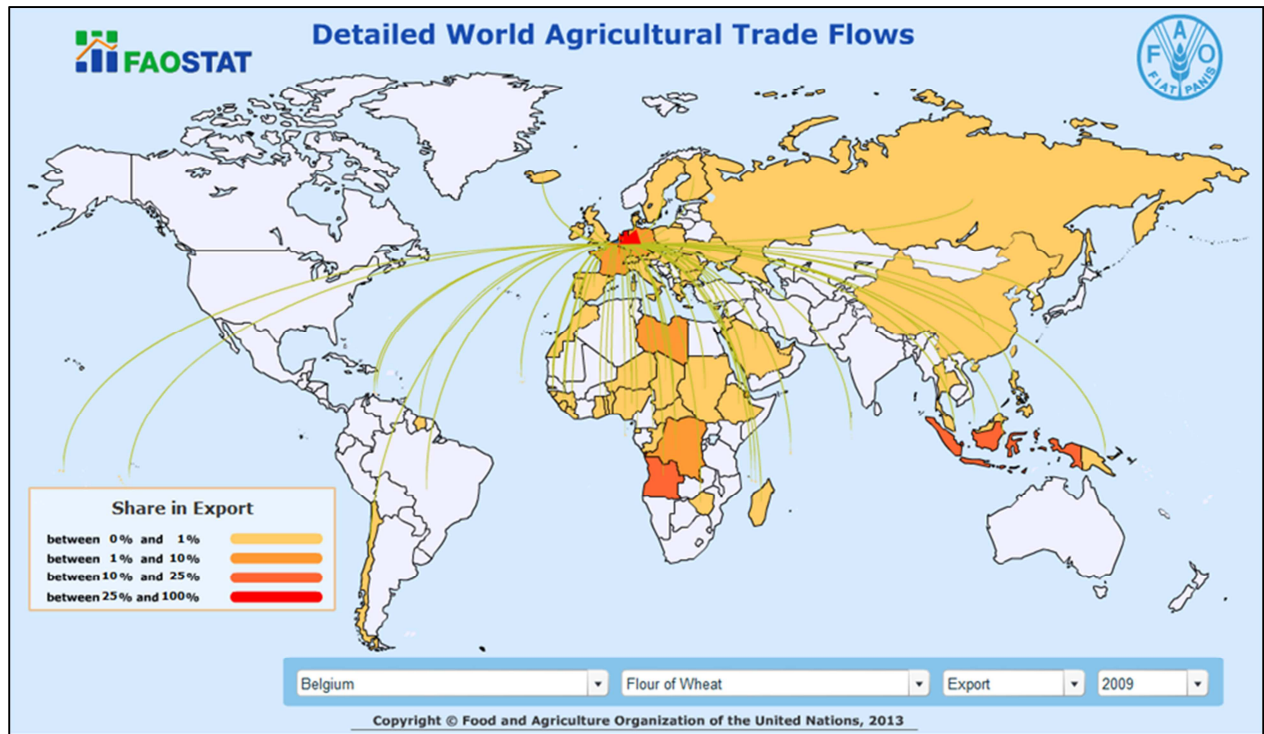


Figure 36: Belgium's Flour Export graphically illustrated<sup>260</sup>

There are currently 35 flour mills operating in Belgium. There are three big mills (Dossche, Brabomills and Ceres), a number of medium size mills and some small mills.<sup>261</sup>

Concerning the exporting process (bags or bulk, used bags and machines) the Association had no information<sup>262</sup>

#### France:

The IGC states that France has the biggest grain sector in the European Union. It is one of the biggest grain exporters worldwide and in particular supplies North Africa.<sup>263</sup>

The milling sector, according to the French Miller's organisation ANMF (Association Nationale de la Meunerie Française), is organised like this: there are 380 mills in total with 454 production units. Four big milling companies (each of them has a production capacity of more than 300.000 tons) produce about 58% of the flour in France.<sup>264</sup>

<sup>260</sup> <http://faostat.fao.org> date of access: 04.09.2013

<sup>261</sup> Cf. Information provided by the Belgian Millers Association

<sup>262</sup> Ibidem

<sup>263</sup> Cf. [www.world-grain.com](http://www.world-grain.com), date of access 02.09.2013

<sup>264</sup> Ibidem

In Figure 37 the export flow of the wheat flour in France in the year 2009 is graphically illustrated.

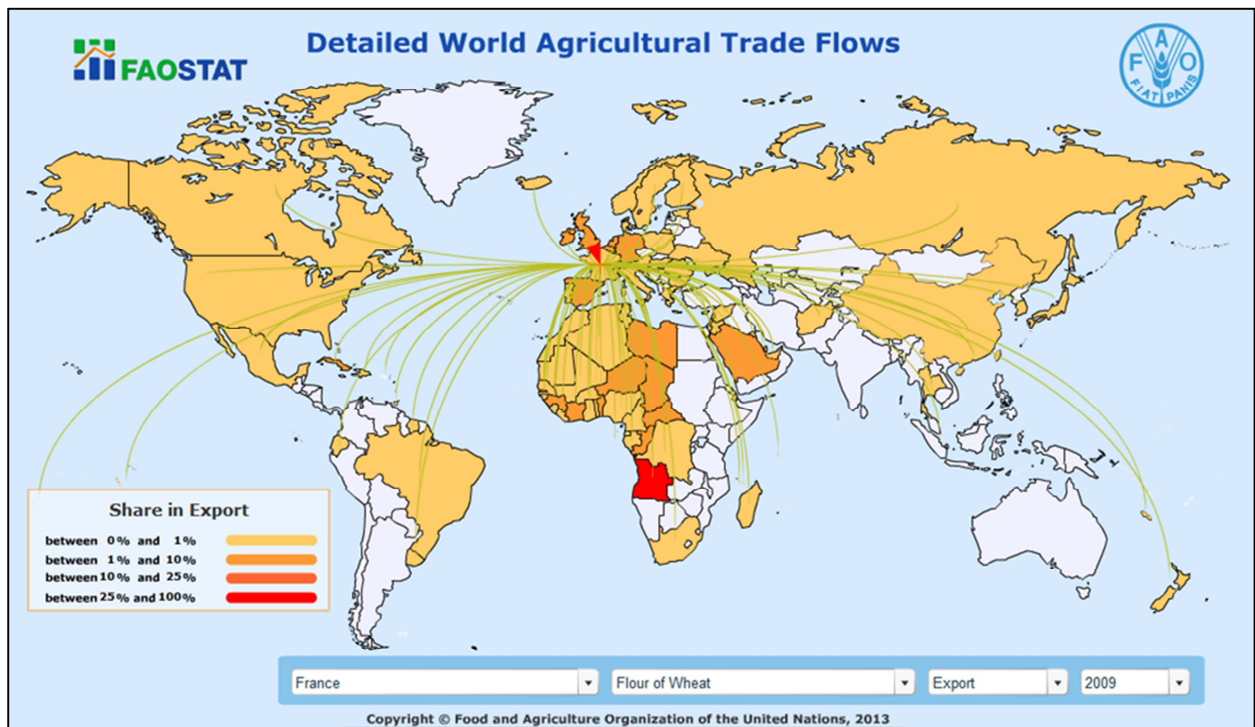


Figure 37: France's Flour Export graphically illustrated<sup>265</sup>

Concerning the exporting process (bags or bulk, used bags and machines) the ANMF had no information.<sup>266</sup>

#### Italy:

Italy is the top producer and consumer of pasta worldwide. For making pasta you need durum wheat, which is called "hard wheat". In the milling industry there are a few very big players – one of the biggest would be Grandi Molini Italiani processing 985.000 tons of wheat yearly in five plants. Italy in general has a very large food processing sector.<sup>267</sup>

Grandi Molini uses only paper open mouth bags, gusseted and with a pinch top.<sup>268</sup>

#### Spain:

Spain is located in the south of Europe. Due to the dryness and the poor soil not much of the area is arable. Therefore Spain has to import a lot of its wheat grain. The wheat milling industry is very fragmented and consisted of 156 flour mills at the end of 2009.

<sup>265</sup> <http://faostat.fao.org> date of access: 04.09.2009

<sup>266</sup> Cf. Information provided by the French Millers Association

<sup>267</sup> Cf. [www.world-grain.com](http://www.world-grain.com), date of access: 04.11.2013

<sup>268</sup> Cf. [www.grandimolini.it](http://www.grandimolini.it), date of access: 27.11.2013

The companies which operate smaller mills tend to merge into bigger groups. The number of mills has been decreasing since 1980. In 2010 three big groups produced about 60 – 70% of the wheat flour (one of them, Harinera Vilafranchina, has a capacity of 4.100 tons a day). Spain also has a big livestock sector. In 2009 21 Mio tons of animal feed were produced.<sup>269</sup>

### **United Kingdom:**

The U.K. has one of the highest wheat yields in the world. The country can supply its own domestic market and can export relatively large quantities of wheat.<sup>270</sup>

The flour milling sector is highly competitive. There are 32 flour milling companies in the country which operate 56 mills according to the National Association of British and Irish Millers (NABIM). In 2011 a total of 5.1 Mio tons of wheat were processed to produce 4.1 Mio tons of wheat flour. The average yearly production per mill is therefore about 73.000 tons.<sup>271</sup>

This means assuming a 6 day work week the daily output per mill would be approximately 230 tons.

A big part of the produced flour is transported in bulk shipments to larger bakers and food manufacturers.<sup>272</sup> In the flour mill survey two milling companies based in the U.K. participated. One company stated that it operated five milling plants. Both companies stated that they filled flour in bags. Both companies stated that they bagged around 30% of their flour output in industrial quantities.<sup>273</sup>

### **5.3.2 Africa**

In a survey about suppliers of milling equipment conducted by World Grain recently the answers showed that especially in developing nations the milling activity and infrastructure is expanding.<sup>274</sup> For example in Khartoum, the capital city of Sudan, a new flour mill was built in 2012 with a daily milling capacity of 600 tons.<sup>275</sup>

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<sup>269</sup> Cf. [www.world-grain.com](http://www.world-grain.com), date of access: 19.09.2013

<sup>270</sup> Cf. [www.world-grain.com](http://www.world-grain.com), date of access: 29.09.2013

<sup>271</sup> Cf. *Ibidem*

<sup>272</sup> Cf. Commercial leaflet by the National Association of British and Irish Millers, 2013

<sup>273</sup> Cf. Results of the Flour Mill Survey "Questionnaire for Flour Mills"

<sup>274</sup> Cf. Sosland (2013a), p. 48

<sup>275</sup> Cf. Sosland (2013a), p. 50

**Egypt:**

According to information from an article in the World Grain magazine from the year 2005, approximately 3% of the land area is arable.<sup>276</sup> The most important crops which are grown are wheat, rice, maize, berseem (Egyptian clover), cotton, fruits and vegetables. Wheat is only grown in the wintertime. As part of government reforms from 1987 to 1995, bans and tariffs were reduced when trading agricultural commodities. The government still plays an important role in the trade of wheat and wheat flour. Especially wheat imports are strategically important as inner country production covers only about half of the demand. In the past years until 2005 the production of wheat and other crops has steadily increased.<sup>277</sup>

The annual per capita consumption in Egypt is estimated one of the world's highest with 186 kg (2004-2005) with a trend to rise.<sup>278</sup>

The public milling sector consists of 126 mills (most of them are small or medium size) operated by only seven companies, which are all controlled by the Food Industries Holding Company (FIHC) (an agency of the Ministry of Public Enterprises). Together they have a capacity of 7 Mio tons per year. In addition to that there are 36 private commercial mills with a capacity of 2.8 Mio tons per year.<sup>279</sup>

**Libya:**

Libya was affected strongly through political turmoil during the last years. It has large oil resources but lacks the food to feed its population due to little arable land. So Libya relies strongly on imports of grains and flour.<sup>280</sup>

The wheat Libya imports comes mostly from Europe, Russia and the Ukraine. There are only a few flour mills in the country, so also wheat flour has to be imported. In 2011 there were 20 privately and 30 publicly owned mills.<sup>281</sup>

**Gambia:**

Gambia with an estimated population of 1.883.051 people built their first flour mill in 2013 with a daily milling capacity of 300 tons. In Gambia the agricultural sector is very important and there is still potential as only less than half of the arable land is cultivated.<sup>282</sup>

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<sup>276</sup> Cf. [www.world-grain.com](http://www.world-grain.com), date of access: 22.10.2013

<sup>277</sup> Ibidem

<sup>278</sup> Ibidem

<sup>279</sup> Ibidem

<sup>280</sup> Cf. Lyddon (2013b), p. 26

<sup>281</sup> Cf. Sosland (2013b), p. 38

<sup>282</sup> Cf. Sosland (2013b), p. 38 et seq.

The new flour mill provides a lot of job opportunities and follows the plan of the nation to move away from exporting raw materials and start value addition (and help the country save millions of dollars through their own flour production instead of importing flour). The mill facility was built to be able to be expanded, to have the possibility of future exports or to satisfy increasing domestic demands.<sup>283</sup>

Gambia is seen as port to western Africa and it could provide a platform to use the apparently huge market potential of the West Africa sub-region and beyond.<sup>284</sup>

In the past Gambia had to import all of its flour (Europe, Turkey). Now they are on the way to food self-sufficiency. An animal feed mill is also planned to encourage investment in poultry and cattle farms.<sup>285</sup>

Initially the mill should only mill wheat flour. In the future the plan is to add animal feed to the product range. Gambia's Trade ministry puts the nation's flour imports at 65.000 tons in 2012. Now the new mill has the capacity to produce this amount of flour itself.<sup>286</sup>

The expectation is that the market is growing, especially in the local area as bread is already a staple food in the Gambian diet.<sup>287</sup>

### **Sudan:**

An article in the World Grain Magazine from 2010 states that in the coming decades the wheat production and trade in Sub-Saharan Africa will strongly increase. A driving factor for this is the rising demand for bread and other wheat based products in several Sub-Saharan countries. The reason for the rise in wheat based foods will be rapid urbanisation.<sup>288</sup>

Nigeria imported about 3.5 Mio tons of wheat in 2010, followed by Sudan which leads the trend of increasing wheat imports (in former times the traditional food crop was sorghum) with 1.7 Mio tons.<sup>289</sup>

In Khartoum, the capital city of Sudan, only 100.000 tons of wheat were milled in modern mills in the 1980s. In 2010 three big milling companies produced between 1.5 and 2 Mio tons of wheat flour. The population of Khartoum is about 10 Mio. That results

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<sup>283</sup> Cf. Sosland (2013b), p. 40

<sup>284</sup> Ibidem

<sup>285</sup> Cf. Sosland (2013b), p. 42

<sup>286</sup> Ibidem

<sup>287</sup> Ibidem

<sup>288</sup> Cf. McKee (2010), p. 42

<sup>289</sup> Ibidem



in a per capita consumption of wheat flour of about 200 grams per day.<sup>290</sup> Similar changes in eating habits also occur in rural areas and other urban areas.<sup>291</sup>

Huge parts of the population in Sudan switch from sorghum to wheat as basic food. About half of the wheat flour produced in the country is consumed in the capital (70.000 to 80.000 50 kg bags per day).<sup>292</sup>

In Sudan one of Africa's most modern milling industries has developed. There are three very big milling companies: Sayga Flour Mills, Wheata Flour Mills and Seen Flour Mills. They represent some of the largest private companies in the country. Sayga Flour Mills has three plants with 2.250, 1.200 and 500 tons daily milling capacity. Wheata Flour Mills also has three milling plants with a daily capacity of 1.750 tons each.<sup>293</sup>

### **Algeria:**

Most of the land in Algeria is desert; this makes the country a big importer of wheat grain. In 2011 Algeria had an estimated population of over 34 million, which consume 245 kg of durum wheat (the preferred bread wheat in North Africa) per capita per year. The government grain agency OAIC (Office Algerien Interprofessionnel des Cereales) tries to keep the food prices for the people low. Private buyers cannot import wheat directly. They have to buy it from the OAIC at their prices.<sup>294</sup>

Algeria's milling sector is owned by private companies and consists of about 330 mills; but only 10 have a milling capacity of more than 1000 tons a day. In the last decade the number of mills increased and in 2011 the capacity was estimated nearly the double amount of what is needed.<sup>295</sup>

### **Nigeria:**

According to the U.S. Department of Agriculture (USDA) Nigeria is a huge export market for wheat. The nation has a high demand for wheat flour for the production of bread, and other wheat flour based products like pasta and biscuits. Nigeria's wheat market is valued approximately 1 billion U.S. dollars in U.S. exports (this makes about 85% market share).<sup>296</sup>

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<sup>290</sup> Cf. McKee (2010), p. 42 et seq.

<sup>291</sup> Cf. McKee (2010), p. 44

<sup>292</sup> Cf. McKee (2010), p. 42

<sup>293</sup> Cf. McKee (2010), p. 45

<sup>294</sup> Cf. [www.world-grain.com](http://www.world-grain.com), date of access: 06.09.2013

<sup>295</sup> Ibidem

<sup>296</sup> Cf. [http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Nigeria%20Can%20Strengthen%20Economy%20via%20Wheat%20Trade%20Liberalization\\_Lagos\\_Nigeria\\_6-27-2013.pdf](http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Nigeria%20Can%20Strengthen%20Economy%20via%20Wheat%20Trade%20Liberalization_Lagos_Nigeria_6-27-2013.pdf), date of access: 02.09.2013



Furthermore, the wheat milling capacity increased in the years 2012/13 from 6.6 Mio tons to about 8.0 Mio tons, but the local capacity utilization is about 50 percent.<sup>297</sup>

The market leader by capacity among the mills is Flour Mills of Nigeria, but this company's competitors Dangote, Honeywell, and BUA, keep an increasing market share.<sup>298</sup>

The competition among the millers is intense in the sections price and quality. The baking industry in Nigeria continues to expand and upgrade its production facilities. The increased competition results in an increased variety and quality of fresh baked products for the consumers.<sup>299</sup>

Nigeria is a big country with a large population, but the wheat production within the country is small. The production of maize, sorghum and rice is higher than the wheat production. The milling sector is dominated by a few big companies: in 2008 only six companies had a collective market share of 80%. These six mills were as reported: Flour Mills of Nigeria Plc. (38% market share), Dangote Flour Mills Plc., Ideal Flour Mills Ltd., Honeywell Flour Mills Ltd., Standard Flour Mills Ltd. and Crown Flour Mills. BUA Flour Mills is mentioned to have a growing market share as well.<sup>300</sup>

The mills are expanding, e.g. Dangote Flour Mills invested to increase their total milling capacity from 4.500 to 7.300 tons per day. But due to the high wheat milling demand within Nigeria no milling corporation can or wants to expand to other African countries.<sup>301</sup>

### **South Africa:**

The most important cereal crop in South Africa is maize. The production and the number of milling plants for maize is higher than for wheat as the Chamber of Milling represents 22 maize processing companies and only 13 wheat processing companies.<sup>302</sup>

In 2009 the number of wheat mills decreased steadily while the number of maize mills increased. The estimated wheat milling capacity in 2009 was 3.3 tons. The estimated utilization was 85%.<sup>303</sup>

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<sup>297</sup> Cf. [http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Nigeria%20Can%20Strengthen%20Economy%20via%20Wheat%20Trade%20Liberalization\\_Lagos\\_Nigeria\\_6-27-2013.pdf](http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Nigeria%20Can%20Strengthen%20Economy%20via%20Wheat%20Trade%20Liberalization_Lagos_Nigeria_6-27-2013.pdf), date of access: 02.09.2013

<sup>298</sup> Ibidem

<sup>299</sup> Cf. <http://www.thebioenergysite.com/reports/?id=415>, date of access: 02.09.2013

<sup>300</sup> Cf. [www.world-grain.com](http://www.world-grain.com), date of access: 21.11.2013

<sup>301</sup> Ibidem

<sup>302</sup> Ibidem

<sup>303</sup> Ibidem

In South Africa the big plant bakers are on the rise. In 2008 they had a market share of 42.4% and there is still need for expansion because the profitability in the industry is low.<sup>304</sup>

### 5.3.3 Middle East

In the region “Middle East” the countries Iran, Turkey, and Saudi Arabia are gathered together.

#### Iran:

In 2010 Iran produced more crops than in 2009. It is currently self-sufficient in this regard which explains the drop in import in the years 2010 and 2011. The production of grain is highly regulated by the government. Iran has one of the highest levels of wheat consumption in the world (especially bread). The milling industry in Iran is very well organized and the equipment is modern. The combined milling capacity of its more than 335 mills is 23 Mio tons of wheat per year.<sup>305</sup>

The government plans to shift its flour subsidies to wheat, so that also pasta, cookies, etc. are covered. This could mean a drop in flour consumption and a higher competition between the mills.<sup>306</sup>

In 2013 there are 344 plants in 31 provinces with a total production of 17.000.000 tons/year. Some further information about the infrastructure and technological state of the mills was available which is shown in Table 2.<sup>307</sup>

**Table 2: Milling Infrastructure and Process Technology in Iran<sup>308</sup>**

Category	Number of Plants	Process Technology Age	Share of total Production
A	139	1 – 10 years	45 %
B	136	10 – 20 years	35%
C	23	20 – 30 years	5%
D*	46	Over 30 years	15%

<sup>304</sup> Cf. [www.world-grain.com](http://www.world-grain.com), date of access: 21.11.2013

<sup>305</sup> Cf. [www.world-grain.com](http://www.world-grain.com), date of access: 10.09.2013

<sup>306</sup> Ibidem

<sup>307</sup> Cf. Information from Statec Binder’s representative in Iran, Kamran Hakimhashi

<sup>308</sup> Ibidem

\* In category D most of the mills already upgraded their technology to current standards.<sup>309</sup>

### Turkey:

Turkey is suited well for agricultural production due to its climate and ecology. In 2011 wheat ranked first among the produced crops with a share of 67% followed by barley with 25%. The country is known for its high wheat flour exports. The most important markets for Turkish wheat flour are Iraq, Indonesia and the Philippines. Turkish trades state that Iran rises to be a competitor, taking market share in Iraq.<sup>310</sup>

In 2011 there were 682 plants producing flour with a capacity of 32.430.829 tons and a utilization rate of 47%.<sup>311</sup>

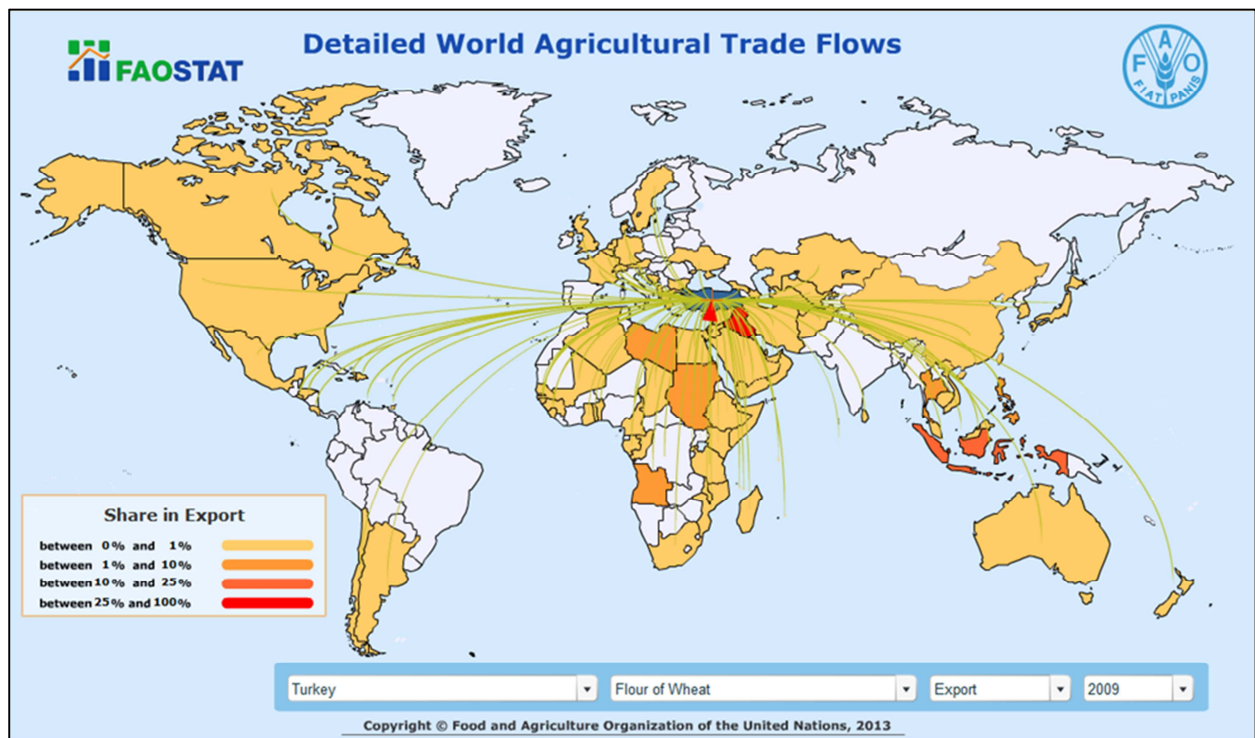


Figure 38: Turkey's Flour Export graphically illustrated<sup>312</sup>

In Figure 38 it is shown that Turkey exports wheat flour worldwide. This strong export activity and the big exported amount (in 2011 Turkey was the biggest wheat flour exporter worldwide) indicates a potential market for a high performance flour bagging machine.

<sup>309</sup> Cf. Information from Statec Binder's representative in Iran, Kamran Hakimhashi

<sup>310</sup> Cf. [www.world-grain.com](http://www.world-grain.com), date of access: 28.10.2013

<sup>311</sup> Ibidem

<sup>312</sup> <http://faostat.fao.org>, date of access: 04.09.2013

**Saudi Arabia:**

Saudi Arabia used its massive profits gained through its oil resources to make wheat production in the desert possible. This creates a lot of complications and was impossible to maintain on the long run due to lack of water resources. So the government decided to phase out the industry in 2016. This will mean a rise in grain imports.<sup>313</sup>

The prognosis for 2016 is that the wheat consumption will rise up to 3.4 Mio tons while production goes down. This will cause changes for the government association “Grain Silos and Flour Mill Organization” (GSFMO). Some of the mills which are operated by the GSFMO will be privatised. Then the traders will have the possibility to buy wheat from the world market and mill it locally. The grain will still get subsidies from the government.<sup>314</sup>

The GSFMO participated in the flour mill survey and filled in the questionnaire as representative for all their members. They stated that their average yearly wheat flour output was about 900 tons. Furthermore, they gave the information that their companies do not transport wheat flour as bulk goods and do not bag it in industrial quantities.<sup>315</sup>

**5.3.4 Far East**

For the “Far East” region the countries China, Japan and South Korea were chosen. China is by far the biggest wheat flour producer worldwide, Japan and South Korea rank under the top grain importers and show increasing wheat flour percentages in their diets.

**China:**

China is nowadays largely self-sufficient in grain production. It holds large stocks to ensure that there are no food shortages. The stocks are unlikely to be exported. Very important crops in China are (besides wheat) maize, rice and soybeans.<sup>316</sup>

The capacity of the flour mills in China is approximately 230 Mio tons total. Intense competition between the mills is created because only 80 to 90 Mio tons of this capacity is used and still about 100 new flour mills have been built in the last decade. The number of mills with a capacity of 50 to 100 tons per day is about 5000. Moreover, there

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<sup>313</sup> Cf. [www.world-grain.com](http://www.world-grain.com), date of access: 25.11.2013

<sup>314</sup> Ibidem

<sup>315</sup> Results from the Flour Mill Survey “Questionnaire for Flour Mills”

<sup>316</sup> Cf. [www.world-grain.com](http://www.world-grain.com), date of access: 02.09.2013

are about 500 to 600 mills with a daily capacity of 150 to 400 tons and approximately 200 large flour mills with capacities from 400 to 16.000 tons per day.<sup>317</sup>

#### **Japan:**

Japan has a low agricultural production but is a large consumer. This makes the country a major grain importer among other foods. The imports in 2012/2013 were about 6 Mio tons of wheat (slightly decreased), 15 Mio tons of maize (slightly increased) and 1.4 Mio tons of barley (slightly increased).<sup>318</sup>

Four big milling companies dominate the flour milling market. Together they hold about 80% market share. The largest company is Nisshin Flour Milling (38% market share), this company is also operated in Canada, Thailand and New Zealand. The other three big companies are Nippon (22% market share), Showa (10% market share) and Nitto-Fuji (8% market share).<sup>319</sup>

In total there are 96 flour milling companies which operate 119 mills. The total milling capacity is about 8.56 Mio tons. The actual production is put at about 4.82 Mio tons.<sup>320</sup>

#### **South Korea:**

In the grain sector South Korea produces much less than it would need, so the country is highly dependent on imports. Also the demand for domestically grown wheat grows. The wheat consumption rose, but high prices stopped the increase. Now about 44% of the wheat is used for noodle production. The grain imports come either from the U.S.A., the Ukraine, Russia, Canada or Australia.<sup>321</sup>

There are eight companies in the flour milling sector which operate 11 plants. The total yearly capacity is 3.082.500 tons of which 2.172.000 are used. The Korea Flour Mills Industrial Association states that a former rice based diet changed to a more wheat and animal protein based diet.<sup>322</sup>

### **5.3.5 Russian Federation**

Russia has become an important grain supplier in 2009, but lack of infrastructure remains a limiting factor. In 2009 Russia was a major exporter of wheat flour. The Russian Organization of Flour and Grain Mills stated in 2009 that it had 198 members

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<sup>317</sup> Cf. [www.world-grain.com](http://www.world-grain.com), date of access: 02.09.2013

<sup>318</sup> Ibidem

<sup>319</sup> Ibidem

<sup>320</sup> Ibidem

<sup>321</sup> Ibidem

<sup>322</sup> Ibidem

with a total production of 8 Mio tons of flour in 2008. This accounts for about 85% of the whole production in the country according to the association's website.<sup>323</sup>

The government stated that they want to strengthen the position of Russia on the world grain market and increase financial and organizational support for the coming years.<sup>324</sup>

In 2013 there were about 7.000 flour mills in Russia. The flour production comprises 16 to 17 Mio tons. The largest flour mill is the Kirov's mill (it is also the largest in Europe) with a daily milling capacity of up to 1.800 tons of wheat equivalent.<sup>325</sup>

In Russia's North Caucasus the first stage of a new flour mill has been launched. This should be the biggest mill in Russia when finally reaching its design capacity of 2.400 tons of wheat per day.<sup>326</sup>

### 5.3.6 Central Asia

The Central Asian region includes Kazakhstan, Kyrgyzstan, Turkmenistan, Uzbekistan, Tajikistan and Afghanistan.

In the nations located in Central Asia wheat is by far the most important cereal in farming and consumption.<sup>327</sup>

#### **Kazakhstan:**

Kazakhstan is ranked highly among the big producers and exporters of wheat and wheat flour. It has the necessary big commercial farms. The number of mills, however, have decreased. In 2000 there were 2300 flour mills, whereas in 2010 only 383 remained. The total milling capacity is 12 Mio tons of flour but only 50% is used.<sup>328</sup>

In Kazakhstan special engineering training and education for flour milling technologists/specialists is available in contrast to a lot of its neighbours.<sup>329</sup>

Currently the government discourages wheat farming and wants to decrease the area for planting wheat and other crops. Instead, the focus should shift to farming feed grains, oilseeds, livestock and poultry.<sup>330</sup>

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<sup>323</sup> Cf. [www.world-grain.com](http://www.world-grain.com), date of access: 29.10.2013

<sup>324</sup> Ibidem

<sup>325</sup> Cf. [www.world-grain.com](http://www.world-grain.com), date of access: 11.11.2013

<sup>326</sup> Ibidem

<sup>327</sup> Cf. McKee (2013), p. 76

<sup>328</sup> Cf. [www.world-grain.com](http://www.world-grain.com), date of access: 02.09.2013

<sup>329</sup> Cf. FAO Agribusiness Handbook – Wheat Flour (2009), p. 39

<sup>330</sup> Cf. [www.world-grain.com](http://www.world-grain.com), date of access: 02.09.2013

In 2011 Kazakhstan wanted to increase flour and grain exports. The traditional markets for the flour export have been in central Asia. In order to export in countries further away Kazakhstan has to overcome some problems. On the one hand, Kazakhstan has no ocean port and is lacking the necessary grain terminals. On the other hand, there are trading bans Russia puts on grain from Kazakhstan. Furthermore, there are constantly increasing transport costs and a shortage of railway boxcars. In the future Kazakhstan wants to target China's and India's grain markets.<sup>331</sup>

For the flour export: in the next five years they expect a decrease in flour demand in their traditional markets, maybe an increase in Afghanistan. Flour exports are very important for Kazakhstan because the domestic market is so small (wheat and wheat flour consumption in Kazakhstan is very low with about 1.8 Mio tons in 2011). Almost the whole shipping of wheat flour is done in boxcars on the railway.<sup>332</sup>

In 2011 the largest milling plant had a capacity of 500 tons per day. Over the years smaller mills went out of business more often and the most typical mill size has 150 to 200 tons per day capacity now. Because of Kazakhstani law the capacity and production of industries is treated as a "commercial secret" which means there are no official lists of the largest milling enterprises. What is known is that the milling equipment is supplied by Turkish manufacturers.<sup>333</sup>

Kazakhstan was the biggest wheat flour exporter worldwide in 2009. Over the last years Turkey and Kazakhstan have been very close to each other in flour export amounts.<sup>334</sup>

As Kazakhstan exports so much wheat flour (2.248.035 tons in 2009) the assumption would be that it presents a large market for a high performance flour bagging machine. Therefore, faostat.org was consulted for a trade flow export graphic which is shown in Figure 39.

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<sup>331</sup> Cf. [www.world-grain.com](http://www.world-grain.com), date of access: 26.09.2013

<sup>332</sup> Ibidem

<sup>333</sup> Ibidem

<sup>334</sup> Cf. <http://faostat.org>, date of access: 09.10.2013



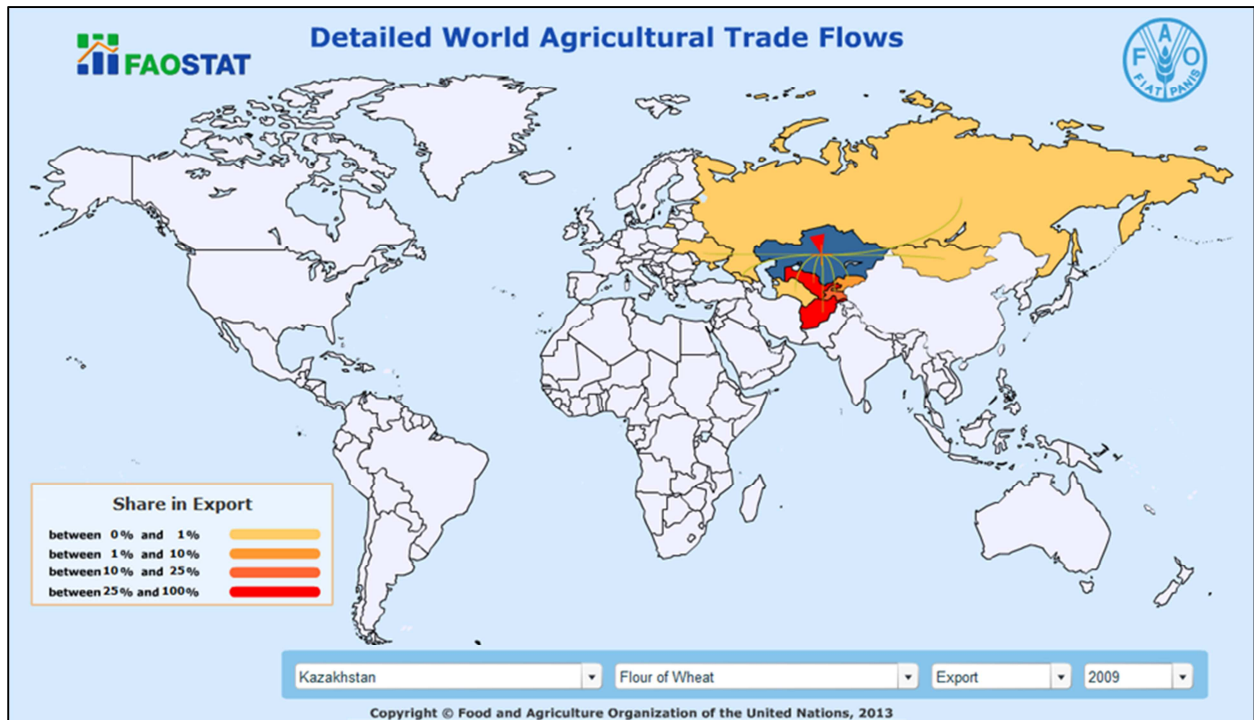


Figure 39: Kazakhstan's Flour Export graphically illustrated<sup>335</sup>

In this graphic it is clearly visible that Kazakhstan exports its flour only to the other countries located in central Asia and the Russian federation.

The wheat flour export into the surrounding countries in Central Asia takes place through railway boxcars.<sup>336</sup> There is no indication that the flour is packaged.

The railway system is said to be excellent and the milling industry is said to consist of large and very efficient mills. The milling industry also dominates the flour markets of the adjacent countries.<sup>337</sup> Kazakhstan wants to increase its exports in grain and wheat flour to bigger and more global markets but the execution of these plans will be interesting to see in the next years.<sup>338</sup>

Therefore, Kazakhstan does not present a relevant market right now. There may be possibilities in the future. What is also an important factor in the Central Asian countries is to conquer the language barrier and invest time and resources to get a foothold in the countries.

<sup>335</sup> <http://faostat.fao.org>, date of access: 04.09.2009

<sup>336</sup> Cf. [www.world-grain.com](http://www.world-grain.com), date of access: 02.09.2013

<sup>337</sup> Cf. McKee (2013), p. 78 et seq.

<sup>338</sup> Cf. [www.world-grain.com](http://www.world-grain.com), date of access: 02.09.2013



**Uzbekistan, Kyrgyzstan, Tajikistan and Afghanistan** are dependent on Kazakhstan in varying amounts when it comes to the supply of wheat and wheat flour.<sup>339</sup>

Uzbekistan would be self-sufficient in their wheat production, but rather than consuming its own wheat on domestic markets, it exports large amounts of wheat to neighbouring countries and imports wheat flour from Kazakhstan instead, because the wheat from Kazakhstan has a higher quality. The estimation is that only about 62% of Uzbekistan's wheat is used for food. Uzbekistan also re-exports Kazakh wheat flour to Afghanistan.<sup>340</sup>

The whole wheat planting and trade in Uzbekistan is controlled by the government. The government also controls 40 to 50% of the milling industry. The grain trade is handled as a state secret, and business conducted there, as well as export figures lack any transparency.<sup>341</sup>

In Afghanistan, wheat consumption accounts for over 60% of caloric intake of the population (nowadays this adds up to about 6 Mio tons per year). A lot of the wheat and wheat flour is imported from Kazakhstan, Uzbekistan and Pakistan.<sup>342</sup>

About 90% of the domestic grown wheat is milled in very small facilities (1-4 tons per day capacity). Investments to build bigger more modern mills have been taken, but these facilities are now very rarely used, due to lack of grain or electricity failures. These conditions are not likely to change in the near future despite government measures.<sup>343</sup>

Afghanistan does not present a relevant market in the near future.

Kyrgyzstan is a very mountainous country. In agriculture it focuses on livestock production. Most of the wheat and wheat flour is imported from Kazakhstan.<sup>344</sup>

The information about this country is very scarce and does not provide any good leads for a relevant market.

Tajikistan is characterized as the most mountainous state in Central Asia. Therefore, the maximum wheat output is about 1 Mio tons per year because of the small area of arable land. Tajikistan is a major importer of Kazakh flour, but in recent years the trend

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<sup>339</sup> Cf. McKee (2013), p. 76

<sup>340</sup> Cf. McKee (2013), p. 79 et seq.

<sup>341</sup> Cf. McKee (2013), p. 80

<sup>342</sup> Cf. McKee (2013), p. 81

<sup>343</sup> Cf. McKee (2013), p. 81 et seq.

<sup>344</sup> Cf. McKee (2013), p. 82

has been to rather importing wheat grains and milling it in local facilities as the milling sector has been expanding.<sup>345</sup>

This could be a possibly relevant market in the future. Choosing this country for business relations presents the same obstacles as in all the other countries in Central Asia.

#### **Turkmenistan:**

In Central Asia only Turkmenistan (although a very closed society) has reached self-sufficiency in wheat production.<sup>346</sup> Turkmenistan has a population of about 10 Mio people. The legal and economic regulations still resemble very much the state in which they were under Soviet Union dominion. But lately some investments have been made to modernise the whole wheat value chain (tractors, state of the art mills etc.).<sup>347</sup>

Furthermore, Turkmenistan showed enormous economic growth during the year 2013 and has demand for import of technologic products in a lot of industry branches.<sup>348</sup>

This could present a relevant market in the future. However, what could inhibit economic relationships with Turkmenistan is that the predominant language is Russian and there is currently close to no information available about the milling industry.

### **5.3.7 South Asia**

In the South Asian region Pakistan, India and Bangladesh were reviewed.

#### **Pakistan:**

Wheat flour produced in Pakistan is known as “Atta” (this is the Hindi word for wheat flour commonly used in south Asian cooking). Atta is a whole wheat flour produced from hard wheat.

In 2008 the milling infrastructure in Pakistan looked like this: in rural areas of Pakistan a lot of “mini flour mills” with a capacity of 5 tons per day or less can be found. The number of such mini flour mills was estimated to be 8000 or more. There are also small and medium flour mills with a daily capacity of 5 – 20 tons. The number of small or medium flour mills was estimated to be 700 or more. There are a few large-scale mills with a capacity of about 200 tons per day (this is also quite small by European standards).

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<sup>345</sup> Cf. McKee (2013), p. 82

<sup>346</sup> Cf. McKee (2013), p. 78

<sup>347</sup> Cf. McKee (2013), p. 80 et seq.

<sup>348</sup> Cf. Information provided by the WKO

In total there were 950 commercial flour mills in Pakistan in 2008. All these mills operate with between 35 and 50 percent of their capacity. The total grinding capacity of wheat flour is about 4 times as high as needed.

Whereas Pakistan is one of the world's most important rice exporters, the staple food in Pakistani homes is wheat. In 2012 Atta flour supplies about 72% of the needed calories in the average Pakistani diet. So the wheat flour consumption is rather high. There is also a tendency to commercially milled flour.<sup>349</sup>

### **India:**

The organized milling sector in India is relatively small according to a World Grain Magazine article in 2013. About 1000 mills are medium or large size with a yearly milling capacity of 22 to 24 Mio tons. They mostly mill wheat flour (maida), semolina and produce bran flakes for the feed industry.<sup>350</sup>

Normally the whole wheat is distributed publically and then custom milled for household use by small flour mills called "chakkies". It is also stated that the sector of branded and packed wheat flour marketed by large food companies is growing.<sup>351</sup>

Cargill Mills quite recently launched their wheat flour brand "Nature Fresh" in India. The flour is sold in various bag sizes in retail. According to Cargill the segment of bagged atta flour grows about 15% annually.<sup>352</sup>

The oilseed production and the rice production are also supposed to rise in the future.<sup>353</sup>

### **Bangladesh:**

In the primarily rice consuming country Bangladesh wheat is the second most important food crop with about 12% of the total cereal consumption. The domestic wheat production is about 1 Mio tons, but the annual demand is about 4 Mio tons. Therefore, Bangladesh has to rely strongly on wheat imports.<sup>354</sup>

The traditional "chakki" stone mills with a capacity of 300 to 800 kg per day are gradually replaced by modern roller mills. Although it is estimated that there are still about 2.000 "chakki" mills still running in Bangladesh.<sup>355</sup>

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<sup>349</sup> Cf. [www.world-grain.com](http://www.world-grain.com), date of access: 02.09.2013

<sup>350</sup> Cf. Lyddon (2013a), p. 25

<sup>351</sup> Ibidem

<sup>352</sup> Cf. World Grain Magazine, January Issue 2013, p. 18

<sup>353</sup> Cf. Lyddon (2013a), p. 25

<sup>354</sup> Cf. GAIN Report – Wheat Milling in Bangladesh (2013), p. 1

<sup>355</sup> Cf. GAIN Report – Wheat Milling in Bangladesh (2013), p. 5

Today about 93% of the flour is milled by modern roller mills. The most common capacity of these mills is at least 50 tons per day. Most recently built facilities have capacities of 300 to 500 tons per day or more.<sup>356</sup>

**Table 3: Milling Infrastructure in Bangladesh**<sup>357</sup>

Types of Flour Mills	No. of Plants	Milling Capacity per Day	Average Production per Day
Large Roller Mills	± 20	100-500 MT	± 150 MT
Medium Roller Mills	± 120	40-100 MT	± 60 MT
Small Roller Mills	± 200	10-40 MT	± 15 MT
Chakki Mills	± 2.000	0,3-0,8 MT	± 0,5 MT

In Table 3 the current milling infrastructure according to USDA estimates is shown. The interesting mills for the new Statec Binder Bagging Carousel would be the Large Roller Mills.

### 5.3.8 Southeast Asia

In the category “Southeast Asia” the countries Malaysia, Philippines and Thailand are gathered. With these countries Statec Binder has good working relationships. Indonesia was ranked among the 20 biggest flour producers worldwide in 2009.

#### Malaysia:

The country has no wheat growing sector and has to rely on wheat imports. In 2009/2010 the wheat imports contained 1.2 Mio tons (they did slightly increase from the previous year). Wheat imports do come from Australia, Canada, U.S.A. and the Black Sea.<sup>358</sup>

<sup>356</sup> Cf. GAIN Report – Wheat Milling in Bangladesh (2013), p. 5

<sup>357</sup> Ibidem

<sup>358</sup> Cf. [www.world-grain.com](http://www.world-grain.com) date of access: 04.11.2013

Furthermore, Malaysia is one of the biggest players in the oilseed industry and the traditional staple food is rice which makes up about one third of the calorie intake in the Malayan diet. However, wheat consumption is on a long-term uptrend.<sup>359</sup>

Three large milling companies can be found in Malaysia: Malayan Flour Mills, Federal Flour Mills and Interflour. There are also three small mills.<sup>360</sup>

Information from the milling survey shows that a commonly used bag type for flour bagging in Malaysia is the laminated woven Propylene open mouth pillow bag.

### **Philippines:**

The population on the Philippines was reported to be rapidly growing in 2011. The economy switches from rural to industrial production. The traditional staple food is rice but the wheat demand is rising.<sup>361</sup>

The Philippine Association of Flour Millers (PAFMIL) expected a 10% rise in flour output in the year 2011 and, therefore, price stability in wheat flour. Also the government moved to increase the availability of wheat. All the wheat which is processed on the Philippines is imported. The biggest suppliers are Australia, U.S.A, and Canada. If wheat flour is imported, it comes mainly from Turkey (150.000 tons in 2011).<sup>362</sup>

On the Philippines 12 companies operated in the wheat flour milling industry or have a segment engaging in the industry. Seven of the companies are members of PAFMIL: RFM Foods Cooperation, Liberty Flour Mills, Wellington Flour Mills, Pilmico Foods Corp., General Milling Corp., Universal Robina Corp. and Philippine Flour Mills. Four companies are members of the Chamber of Philippine Flour Millers (CHAMFLOUR): San Miguel Mills, Phil. Foremost Milling Corp., Morning Star Milling Corp. and Delta Milling Corp. The last company produces food for its own use in food production: Monde Nissin Corporation.<sup>363</sup>

PAFMIL states that the total processing capacity of the industry is 13.360 wheat equivalent per day. In 2011 the industry ran at 50% capacity.<sup>364</sup>

Most bakeries on the Philippines are small and family owned and operated. About 20% of the bakeries have mechanized operations.<sup>365</sup>

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<sup>359</sup> Cf. [www.world-grain.com](http://www.world-grain.com) date of access: 04.11.2013

<sup>360</sup> Ibidem

<sup>361</sup> Ibidem

<sup>362</sup> Ibidem

<sup>363</sup> Ibidem

<sup>364</sup> Ibidem

<sup>365</sup> Ibidem

The many small bakeries could give the hint that not every bakery owns its own silo, so the flour has to be bought and delivered in bags.

According to information gathered by Statec Binder only 25 kg bags are used for bagging flour in industrial quantities on the Philippines. 75% are from the type unlaminated woven Polypropylene bags and 25% are cotton bags.<sup>366</sup>

The machines sold by competitors on the Philippines are currently distributed like that: Premiartech Chronos (market share of 60%), Bühler (market share of 30%) and Paglierani (market share of 10%).<sup>367</sup>

### **Thailand:**

The main staple food, most consumed crop and most important export good of Thailand, is rice. The second most important food grain is maize.<sup>368</sup>

The flour milling industry is small. Only imported wheat is used. In 2010 about 1.1 Mio tons of wheat were imported. Furthermore, there were eight large-scale wheat flour mills in 2010 in Thailand. They had an annual production of around 500.000 tons. Flour consumption was put at 24.3 grams per day.<sup>369</sup>

The flour mills were described as modern. The best known flour milling companies are: United Flour Mill Co. Ltd., Siam Flour Trading Co. Ltd., Laemthong Corporation Ltd., Thai Flour Mill Industry Co. Ltd., Bangkok Flour Mill Co. Ltd., Nisshin-STC Flour Milling Co. Ltd. and Kerry-Glory Flour Mill Co. Ltd.<sup>370</sup>

### **Indonesia:**

Indonesia is a country with one of the biggest agricultural sectors. Its two most important agricultural products are rice and palm oil. Rice also plays an important role in the Indonesian diet.<sup>371</sup>

The flour milling industry had 10 operating flour mills in 2009. The biggest milling company is Bogasari Flour Mills. It had a capacity of 4.4 Mio tons per year in 2010. The company had two mills; one in Jakarta with a capacity of 10.000 tons per day and one in Surabaya with 5.900 tons per day.<sup>372</sup>

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<sup>366</sup> Information provided by DI Gerhard Steinmayr, Statec Binder Sales

<sup>367</sup> Ibidem

<sup>368</sup> Cf. [www.world-grain.com](http://www.world-grain.com), date of access: 12.11.2013

<sup>369</sup> Ibidem

<sup>370</sup> Ibidem

<sup>371</sup> Cf. [www.world-grain.com](http://www.world-grain.com), date of access: 06.09.2013

<sup>372</sup> Ibidem

The second biggest flour milling company was Sriboga Raturay with a milling capacity of 740.000 tons. In 2010 the whole industry has a total yearly milling capacity of 9.2 Mio tons.<sup>373</sup>

### 5.3.9 Australia

The flour production in Australia was approximately 2 Mio tons in 2009 of which 1.35 Mio tons were intended for human consumption on the domestic market.<sup>374</sup> Wholesalers play a traditional key role in the transportation and distribution of flour.<sup>375</sup>

The big flour export markets for Australia in 2009 were Indonesia, Thailand and the Asia Pacific region in general.<sup>376</sup>

In 2009 it was estimated that four flour milling companies together hold a market share of 80%. The expectation for the coming years was that rationalisation processes take place and make fewer mills serve larger geographic areas as the number of mills declined during the last years until in 2009 there were 32 flour mills in Australia. The trend is towards automated operations and in 2008 capacity utilisation was about 83%.<sup>377</sup>

The average flour output per 100% wheat grain was 78% to 80% in 2009.<sup>378</sup>

The key players in the Australian milling industry in 2009 were: Manildra Milling Pty Ltd. (approximately 35% market share), George Weston Foods (30% market share) and Allied Mills (15% market share).<sup>379</sup>

Weston Milling distributes most of its flour as bulk shipments.<sup>380</sup> Manildra Milling bags some of the flour in bags with capacities of 10 kg, 12.5 kg and 25 kg.<sup>381</sup> Allied mills also bag flour in bags with capacities of 12.5 kg or 25 kg.<sup>382</sup>

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<sup>373</sup> Cf. [www.world-grain.com](http://www.world-grain.com), date of access: 06.09.2013

<sup>374</sup> Cf. Department of Agriculture and Food (2009), p. 8

<sup>375</sup> Cf. Department of Agriculture and Food (2009), p. 9

<sup>376</sup> Ibidem

<sup>377</sup> Cf. Department of Agriculture and Food (2009), p. 10

<sup>378</sup> Cf. Department of Agriculture and Food (2009), p. 12

<sup>379</sup> Cf. Department of Agriculture and Food (2009), p. 13

<sup>380</sup> Ibidem

<sup>381</sup> Cf. [www.manildra.com.au](http://www.manildra.com.au), date of access: 27.11.2013

<sup>382</sup> Cf. [www.alliedmills.com.au](http://www.alliedmills.com.au), date of access: 27.11.2013

### 5.3.10 North America

On the North American Continent the three Nations, Canada, the United States of America and Mexico were analysed. The mills in the U.S.A. use fully automatic bagging solutions to a high percentage as was found in the flour mill survey. A lot of large mills can be found there with high milling capacities. Facts of the Canadian market are explained by a representative of the Canadian Millers Association. Mexico is examined because of its rank under the top 20 of the wheat flour producers worldwide.

#### **Canada:**

A short interview was conducted with a representative of the Canadian Millers Association via telephone. The representative kindly gave some crucial information about the milling industry and specifics about the flour market (milling, packaging and logistics) in Canada. The telephone interview took place on the 27<sup>th</sup> of September, 2013.

The daily milling capacity of all members of the Canadian Millers Association is 200.000 cwt. (hundredweight; 1 cwt. = 45,359237 kg). This corresponds to about  $\frac{1}{8}$  of the U.S. industry. The milling is done six days a week. The standard bag sizes in which wheat flour is bagged are 25 kg and 40 kg. Both, pillow and gusseted bags are used. For bag material double or triple wall paper bags are used.<sup>383</sup>

The representative states that 90% of the flour shipments are transported in bulk. The total shipment is 2.4 Mio tons which leaves a very small amount of flour which is bagged.<sup>384</sup>

Some mills in Canada do not even have bagging lines. Some of the very modern mills have bagging carousels (e.g. Montreal) but these are scarce. When operating bagging carousels the bag size used is usually 25 kg or smaller.<sup>385</sup>

Considering these facts, Canada does not represent a relevant market.

#### **United States of America:**

The USA produces and exports by far the most grain worldwide. Not only do they play an important role in feeding the world, but also use their massive maize production to produce fuel for vehicles. Other crops than wheat which hold a major share in

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<sup>383</sup> Cf. Interview with a representative of the Canadian Millers Association, conducted on 27.09.2013

<sup>384</sup> Ibidem

<sup>385</sup> Ibidem



production are barley, sorghum and oats. For coarse grains: the USA is a major rice producer.<sup>386</sup>

In 2013 there are 165 flour mills with a total milling capacity of just under 67.000 tons. 68 of these mills have a daily capacity of about 454 tons or more. The largest listed flour mill is located in North Dakota and belongs to the North Dakota Mill & Elevator Association. This mill has a daily capacity of 1.362 tons. The milling company which is the biggest by capacity is Horizon Milling LLC (a joint venture between Cargill and ConAgra Foods) with a daily capacity of 12.270 tons of wheat flour.<sup>387</sup>

#### **Mexico:**

63 flour mills which produce wheat flour could be found in the country.

Otherwise the traditional and most consumed grain in Mexico is maize.<sup>388</sup>

The Chamber of Milling Industry participated in the flour mill survey representing their members. They stated that their yearly flour output is on average about 4.537.000 metric tons. Wheat flour is transported as bulk goods as well as it is bagged in industrial quantities (about 2.700.000 tons per year). The bags which are used within the industry are 70% bags from 30 kg to 50 kg. The bag types which are used are open mouth unlaminated woven Propylene pillow bags, open mouth Polyethylene bags and woven Polypropylene valve bags.<sup>389</sup>

### **5.3.11 South America**

In South America only two countries seemed significant for analysis: Argentina because of its high amount of wheat flour export and Brazil because of its relatively high and stable grain imports.

#### **Argentina:**

Being located in the south of South America, Argentina has an important role as grain supplier when no new grains come from the northern hemisphere. The country plays an important role as major grain exporter. In 2012 some beginning trends can be seen, farmers planting soybeans, barley or sorghum instead of planting wheat in both seasons.<sup>390</sup>

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<sup>386</sup> Cf. [www.world-grain.com](http://www.world-grain.com), date of access: 02.09.2013

<sup>387</sup> Ibidem

<sup>388</sup> Cf. [www.world-grain.com](http://www.world-grain.com), date of access: 21.11.2013

<sup>389</sup> Cf. Results of the International Flour Mill Survey "Questionnaire for Flour Mills"

<sup>390</sup> Cf. [www.world-grain.com](http://www.world-grain.com), date of access: 29.10.2013

Argentina is also known as a major flour exporter. 94 members (millers) are listed by the Argentinian milling association “Federación Argentina de la Industria Molinera”. The milling association tells that in 2011 6.64 Mio tons of wheat were milled into 4.84 Mio tons of wheat flour; with an export amount of 1.02 Mio tons. The domestic wheat flour consumption in 2011 is 3.8 Mio tons, summing up to 95 kg per capita per year.<sup>391</sup>

In Figure 40 Argentina’s flour export is graphically shown to illustrate the trade relations.

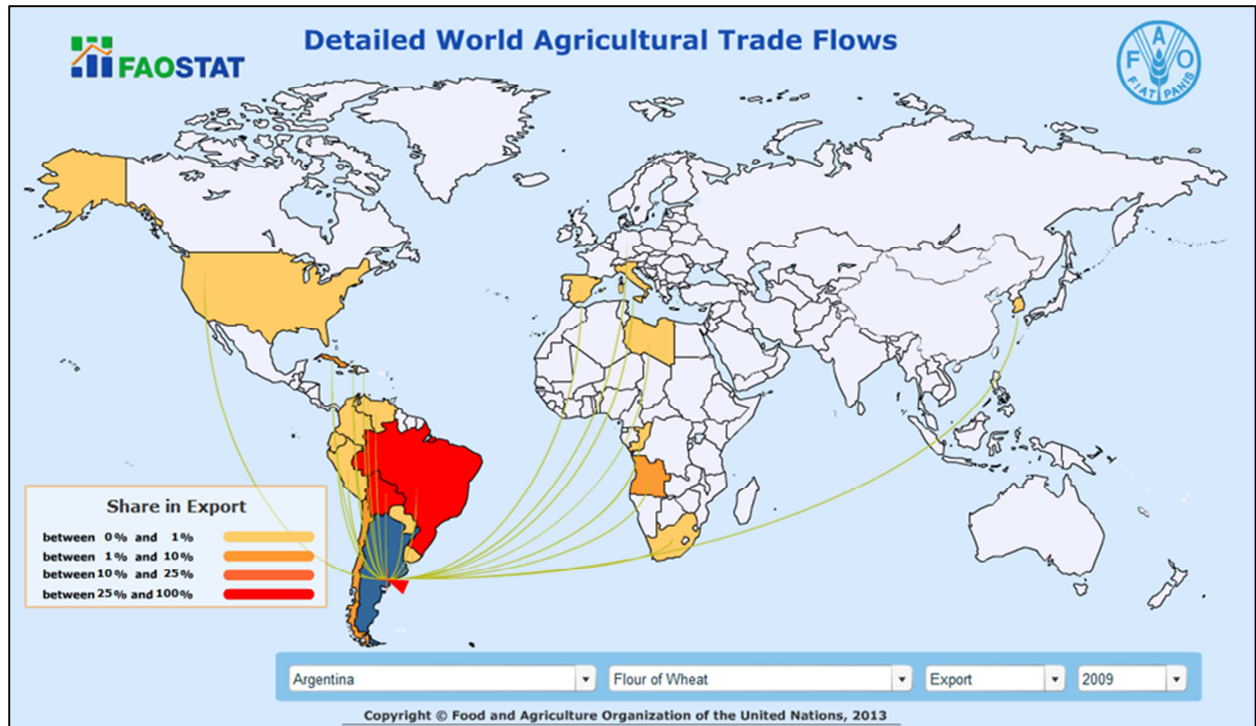


Figure 40: Argentina’s Flour Export graphically illustrated<sup>392</sup>

According to recent information from Statec Binder’s representative in South America the standard bagging solution used in Argentina’s milling industry is to use 50 kg paper valve bags.<sup>393</sup>

If the whole industry uses valve bags and a change is not predictable in the near future Argentina can be dismissed as a market. According to Mr Haiden from Stated Binder it is highly unlikely that a single mill will stop following the industry trend alone and change their bagging methods to buy a new open mouth bagging machine.<sup>394</sup>

<sup>391</sup> Cf. [www.world-grain.com](http://www.world-grain.com), date of access: 29.10.2013

<sup>392</sup> <http://faostat.fao.org>, date of access: 04.09.2013

<sup>393</sup> Cf. Information provided by Statec Binder’s representative in South America

<sup>394</sup> Cf. Interview with Mag (FH) Günter Haiden, Statec Binder Sales

**Brazil:**

The majority of the grains produced in Brazil are maize. In 2011 the maize production is estimated by the IGC with 57.5 Mio tons, compared to 5.1 Mio tons of wheat. Also Brazil is a very big soybean producer with 75.3 Mio tons produced in 2011.<sup>395</sup>

The Brazilian Milling Association Associação Brasileira da Indústria do Trigo (Abitrigo) states that there were 239 operating mills in Brazil in 2011. In this year a lot of farmers did not plant wheat, and in general, planting wheat is not that popular. Brazil also has a strong currency, so about half of the wheat consumed on domestic markets is imported from Argentina.<sup>396</sup>

In the survey conducted for flour mills, the Brazilian milling Abitrigo participated and filled in the survey representing their industry. They stated that their yearly wheat flour output was on average 10.900.000 tons. About 10% are transported as bulk goods. They do bag wheat flour in industrial quantities, about 70% is bagged in bags ranging from 30 to 50kg. Their members use laminated and unlaminated woven Polypropylene pillow bags and paper valve bags. Some of their members also use manually operated/semi-automatic machines, others use fully automatic line bagging machines with a single spout and some use carousels.<sup>397</sup>

One can conclude that, given this information, in Brazil at least 6.867.000 tons of wheat flour are bagged in industrial quantities per year. The amount which is bagged in open mouth bags is not known.

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<sup>395</sup> Cf. [www.world-grain.com](http://www.world-grain.com), date of access: 06.09.2013

<sup>396</sup> Ibidem

<sup>397</sup> Cf. Results of the international Flour Mill Survey "Questionnaire for Flour Mills"

## 5.4 Analysis of Competitors in the Field of High-Performance Flour Bagging Machines

In this chapter the results of the research of competitors in the field of high performance flour bagging are listed. The competitors were chosen according to their product range. The question was whether they had a competitive product for high speed flour bagging for sale. The sources for the research have been the websites of the companies, internal information provided by Statec Binder and their representatives and videos which could be found online, in order to assess technical principles.

The features a bagging machine has to have for being seen as a competitive product:<sup>398</sup>

- Performance of **600 bags/hour** (10 – 50 kg) or higher
- **Fully automatic** (no human operator required – except for filling the bag magazine and supervision)
- Preferably **Open Mouth Bagging Machines** (Statec Binder does not plan to introduce a Valve Bagger to the market in the future)

The companies identified as competitors together with their respective competitive product(s) are listed below and some information about the companies was included.

### 5.4.1 Arodo (Belgium)

#### Company information:

Arodo manufactures complete filling lines which can handle a variety of products and bags. They also produce palletisers and stretch hood systems. The packing machines are customer specified. The company developed a vacuum bagging system called AROVAC. Arodo supplies to Europe, USA and Canada.<sup>399</sup>

Arodo provides packaging solutions for the product categories construction, chemistry, pharmaceuticals, food, animal feed, plastics and agriculture/garden.<sup>400</sup>

The filling lines by Arodo are able to handle bags with capacities from 1 to 5 kg or from 5 to 50 kg. The lines can handle every type of bag and in almost every case the machine spreads the bag at the filling spout.<sup>401</sup>

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<sup>398</sup> Criteria developed in accordance with Statec Binder

<sup>399</sup> Cf. [www.arodo.be/en/](http://www.arodo.be/en/), date of access: 19.11.2013

<sup>400</sup> Ibidem

In order to secure a 100% safe transport of the spread bag to the closing, the bagging line has an overtaking mechanism to support the bag from station to station so that sealing, folding, etc. can be undertaken on a static bag.<sup>402</sup>

Different kinds of dosing units are available, depending on the product characteristics.<sup>403</sup>

The capacity of Arodo's bagging lines is stated to be up to 1400 bags per hour.<sup>404</sup> This amount is very likely to be valid only for granular products. For powdery products it is most certainly less.

#### Competitive product:

In the food section Arodo sells machines for bagging powders like milk powder, flour, bakery commodities, whey powder, cacao powder, potato starch and powdered sugar.<sup>405</sup>

#### **Automatic Bagging Line:**

For the specific application of bagging wheat flour Arodo provides an **Automatic Bagging Line** (no specific name available), which uses open mouth bags (stated capacity is maximum 1400 bags/hour, depending on product).<sup>406</sup> On the Internet this fully automatic bagging line was observed bagging **750 bags/hour** of powdery product.<sup>407</sup>

In Figure 41 the automatic line bagging machine by Arodo is depicted.

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<sup>401</sup> Cf. [www.arodo.be/en/](http://www.arodo.be/en/), date of access: 19.11.2013

<sup>402</sup> Ibidem

<sup>403</sup> Ibidem

<sup>404</sup> Ibidem

<sup>405</sup> Ibidem

<sup>406</sup> Ibidem

<sup>407</sup> Cf. [www.youtube.com](http://www.youtube.com), date of access: 12.11.2013



Figure 41: Arodo Automatic Bagging Line<sup>408</sup>

#### 5.4.2 Bühler (Switzerland)

##### Company information:

Bühler's core competences lie in providing industry solutions for machines, plants and services for food processing and producing high quality materials. The company holds leading market positions in the sections production plants for flour, feed processing, pasta production, chocolate production and aluminium die casting.<sup>409</sup>

Bühler also provides process technologies for weighing and packing.<sup>410</sup> The bagging machines by Bühler can handle bags with capacities from 10 to 50 kg, (manual or automatic) which can handle bags made from paper, plastic, jute or cotton.<sup>411</sup>

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<sup>408</sup> [www.arodo.be/en/](http://www.arodo.be/en/), date of access: 19.11.2013

<sup>409</sup> Cf. [www.buhlergroup.com](http://www.buhlergroup.com), date of access: 22.11.2013

<sup>410</sup> Ibidem

<sup>411</sup> Ibidem



### Competitive products:

Bühler offers two fully automatic bagging machines for flour bagging:

- **Bagging Carousel MWPL:**

The **Bagging Carousel MWPL** which can handle up to **1080 bags/hour** of powdered product (using six bagging spouts). The carousel is available in a right-hand or a left-hand rotating version. It is suited for open mouth bags with capacities from 10 to 50 kg, made of paper, plastic, jute or cotton (in case of using jute or cotton bags the machine cannot work fully automatic).<sup>412</sup>

In Figure 42 the bagging carousel MWPL by Bühler is depicted.



Figure 42: Bühler Bagging Carousel MWPL<sup>413</sup>

- **Bagging Station Maia:**

The **Bagging Station Maia** was created especially for bagging flour, premixes and granular products. It is a fully automatic **line bagging** machine. Important features for hygienic powder bagging are dust handling features (low dust filling, dust-tight bag spout with integrated aspiration system, access for cleaning) and a filling screw for dosing powdered products. The product is available with one or two filling spouts. It can handle paper, plastic and woven PP bags. With two bagging spouts the machine can fill up to **900 bags/hour** powdery products.<sup>414</sup>

In Figure 43 the bagging station “Maia” by Bühler is depicted.

<sup>412</sup> Cf. Technical Brochure Bagging Carousel MWPL (English) by Bühler: [www.buhlergroup.com](http://www.buhlergroup.com)

<sup>413</sup> Technical Brochure Bagging Carousel MWPL (English) by Bühler: [www.buhlergroup.com](http://www.buhlergroup.com)

<sup>414</sup> Cf. Technical Brochure Bagging Station Maia (English) by Bühler: [www.buhlergroup.com](http://www.buhlergroup.com)

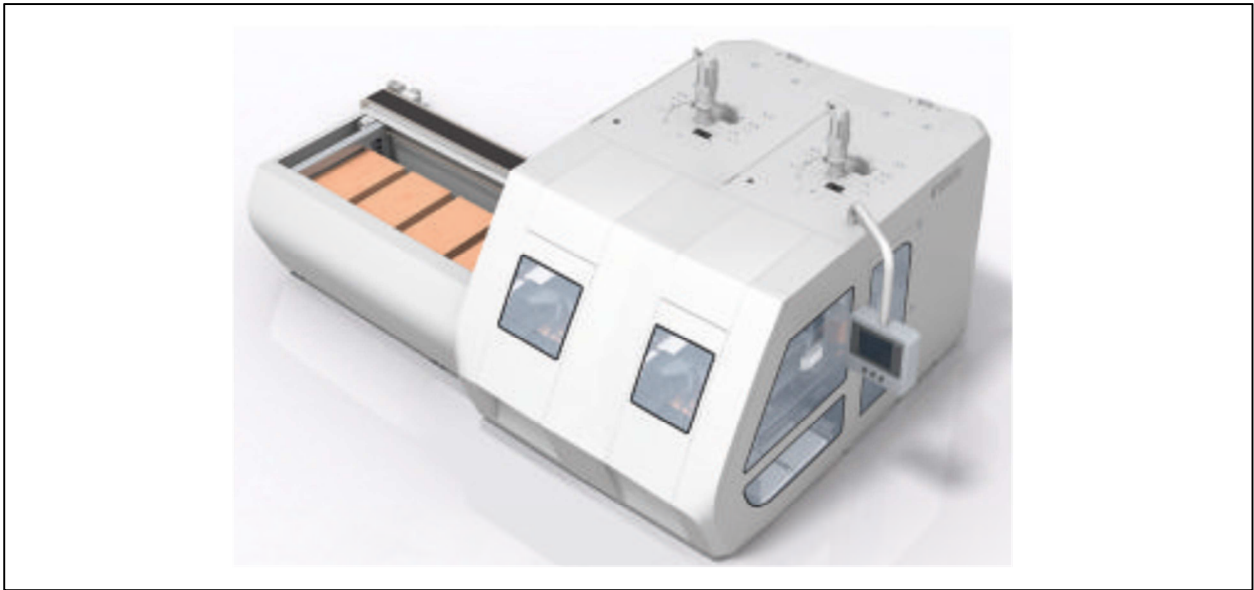


Figure 43: Bagging Station Maia by Bühler<sup>415</sup>

### 5.4.3 Concetti (Italy)

#### Company information:

The Concetti Group manufactures weighing, bagging, closing and palletizing machines for handling bulk products.<sup>416</sup> In the category of powdered products they offer solutions for milk powder and flour.<sup>417</sup>

For flour bagging Concetti offers fully automatic machines with dust-free product feeding and filling. In addition to the usual bag materials which can be handled by bagging machines (paper, woven PP etc...) the IGF Series by Concetti can also handle cloth bags (e.g. mixed cotton) automatically.<sup>418</sup>

#### Competitive products:

- **IGF 1200:**

The IGF Multifunction Bagging Systems is a fully automatic product series by Concetti. In this product family the **IGF 1200** is the machine with the highest performance – it can handle up to **1200 bags/hour** depending on the product (1200 bags again most likely refers to **granular products**. For powdery products

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<sup>415</sup> Technical Brochure Bagging Station Maia (English) by Bühler: [www.buhlergroup.com](http://www.buhlergroup.com)

<sup>416</sup> Cf. [www.concetti.com](http://www.concetti.com), date of access: 29.08.2013

<sup>417</sup> Ibidem

<sup>418</sup> Cf. [www.concetti.com](http://www.concetti.com), date of access: 29.08.2013



the capacity is smaller). The IGF 1200 is a line bagging machine which can use open mouth bags with various sizes, shapes and materials. For bagging powdery products a screw feeder, deaeration devices and bag vibraters during the filling are available. The weighing range is 2 – 50 kg. The bag can be closed through sewing, tape, hot-melt closing, heat sealing or pinch top closing. The bag materials which can be used are: Paper, coated Paper, Paper with PE liner, Paper with aluminium liner, PE, PP, Raffia, coated Raffia, and Raffia with PE liner.<sup>419</sup>

(Raffia is another term for woven Polypropylene).

In Figure 44 a picture of the IGF 1200 by Concetti is shown.



Figure 44: IGF 1200 – Fully Automatic Line Bagging Machine by Concetti<sup>420</sup>

<sup>419</sup> Cf. [www.concetti.com](http://www.concetti.com), date of access: 29.08.2013

<sup>420</sup> [www.concetti.com](http://www.concetti.com), date of access: 29.08.2013

- **Six Station Bagging Carousel:**

The carousel by Concetti is equipped with six filling stations to maximize the throughput. The company states that the maximum performance is 1200 bags/hour with 25 kg bags.<sup>421</sup> For flour the research showed that 800 bags/hour are possible.<sup>422</sup>

The carousel can use open mouth bags made from Paper, coated Paper, Paper with PE liner, Paper with aluminium liner and PE. The machine can use pillow bags and gusseted bags.<sup>423</sup>

In Figure 45 the fully automatic six station carousel by Concetti is depicted.



Figure 45: Six Station Bagging Carousel by Concetti<sup>424</sup>

<sup>421</sup> Cf. [www.concetti.com](http://www.concetti.com), date of access: 29.08.2013

<sup>422</sup> Cf. [www.youtube.com](http://www.youtube.com), date of access: 08.10.2013

<sup>423</sup> Cf. [www.concetti.com](http://www.concetti.com), date of access: 29.08.2013

<sup>424</sup> [www.concetti.com](http://www.concetti.com), date of access: 29.08.2013

#### 5.4.4 GEA Avapac (New Zealand)

##### Company information:

The company designs and manufactures machines filling powders into bulk bags and retail containers. The applications are food, dairy and pharmaceuticals.<sup>425</sup>

GEA Avapac packs various milk powders and other milk components in powder form, soya bean bases, tomato powders, cocoa powders, bakery mixes, coffee whitener, soup bases, etc.<sup>426</sup>

##### Competitive product:

##### **Rotary Bag Filler RBF-1800:**

This **carousel** is built to handle **25 kg** open mouth bags. GEA Avapac states that the machine can bag a throughput of 18 tons per hour broken down to 12x25kg bags per minute. This means the RBF-1800 can handle up to **720 bags/hour**.<sup>427</sup>

The RBF-1800 is the largest bagging machine in the Avapac production range. It uses the company's bottom up filling process to minimize the introduction of air into the powder. It is built with 4x2 linked filling heads.<sup>428</sup>

Moreover, it features a multi-stage filling and an optional product sampling device for quality control.<sup>429</sup>

In Figure 46 the RBF-1800 is depicted.

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<sup>425</sup> Cf. [www.avapac.com](http://www.avapac.com) date of access: 04.11.2013

<sup>426</sup> Ibidem

<sup>427</sup> Ibidem

<sup>428</sup> Ibidem

<sup>429</sup> Cf. GEA Avapac Rotary Bag Filler Brochure (English): [www.avapac.com](http://www.avapac.com)



Figure 46: RBF-1800, Rotary Bag Filler by GEA Avapac<sup>430</sup>

#### 5.4.5 Behn&Bates (Germany)

##### Company information:

Behn&Bates is a member of the Haver and Boecker Group.

They provide bagging solutions for food and feed. Their technical solutions include open mouth bagging machines for pre-fabricated open mouth bags, valve baggers, FFS bagging machines and solutions for big bags.<sup>431</sup>

Behn&Bates produces machines for granular and for powdery products. The powders which are mentioned are: starch, dextrose, flours, baking components, premixes and cocoa powder.<sup>432</sup>

##### Competitive products:

Behn&Bates offers multiple bagging solutions for powdered products. The relevant ones were one pneumatic valve bagger and one open mouth bagger. Both machines are designed as **carousels**.<sup>433</sup>

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<sup>430</sup> [www.avapac.com](http://www.avapac.com), date of access: 04.11.2013

<sup>431</sup> Cf. [www.behnates.de](http://www.behnates.de), date of access: 19.10.2013

<sup>432</sup> Ibidem



- **Rotoseal:**

The Rotoseal valve bagger has a performance from **600 to 2200 bags/hour**, depending on the number of filling spouts (the machine is available with 3 to 10 filling spouts).<sup>434</sup>

Figure Figure 47 depicts the Rotoseal valve bagger by Behn&Bates.



Figure 47: Rotoseal Valve Bagger by Behn&Bates<sup>435</sup>

- **Orbris:**

The Orbris open mouth fully automatic bagging carousel can handle up to **600 bags/hour** powdered product.<sup>436</sup>

Figure 48 depicts the Orbris open mouth bagger.

<sup>433</sup> Cf. [www.behnates.de](http://www.behnates.de), date of access: 19.10.2013

<sup>434</sup> Cf. Behn&Bates Valve Bagger Brochure (German): [www.behnates.com](http://www.behnates.com)

<sup>435</sup> Behn&Bates Valve Bagger Brochure (German): [www.behnates.com](http://www.behnates.com)

<sup>436</sup> Cf. Behn&Bates Valve Bagger Brochure (German): [www.behnates.com](http://www.behnates.com)



Figure 48: Orbris Carousel Open Mouth Bagger by Behn&Bates<sup>437</sup>

#### 5.4.6 IMECO (Italy)

##### Company information:

IMECO provides solutions for weighing, bagging and palletizing of bulk products.<sup>438</sup> In their bagging product range open mouth baggers (manual and fully automatic), FFS machines and big bag fillers can be found.<sup>439</sup>

For flour the company offers only open mouth bagging solutions.<sup>440</sup> The two relevant fully automatic products are listed below.

##### Competitive products:

###### ○ **ABP120UR:**

The ABP120UR is designed as an **open mouth bagger carousel**. It is suitable for floury products and can handle up to **1200 bags/hour**. The machine can handle pillow and gusseted bags. The possible bag materials are: multi wall paper, coated paper, paper with PE liner, woven PP with PE liner, woven PP and paper with aluminium.<sup>441</sup>

In Figure 49 the carousel by IMECO is depicted.

<sup>437</sup> [www.behnbates.com](http://www.behnbates.com), date of access: 19.10.2013

<sup>438</sup> Cf. <http://www.imeco.org/node>, date of access: 14.10.2013

<sup>439</sup> Cf. [www.imeco.org](http://www.imeco.org), date of access: 14.10.2013

<sup>440</sup> Ibidem

<sup>441</sup> Ibidem



Figure 49: ABP120UR Open Mouth Bagging Carousel by IMECO<sup>442</sup>

- **ABP120F:**

The ABP120F is a line bagger which uses open mouth bags. The performance ranges between **600 and 1200 bags/hour**, depending on the product.<sup>443</sup>

As this machine is also used for bagging granular products, for powders the performance has to be assumed closer to the lower border of 600 bags/hour.

It is also possible to use various bag materials.<sup>444</sup>

In Figure 50 the line bagger by IMECO is depicted.

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<sup>442</sup> [www.imeco.org](http://www.imeco.org), date of access: 14.10.2013

<sup>443</sup> Cf. [www.imeco.org](http://www.imeco.org), date of access: 14.10.2013

<sup>444</sup> Ibidem



Figure 50: ABP120F Open Mouth Line Bagger by IMECO<sup>445</sup>

#### 5.4.7 Paglierani (Italy)

##### Company information:

Paglierani produces weighing, bagging, packaging palletizing, wrapping and lorry loading machines.<sup>446</sup> For the company it is important that every product they provide is completely developed and manufactured in Italy without involvement of know-how of other companies.<sup>447</sup>

##### Competitive products:

The research of the Paglierani products was extremely difficult as most product descriptions can only be accessed if one has a customer account on the company's website. Two possible competitive products could be identified. Pictures of sufficient quality could not be obtained.

- **Open Mouth Bagging Carousel:**

During web research a video was found, featuring a Paglierani open mouth bagging **carousel**.<sup>448</sup> The name is unknown. Through observation assumptions

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<sup>445</sup> [www.imeco.org](http://www.imeco.org), date of access: 14.10.2013

<sup>446</sup> Cf. <http://www.paglierani.com/uk/>, date of access: 15.10.2013

<sup>447</sup> <http://www.paglierani.com/uk/>, date of access: 15.10.2013

<sup>448</sup> [www.youtube.com](http://www.youtube.com), date of access: 29.10.2013



were made: for flour bagged in 25 kg bags the performance could be approximately **500 to 600 bags/hour**.<sup>449</sup>

- **Valve Bagger:**

In obtaining a sales offer for a valve bagging machine (name unknown) the information could be extracted that Paglierani produces valve baggers for bagging of industrial capacities of powder. The valve bagger apparently has a performance capacity of **2200 – 2400 bags/hour** for cement.<sup>450</sup>

#### 5.4.8 Premiartech Chronos (Canada)

##### Company information:

Premiartech Chronos provides solutions for packaging, material- and bulk material processing. In the category of packaging Premiartech Chronos manufactures weighing and feeding systems, as well as bagging and palletizing machines.<sup>451</sup>

The company provides open mouth baggers, valve baggers, big bag fillers and FFS machines.<sup>452</sup>

For bagging flour Premiartech Chronos offers open mouth baggers and valve baggers.<sup>453</sup>

##### Competitive products:

- **PTK Series:**

The PTK series features high speed **open mouth line bagging** machines which can be purchased with a single or double spout. The machines are applicable for powder or granular products. The bag materials which can be handled are paper, plastic (PE) and woven PP.

Using the single spout version the maximum performance is **1500 bags/hour**, depending on the product and bag size. Using the **double spout** version (**PTK-**

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<sup>449</sup> Information provided by Mag (FH) Günter Haiden, Statec Binder Sales

<sup>450</sup> Information provided by DI Gerhard Steinmayr, Statec Binder Sales

<sup>451</sup> Cf. <http://www.ptchronos.com/de-at/>, date of access: 12.09.2013

<sup>452</sup> Ibidem

<sup>453</sup> Ibidem

**2700**) the maximum performance is **2400 bags/hour**, depending on the product and bag size.<sup>454</sup>

These top performances of 1500 or 2400 bags per hour are most certainly not possible for powdery products.

In Figure 51 the double spout high speed open mouth bagger PTK-2700 by Premiartech Chronos is depicted.



Figure 51: PTK-2700 Open Mouth Bagger by Premiartech Chronos<sup>455</sup>

- **OMC Series:**

In the OMC Series the relevant product is an **open mouth** bagging **carousel** which recently was upgraded by Premiartech Chronos to a fully automatic version. The carousel is suitable for powdery bulk materials. It can be purchased with a number of filling spouts. With the maximum number of filling spouts of six the carousel should be able to handle **900 bags/hour**. The machine can use

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<sup>454</sup> Cf. Technical Brochure PTK Series (English): [www.ptchronos.com](http://www.ptchronos.com)

<sup>455</sup> Technical Brochure PTK Series (English): [www.ptchronos.com](http://www.ptchronos.com)

bags in the range of 5 to 50 kg capacity. For bag materials: PE bags, woven PP bags and paper bags are possible.<sup>456</sup>

In Figure 52 the OMC Series Carousel is depicted.



Figure 52: Open Mouth Bagging Carousel OMC Series by Premiartech Chronos<sup>457</sup>

#### 5.4.9 Technipes Cordano (Italy)

##### Company information:

Technipes Cordano specializes in dry bulk packaging systems. The products range from granular, pellets, flakes to powders. The application sectors are foods, chemicals, minerals, seeds, animal feeds, pet foods, wood products, mortars and cements.<sup>458</sup>

The company provides semi-automatic and fully automatic fillers and turnkey solutions for many industries.<sup>459</sup>

<sup>456</sup> Cf. [www.ptchronos.com](http://www.ptchronos.com), date of access: 29.10.2013

<sup>457</sup> [www.ptchronos.com](http://www.ptchronos.com), date of access: 29.10.2013

<sup>458</sup> Cf. [www.cordanopackaging.com](http://www.cordanopackaging.com) date of access: 03.11.2013

<sup>459</sup> Ibidem

Competitive products:

- **Futura Automated Bagging Lines:**

This product series of fully automatic **open mouth line baggers** can be customized to suit the purpose of flour bagging. One can choose net weighing, and screw feeders. The weighing is accurate from +/- 15g to 75g depending on the product. The capacities of the bags can range from 5 to 50 kg. The bag material and the type of closing can also be selected. The maximum capacity of the bagging lines is 1000 bags/hour.<sup>460</sup>

This amount of 1000 bags/hour is most certainly only true for granular products.



Figure 53: Futura Bagging Line by Technipes Cordano<sup>461</sup>

- **Technipes Futura-V:**

This **open mouth line bagger** is equipped with a **double spout** to increase performance. It is recommended especially for flour and can handle up to **1100 bags/hour** of powdered product.<sup>462</sup>

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<sup>460</sup> Cf. [www.cordanopackaging.com](http://www.cordanopackaging.com), date of access: 03.11.2013

<sup>461</sup> [www.cordanopackaging.com](http://www.cordanopackaging.com), date of access: 03.11.2013

<sup>462</sup> Cf. [www.youtube.com](http://www.youtube.com), date of access: 03.11.2013

- **Carousel Open Mouth Bag Packing System:**

The carousel by Technipes Cordano was a semi-automatic machine initially. An operator had to attach the bag to the filling spout. Now it is available with an additional automatic bag placer so the bagging process runs fully automatic.<sup>463</sup>

The machine can be equipped with four to six filling spouts. The highest performance can be reached with six spouts. The bag capacities which can be used range from 10 to 50 kg. The company states that even with 50 kg bags the machine can handle 1000 bags/hour with powdered products.<sup>464</sup>

In Figure 54 the bagging carousel by Technipes Cordano is depicted, although this is the semi-automatic version without the bag placer.



Figure 54: Open Mouth Bagging Carousel by Technipes Cordano<sup>465</sup>

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<sup>463</sup> Cf. [www.cordanopackaging.com](http://www.cordanopackaging.com), date of access: 21.11.2013

<sup>464</sup> Ibidem

<sup>465</sup> [www.cordanopackaging.com](http://www.cordanopackaging.com), date of access: 21.11.2013



#### 5.4.10 Thiele Technologies (USA)

##### Company information:

Thiele Technologies is active on many markets. Their product range includes bagging systems, bag and pouch manufacturing, cartoning and case packaging, bliss, tray and case erecting, dairy packaging, robotics and placers.<sup>466</sup>

In the open mouth bagger section the company provides solutions for free flowing bulk products and semi-free flowing products (flour, chemicals, fine powders).<sup>467</sup>

##### Competitive product:

##### **Series 7116 AutoTrim Flour Packer:**

The AutoTrim Flour Packer is an **open mouth line bagging machine**. The range of bag capacities goes from 8.9 to 50 kg. The maximum performance of the machine is **720 bags/hour**.<sup>468</sup>



Figure 55: Series 7116 AutoTrim Flour Packer by Thiele Technologies<sup>469</sup>

<sup>466</sup> Cf. [www.thieletech.com](http://www.thieletech.com), date of access: 18.10.2013

<sup>467</sup> Ibidem

<sup>468</sup> Ibidem

<sup>469</sup> [www.thieletech.com](http://www.thieletech.com), date of access: 18.10.2013

### 5.4.11 Umbra Packaging (Italy)

#### Company information:

Umbra Packaging is specialized on the development, design and production of Packaging Line Plants. Various materials and bags can be handled in bagging powdered and granular products.<sup>470</sup>

#### Competitive product:

The **Linea di confezionamento UPD EVO “Settore Farine Alimentari”** is especially developed for bagging flour. The maximum performance is **850 bags/hour**. It is an open mouth bagger with possible bag capacities from 5 to 50 kg.<sup>471</sup>

In Figure 56 the open mouth bagger for flour by Umbra Packaging is shown.



Figure 56: Linea di confezionamento UPD EVO “Settore Farine Alimentari” by Umbra<sup>472</sup>

<sup>470</sup> Cf. [www.umbrapackaging.it](http://www.umbrapackaging.it), date of access: 15.10.2013

<sup>471</sup> Ibidem

<sup>472</sup> [www.umbrapackaging.it](http://www.umbrapackaging.it), date of access: 15.10.2013

## 5.5 Summary of Analysed and Assessed Data

In this chapter the analysed and assessed countries are summarised and categorised. A qualitative evaluation is done to get a good overview over the relevant markets. For every country positive and negative points are pointed out. The main criteria for these points will be the flour output of the respective country, the milling infrastructure and the Gross domestic product (GDP). The criteria are explained below:

- The flour output of the country represents the market potential. The amount of flour which is actually packed in bags in industrial quantities would represent the size of the market. Unfortunately, these data were not available for evaluation. Assessed were the following parameters: flour output of the country, flour export (if it is usable) and known facts about the flour transportation (bulk, bags with large capacities or household use bags).
- The milling infrastructure will be evaluated as follows:

The fastest bagging machine for powdery products by Statec Binder will be able to bag 1200 bags/hour. But the assumption is that for millers it is also interesting to use a fully automatic solution at 600 bags/hour. This amount corresponds to the second machine developed by Stated Binder.

An assumption was made that the flour bagging is done in 25 kg bags and the bagging machine should work 8 hours per day.

The calculation shows that a flour mill for which a high performance bagging machine is viable will have to have a daily flour output of at least 120 tons.

Assuming that an average flour mill has a rate of 70% flour output per 100% grain input, this leads to necessary a daily milling capacity of about 170 tons. In yearly capacity (when assuming a 6 day work week) this means about 53.040 tons.

It was analysed in which countries mills of this size or larger operate. If mills of this size could be found, the country gets positive points, if not, the evaluation will be negative.

Growing or decreasing milling infrastructures were also taken into account.

- A high GDP (here: more than 30.000 US\$ per capita) indicates a high level of industrialisation within the country, highly classified workers and relatively good pay. Such countries are likely to employ fully automatic machines to save costs for operators. Countries with a high GDP achieved positive points.



For the assessment five experts from Statec Binder were consulted to evaluate the countries. My own opinion was also taken into account.

The grades that can be given are (downward from best to worst): ++, +, o, -, - -.

**Table 4: Country Assessment**

Region	Country	Positive Aspects	Negative Aspects	Overall Assessment
Europe	Austria	<ul style="list-style-type: none"> <li>fully automatic operating bagging machines are highly appreciated within the flour milling industry</li> </ul>	<ul style="list-style-type: none"> <li>the trend goes to fewer and smaller bags in flour bagging</li> <li>the biggest part of the produced flour is transported as bulk goods</li> <li>the mills are rather small and seldom have a high enough output to justify a high performance bagging machine</li> <li>most mills don't have the space to operate a large bagging carousel</li> </ul>	- -
	Germany	<ul style="list-style-type: none"> <li>fully automatic operating bagging machines are highly appreciated within the flour milling industry</li> </ul>	<ul style="list-style-type: none"> <li>75 to 80% of the flour are transported as bulk goods</li> <li>the rest of the infrastructure is very similar to Austria</li> </ul>	-
	Belgium	<ul style="list-style-type: none"> <li>big wheat flour exporter (651.352 tons in 2009)</li> <li>exports to far off destinations</li> <li>high GDP (43.413 US\$ in 2012)</li> <li>high wheat consumption (105,9 kg per capita in 2009)</li> <li>flour production in 2009 was 1.185.000 tons (with 35 operating mills this makes an average daily flour output of approximately 110 tons per mill)</li> </ul>	<ul style="list-style-type: none"> <li>only 3 big mills, rest medium and small mills</li> <li>decreasing flour export over the last years</li> </ul>	o
	France	<ul style="list-style-type: none"> <li>big milling companies exist</li> <li>one of the biggest flour exporters in 2009</li> <li>flour is exported to far off destinations</li> <li>5.394.000 tons of wheat flour produced in 2009, rank 7 worldwide</li> <li>a GDP per capita of 39.772 US\$ in 2012</li> </ul>	<ul style="list-style-type: none"> <li>no information about how the export takes place</li> <li>no further information about the mills and their sizes</li> </ul>	+

	Italy	<ul style="list-style-type: none"> <li>• flour production of 3.850.000 tons in 2009</li> <li>• GDP per capita of 33.049 US\$ in 2013</li> <li>• there is at least one very big milling company (Grandi Molini) which has a very high flour production and export rate</li> </ul>	<ul style="list-style-type: none"> <li>• very few big players in the milling industry</li> <li>• not very much information about the milling industry and the flour export</li> </ul>	○
	Spain	<ul style="list-style-type: none"> <li>• flour production of 2.700.000 tons in 2009</li> <li>• GDP per capita of 29.195 US\$ in 2012</li> <li>• smaller mills tend to merge into big groups</li> <li>• one mill is known to have a capacity of 4.100 tons a day, it is part of three big groups which produce 60-70% of the flour</li> </ul>		○
	United Kingdom	<ul style="list-style-type: none"> <li>• flour production of 4.861.000 tons in 2009</li> <li>• GDP per capita of 38.514 US\$ in 2012</li> <li>• highly competitive flour milling sector</li> <li>• average yearly flour production of one mill is approximately 73.000 tons (about 230 tons per day)</li> </ul>		○
Africa	Egypt	<ul style="list-style-type: none"> <li>• flour production of 5.624.400 tons in 2009</li> <li>• one of the highest wheat flour consumption rates per capita with 186 kg per year (2005)</li> <li>• average of 200 tons daily capacity</li> </ul>	<ul style="list-style-type: none"> <li>• the milling sector consists only of small or medium sized mills</li> <li>• GDP per capita of 3.187 US\$ in 2012</li> </ul>	+
	Libya	<ul style="list-style-type: none"> <li>• imports its grain and mills locally</li> <li>• 50 mills are operating in the country</li> </ul>	<ul style="list-style-type: none"> <li>• no flour production amount available</li> <li>• GDP per capita of 10.456 US\$ in 2009</li> <li>• very little information available</li> </ul>	○
	Gambia	<ul style="list-style-type: none"> <li>• built their first flour mill in 2013 (300 tons daily capacity)</li> <li>• increasing domestic wheat/flour demands</li> <li>• future exports are planned to act as port to the huge potential market of the West Africa sub region</li> </ul>	<ul style="list-style-type: none"> <li>• no flour production amount available</li> <li>• GDP per capita of 512 US\$ in 2012</li> </ul>	-

	Sudan	<ul style="list-style-type: none"> <li>• wheat production and trade in the Sub-Saharan region will increase</li> <li>• wheat flour consumption is rising</li> <li>• three big milling companies produced between 1.5 Mio and 2 Mio tons of wheat flour in 2010 (in Khartoum)</li> <li>• about half of the produced wheat flour is consumed in the capital, 70.000 to 80.000 50 kg bags per day</li> <li>• modern milling industry</li> <li>• the three big milling companies have milling plants with daily capacities between 500 and 2.250 tons</li> </ul>	<ul style="list-style-type: none"> <li>• flour production of 1.750.000 tons in 2009</li> <li>• GDP per capita of 1.580 US\$ in 2012</li> </ul>	+
	Algeria	<ul style="list-style-type: none"> <li>• high per capita consumption of wheat (245kg in 2011)</li> <li>• 10 mills with a capacity of more than 1000 tons per day (out of 300; year 2011)</li> </ul>	<ul style="list-style-type: none"> <li>• the milling capacity is estimated to be nearly the double amount of what is needed</li> <li>• GDP per capita of 5.404 US\$ in 2012</li> </ul>	○
	Nigeria	<ul style="list-style-type: none"> <li>• huge export market for wheat</li> <li>• high demand for wheat flour</li> <li>• milling capacity increased in 2012/13 from 6.6 Mio tons to 8 Mio tons</li> <li>• highly competitive milling sector</li> <li>• four big companies dominate the milling sector</li> <li>• mills are expanding their milling capacities due to high wheat flour demand</li> <li>• no milling corporation can or wants to expand to other African countries right now because of the high domestic wheat flour demand</li> </ul>	<ul style="list-style-type: none"> <li>• milling capacity utilisation is about 50%</li> <li>• GDP per capita of 1.555 US\$ in 2012</li> </ul>	+

	South Africa	<ul style="list-style-type: none"> <li>• milling capacity utilization was about 85% in 2009</li> </ul>	<ul style="list-style-type: none"> <li>• flour production of 2.260.000 tons in 2009</li> <li>• GDP per capita of 7.508 US\$ in 2012</li> <li>• most important cereal crop is maize</li> <li>• number of wheat mills is decreasing (13 in 2009), number of maize mills is increasing (22 in 2009)</li> <li>• estimated wheat milling capacity in 2009 was 3.3 Mio tons</li> <li>• big plant bakers on the rise (much higher probability of having their own flour silos)</li> </ul>	+
Middle East	Iran	<ul style="list-style-type: none"> <li>• the process technology of about half of the mills is not older than 10 years</li> <li>• wheat gets government subsidies</li> <li>• combined milling capacity of more than 335 mills was 23 Mio tons per year in 2009 (average of 220 tons per day per mill)</li> </ul>	<ul style="list-style-type: none"> <li>• GDP per capita of 6.816 US\$ in 2011</li> <li>• number of mills decreased (344 in 2013)</li> <li>• milling capacity decreased (17 Mio tons in 2013 - average capacity of 160 tons per mill per day)</li> </ul>	o
	Turkey	<ul style="list-style-type: none"> <li>• flour production of 10.908.032 tons in 2009</li> <li>• high wheat flour export</li> <li>• export to far off destinations all over the world</li> </ul>	<ul style="list-style-type: none"> <li>• milling capacity utilisation rate of 47% in 2011</li> <li>• milling capacity of 32.430.829 tons in 2011 with 682 milling plants (average capacity per mill of about 150 tons per day)</li> <li>• GDP per capita of 10.666 US\$ in 2012</li> </ul>	+ +
	Saudi Arabia	<ul style="list-style-type: none"> <li>• rise in grain imports predicted for 2016</li> <li>• predicted rise of wheat consumption up to 3.4 Mio tons in 2016</li> <li>• mills will be privatised (traders can buy grain on the world market and mill it locally - until now: grain trade controlled by government)</li> </ul>	<ul style="list-style-type: none"> <li>• very little information about the industry</li> <li>• GSFMO stated that the average wheat flour output of their members is 900 tons per year</li> <li>• GSFMO stated that their members don't transport wheat flour as bulk goods and don't bag it in industrial quantities</li> <li>• GDP per capita of 25.136 US\$ in 2012</li> </ul>	-

Far East	China	<ul style="list-style-type: none"> <li>• flour production of 79.371.000 tons in 2009</li> <li>• highly competitive milling sector</li> <li>• 100 new flour mills have been built in the last decade</li> <li>• 500 to 600 mills with a daily capacity of 150 to 400 tons</li> <li>• about 200 flour mills with a daily capacity of 400 to 16.000 tons</li> </ul>	<ul style="list-style-type: none"> <li>• milling capacity utilisation is about 40%</li> <li>• GDP per capita of 6.188 US\$ in 2012</li> </ul>	+
	Japan	<ul style="list-style-type: none"> <li>• flour production of 4.558.800 tons in 2009</li> <li>• GDP per capita of 46.720 US\$ in 2012</li> <li>• four big milling companies dominate the market</li> <li>• there are 119 mills with a total yearly capacity of 8.56 Mio tons (average daily capacity per mill 230 tons)</li> </ul>		o
	South Korea	<ul style="list-style-type: none"> <li>• former rice based diet changes to wheat and animal protein based diet</li> <li>• milling capacity utilisation is about 70%</li> <li>• 11 mills have a total yearly milling capacity of 3.082.500 tons (average daily milling capacity per mill 900 tons)</li> <li>• GDP per capita of 22.950 US\$ in 2012</li> </ul>	<ul style="list-style-type: none"> <li>• only 11 mills in the country</li> </ul>	-
Russian Federation	Russian Federation	<ul style="list-style-type: none"> <li>• flour production of 14.188.425 tons in 2009</li> <li>• flour production of 16 to 17 Mio tons in 2013</li> <li>• 7000 flour mills in Russia</li> <li>• biggest mill until now has a daily milling capacity of 1.800 tons wheat equivalent</li> <li>• new mill has been built recently (2013) with a design capacity of 2.400 tons per day</li> </ul>	<ul style="list-style-type: none"> <li>• GDP per capita of 14.037 US\$ in 2012</li> <li>• no information about flour logistics</li> </ul>	+
Central Asia	Kazakhstan	<ul style="list-style-type: none"> <li>• the biggest mills have daily milling capacities of 500 tons</li> <li>• one of the biggest grain exporters</li> <li>• flour production of 4.552.677 tons (rank 13 in 2009)</li> <li>• most of the mills have a daily milling capacity between 150 and 200 tons</li> </ul>	<ul style="list-style-type: none"> <li>• the flour is transported only in silo waggons on railway</li> <li>• GDP per capita of 11.935 US\$ in 2012</li> </ul>	o

	Uzbekistan		<ul style="list-style-type: none"> <li>• imports wheat flour from Kazakhstan</li> <li>• grain trade and business conducted is handled as a state secret</li> <li>• GDP per capita of 1.717 US\$ in 2012</li> </ul>	-
	Kyrgyzstan		<ul style="list-style-type: none"> <li>• flour production of 546.893 tons in 2009</li> <li>• GDP per capita of 1.160 US\$ in 2012</li> <li>• agricultural focus lies on livestock sector</li> <li>• wheat flour imported from Kazakhstan</li> <li>• little information about the country and no information about the milling infrastructure</li> </ul>	-
	Tajikistan	<ul style="list-style-type: none"> <li>• trend goes to buying wheat grain and milling it in local facilities</li> <li>• expanding milling sector</li> </ul>	<ul style="list-style-type: none"> <li>• flour production of 807.387 tons in 2009</li> <li>• GDP per capita of 872 US\$ in 2012</li> <li>• major importer of wheat flour from Kazakhstan</li> </ul>	-
	Afghanistan	<ul style="list-style-type: none"> <li>• wheat accounts for about 60% of the calorie intake of the population</li> </ul>	<ul style="list-style-type: none"> <li>• wheat flour imported from Kazakhstan and Uzbekistan</li> <li>• GDP per capita of 620 US\$ in 2011</li> <li>• about 90% of the domestic grown wheat is milled in small facilities (1-4 tons per day capacity)</li> <li>• investments to build bigger mills have been taken, but they can seldom be used due to lack of grain or electricity failures</li> </ul>	- -
	Turkmenistan	<ul style="list-style-type: none"> <li>• lately some investments have been made to modernize the milling infrastructure</li> <li>• enormous economic growth during the last years (increasing import of technologic products)</li> </ul>	<ul style="list-style-type: none"> <li>• flour production of 745.526 tons in 2009</li> <li>• GDP per capita of 6.511 US\$ in 2012</li> <li>• currently no information about the milling industry available</li> </ul>	-

South Asia	Pakistan	<ul style="list-style-type: none"> <li>• staple food is wheat</li> <li>• flour production of 4.870.800 tons in 2009</li> <li>• the trend goes from home-ground wheat flour to commercially milled flour</li> <li>• there are a few large scale flour mills with a daily capacity of 200 tons</li> </ul>	<ul style="list-style-type: none"> <li>• in 2008 milling capacity was four times as high as needed</li> <li>• the milling infrastructure mainly consists of very small (&gt;5 tons per day) and medium flour mills (max. 20 tons per day)</li> <li>• GDP per capita of 1.290 US\$ in 2012</li> </ul>	-
	India	<ul style="list-style-type: none"> <li>• flour production of 2.341.200 tons in 2009</li> <li>• the sector of branded and packaged wheat flour is growing</li> </ul>	<ul style="list-style-type: none"> <li>• relatively small milling sector</li> <li>• GDP per capita of 1.489 US\$ in 2012</li> <li>• in 2013 there are about 1000 mills with medium or large size with a total annual capacity from 22 Mio tons to 24 Mio tons</li> </ul>	o
	Bangladesh	<ul style="list-style-type: none"> <li>• wheat is the second most important food grain after rice</li> <li>• traditional stone mills are gradually replaced by modern roller mills</li> <li>• most currently built mills have a daily capacity of 300 to 500 tons</li> <li>• there are about 20 large roller mills with daily milling capacities from 100 - 500 tons but the average production per day is only 150 tons of wheat flour</li> </ul>	<ul style="list-style-type: none"> <li>• flour production of 146.400 tons in 2009</li> <li>• GDP per capita of 747 US\$ in 2012</li> <li>• most mills have a daily milling capacity of 50 tons</li> </ul>	o
Southeast Asia	Malaysia	<ul style="list-style-type: none"> <li>• wheat consumption is on a long-term uptrend</li> <li>• there are three large flour milling companies</li> <li>• a commonly used bag for flour bagging is the laminated woven Propylene open mouth pillow bag</li> </ul>	<ul style="list-style-type: none"> <li>• flour production of 889.200 tons in 2009</li> <li>• GDP per capita of 10.381 US\$ in 2012</li> </ul>	o
	Philippines	<ul style="list-style-type: none"> <li>• 12 companies engage in wheat flour production</li> <li>• many small bakeries</li> <li>• about 75% of the used bags for flour bagging are woven Propylene open mouth bags</li> </ul>	<ul style="list-style-type: none"> <li>• a lot of wheat flour is imported from Turkey</li> <li>• flour production of 2.000.000 tons in 2009</li> <li>• GDP per capita of 2.587 US\$ in 2012</li> <li>• in 2011 the milling capacity utilization was about 50%</li> </ul>	o
	Thailand	<ul style="list-style-type: none"> <li>• eight large-scale flour mills with a total production of 500.000 tons of flour in 2010</li> <li>• modern mills</li> </ul>	<ul style="list-style-type: none"> <li>• most important food grain is rice, second most important is maize</li> <li>• GDP per capita of 5.480 US\$ in 2012</li> </ul>	+

	Indonesia	<ul style="list-style-type: none"> <li>• flour production of 3.325.000 tons in 2009</li> <li>• very big mills (e.g. Bogasari: 10.000 tons per day and 5.900 tons per day)</li> </ul>	<ul style="list-style-type: none"> <li>• in 2010 the whole industry had a milling capacity of 9.2 Mio tons</li> <li>• GDP per capita of 3.557 US\$ in 2012</li> </ul>	+
Australia	Australia	<ul style="list-style-type: none"> <li>• among the top 20 flour exporters in 2009 (mainly to Thailand, Indonesia, Asian Pacific Region)</li> <li>• expected rationalization process concerning mills (2009)</li> <li>• modern mills (high flour output percentage per 100% grain)</li> <li>• flour is bagged in 10 kg to 25 kg bags</li> <li>• in 2009 four big milling company hold a market share of approximately 80%</li> <li>• GDP per capita of 67.036 US\$ in 2012</li> </ul>	<ul style="list-style-type: none"> <li>• flour production of 2.252.000 tons in 2009</li> <li>• flour is also transported in bulk shipments</li> <li>• little information about current milling infrastructure</li> </ul>	o
North America	Canada	<ul style="list-style-type: none"> <li>• standard bag sizes are 25 kg and 40 kg</li> <li>• GDP per capita of 52.219 US\$ in 2012</li> </ul>	<ul style="list-style-type: none"> <li>• the daily milling capacity of all the members of the Canadian Millers Association is about 9.071,8 tons (about 1/8 of the U.S. industry capacity)                             <ul style="list-style-type: none"> <li>• about 90% of the wheat flour is transported in bulk shipments</li> <li>• some mills do not even have bagging lines</li> </ul> </li> <li>• flour production of 2.310.000 tons in 2009</li> </ul>	o
	United States	<ul style="list-style-type: none"> <li>• 165 flour mills with a total daily milling capacity of 67.000 tons (2013)</li> <li>• 68 mills have a daily capacity of 454 tons or more</li> <li>• the biggest mill has a daily capacity of 1.362 tons</li> <li>• milling infrastructure easily accessible</li> <li>• flour production of 18.808.800 tons in 2009</li> <li>• GDP per capita of 49.965 US\$ in 2012</li> </ul>		++



	Mexico	<ul style="list-style-type: none"> <li>• for bagging wheat flour to a high percentage open mouth bags are used with a capacity from 30 kg to 50 kg</li> <li>• about 2.7 Mio tons per year are bagged in industrial quantities by the members of the Chamber of Milling Industry (2013)</li> <li>• flour production of 2.991.600 tons in 2009</li> </ul>	<ul style="list-style-type: none"> <li>• most consumed grain is maize</li> <li>• not a lot of information available about the sizes and bagging customs of the mills</li> <li>• GDP per capita of 9.747 US\$ in 2012</li> </ul>	+
South America	Argentina	<ul style="list-style-type: none"> <li>• flour production of 4.676.400 tons in 2009</li> <li>• one of the 20 biggest flour exporters in 2009</li> <li>• export amount in 2011 of about 1.02 Mio tons</li> </ul>	<ul style="list-style-type: none"> <li>• the standard bag in the whole industry for bagging wheat flour is a 50kg paper valve bag</li> <li>• GDP per capita of 11.452 US\$ in 2012</li> </ul>	o
	Brazil	<ul style="list-style-type: none"> <li>• flour production of 7.013.000 tons in 2009 (about 10.9 Mio tons in 2013)</li> <li>• the members of the Brazilian Milling Association bag about 70% in bags with a capacity of 30 kg to 50 kg</li> <li>• at least 6.867.000 tons of wheat flour were bagged in industrial quantities in 2013 (the percentage which was bagged in open mouth bags is not known)</li> <li>• about 10% are transported in bulk shipments</li> </ul>	<ul style="list-style-type: none"> <li>• the commonly used bags for flour bagging are woven Propylene open mouth bags and valve bags</li> <li>• other than that there were 239 operating flour mills in 2011 nothing is known about the milling infrastructure (size of the mills etc.)</li> <li>• GDP per capita of 11.340 US\$ in 2012</li> </ul>	+

## 6 Conclusions and Prospects

### Competitors

Within the field of fully automatic high-performance bagging machines for wheat flour eleven competitors could be found. These companies provide a total of 19 competitive products with performances of more than 600 bags/hour.

A significant number of competitors are located in Italy.

These are the identified competitors:

- Arodo (Belgium)
- Bühler (Switzerland)
- Concetti (Italy)
- GEA Avapac (New Zealand)
- Haver & Boecker (Germany)
- IMECO (Italy)
- Paglierani (Italy)
- Premiartech Chronos (Canada)
- Technipes Cordano (USA)
- Thiele Technologies (USA)
- Umbra Packaging (Italy)

The most used technical solution used in competitive products are open mouth bags. Some use valve bags, but what is used only occasionally to bag powdery products in industrial quantities are form, fill and seal (FFS) solutions.

### Customers

The results from the milling survey are based on a small sample size, but they propose that the most used means for bagging wheat flour are manually or semi-automatic operated machines together with open mouth pillow bags.

The fact that eight out of 16 mills (which use a manually operated or semi-automatic bagging solution) were interested in a fully automatic machine with a performance of up to 600 bags/hour and six out of 16 mills would like to change to a fully automatic machine which can handle up to 1200 bags/hour indicate an increasing demand for this section of machinery.

## Markets

The evaluation of the potential markets can be found in the previous chapter “Summary of the Analysed and Assessed Data”.

As can be seen in Table 4, the highest evaluated countries (++) are Turkey and the United States of America.

The countries which are in the second best evaluation category (+) were France, Egypt, Nigeria, Sudan, South Africa, China, Russia, Thailand, Indonesia, Mexico and Brazil.

These results can be seen graphically on the map in Figure 57. The countries marked in different colours show the evaluation grades of experts.

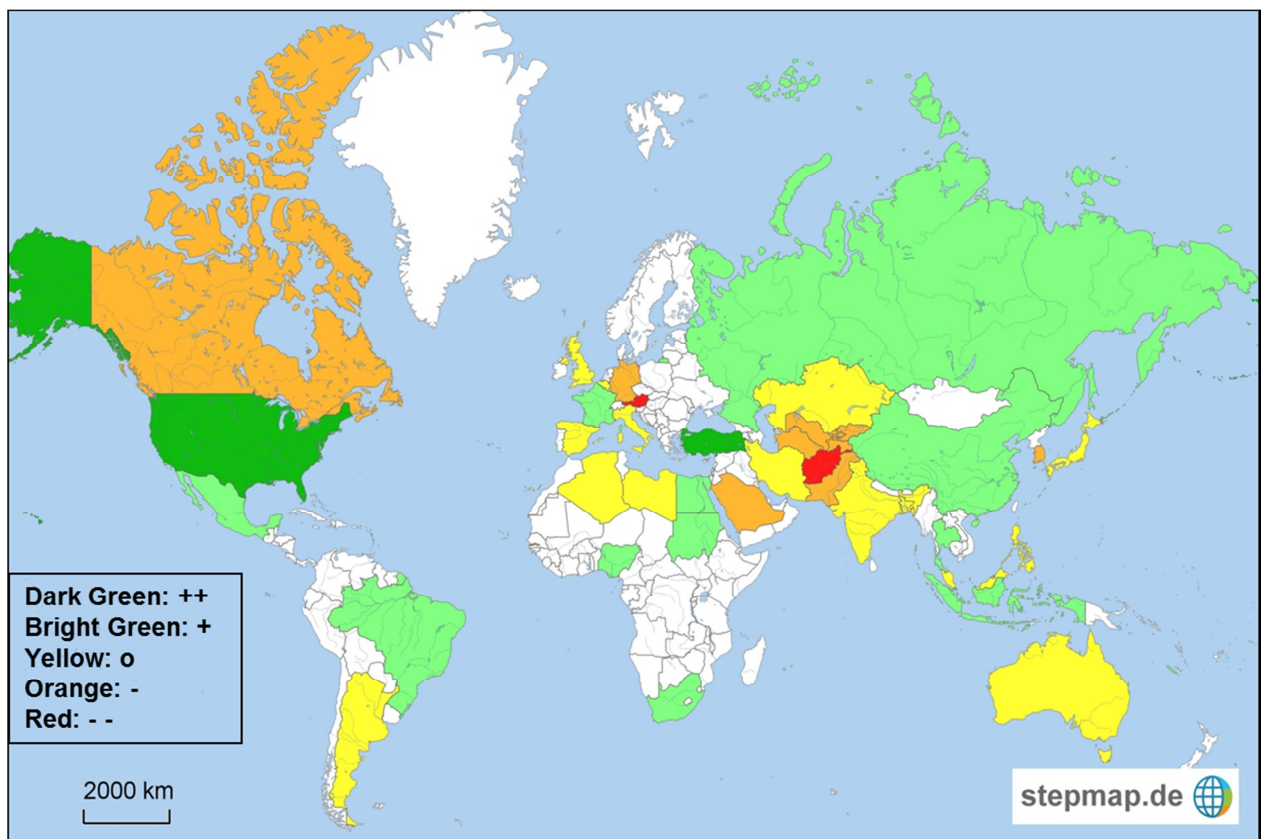


Figure 57: Country Assessment Map<sup>473</sup>

The red countries represent the worst category (--). These countries hold the least market potential for Statec Binder.

<sup>473</sup> Own Illustration

Orange countries were evaluated with (-). This means there is not much potential in these countries.

Yellow countries were neutral in the assessment scale (o). These countries hold some potential.

Bright green (+) shows countries which show even more potential. Further research has to be done in the future.

Dark green countries (++) show the most potential and got the best evaluation by all experts.

The rest (white countries) were not evaluated. In these regions no information was available. For further considerations the market entry barriers of the proposed relevant markets could be evaluated and market entry strategies could be developed.

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## 11 List of Abbreviations

ABITRIGO	Associação Brasileira da Industria do Trigo
AMA	American Marketing Association
ANMF	Association Nationale de la Meunerie Française
BCG	Boston Consulting Group
CHAMFLOUR	Chamber of Philippine Flour Millers
FAO	Food and Agriculture Organization of the United Nations
FFS	Form Fill and Seal
FIHC	Food Industries Holding Company
GAIN	Global Agricultural Information Network
GDP	Gross Domestic Product
GSFMO	Grain Silos and Flour Mill Organization
IGC	International Grains Council
NABIM	National Association of British and Irish Millers
OAIC	Office Algerien Interprofessionnel des Cereales
PAFMIL	Philippine Association of Flour Millers
PE	Polyethylene
PP	Polypropylene
SBU	Strategic Business Unit
USDA	U.S. Department of Agriculture
VFFS	Vertical Form Fill and Seal

## Appendix

### The Questionnaire from the Survey “Questionnaire for Flour Mills”

#### General Information

Name of the Company/Facility (\*)

*(text field)*

Please select your Country: (\*)

*(drop down list)*

#### Flour

How high is your average wheat flour output per year (all types, brands)? [in metric tons] (\*)

*(numerical field)*

Do you transport wheat flour as bulk goods to your customers? (Flour is not bagged but transported loose in a silo truck.) (\*)

*(check either YES/NO)*

How many tons of wheat flour or which percentage of your total wheat flour production per year do you transport as bulk goods to your customers? *(only visible if question 2 of the Flour group was answered with YES)*

*(numerical field)*

Do you bag wheat flour in industrial quantities? (Bags with a capacity of 10 kg or more.) (\*)

*(check either YES/NO)*

How many tonnes of wheat flour or percentage of your wheat flour production are bagged in industrial quantities per year? ( $\geq 10$  kg) *(only visible if question 4 of the Flour group was answered with YES)*

*(numerical field)*

#### Bags

Which bag sizes do you use for bagging wheat flour in industrial quantities? (\*) *(only visible if question 4 of the Flour group was answered with YES)*

*(more than one answer can be chosen)*

Answer III.1.1  10 – 20 kg

Answer III.1.2  20 – 30 kg

Answer III.1.3  30 – 50 kg

Answer III.1.4  > 50 kg

How many percent of the used bags have a capacity from 10 - 20 kg? (\*) *(only visible if Answer II.1.1 was checked)*

*(numerical field)*

How many percent of the used bags have a capacity from 20 - 30 kg? (\*) *(only visible if Answer II.1.2 was checked)*

*(numerical field)*

How many percent of the used bags have a capacity from 30 - 50 kg? (\*) *(only visible if Answer II.1.3 was checked)*

*(numerical field)*

How many percent of the used bags have a capacity more than 50 kg? (\*) *(only visible if Answer II.1.4 was checked)*

*(numerical field)*

Which kind of bag do you use to bag industrial quantities ( $\geq 10\text{kg}$ ) of wheat flour? *(only visible if question 4 of the Flour group was answered with YES)*

*(more than one answer can be chosen)*

Answer III.2.1  Open mouth bag Paper

Answer III.2.2  Open mouth bag Polyethylene (PE)

Answer III.2.3  Open mouth bag woven Polypropylene (PP)

Answer III.2.4  Open mouth bag Cotton

Answer III.2.5  Open mouth bag Jute

Answer III.2.6  Valve bag Paper

Answer III.2.7  Valve bag Polyethylene (PE)

Answer III.2.8  Valve bag woven Polypropylene (PP)

Answer III.2.9  Form, Fill and Seal; Polyethylene (PE) tubular

Answer III.2.10  Form, Fill and Seal; Polyethylene (PE) foil/flat film

Answer III.2.11  Other

Please categorize the Paper bags you use further: (\*) *(only visible if Answer III.2.1 was checked)*

*(more than one answer can be chosen)*

Answer III.2.a.1  Single Layer Paper

Answer III.2.a.2  Multi Layer Paper

Answer III.2.a.3  Multi Layer: Paper with Polyethylene (PE) Inliner

Answer III.2.a.4  Multi Layer: Paper, Polypropylene (PP) coated

Please categorize the woven Polypropylene bags you use further: (\*) *(only visible if Answer III.2.3 was checked)*

*(more than one answer can be chosen)*

Answer III.2.b.1  Unlaminated

Answer III.2.b.1  Laminated

Answer III.2.b.1  With Polypropylene (PE) Inliner

Which bag types do you use for bagging wheat flour in industrial quantities ( $> 10\text{ kg}$ )? (\*)

*(more than one answer can be chosen)*

Answer III.3.1  Pillow

Answer III.3.2  Gusseted

What are the bag dimensions you use for bagging wheat flour in industrial quantities? WIDTH: *(only visible if question 4 of the Flour group was answered with YES)*

*(table to fill in maximum and minimum bag widths for the different bag capacities)*

What are the bag dimensions you use for bagging wheat flour in industrial quantities? LENGTH: *(only visible if question 4 of the Flour group was answered with YES)*

*(table to fill in maximum and minimum bag lengths for the different bag capacities)*

### **Machinetype**

Which kind of bagging machine do you use to bag wheat flour in industrial quantities ( $\geq 10\text{kg}$ )? (\*) *(only visible if question 4 of the Flour group was answered with YES) (more than one answer can be chosen)*

Answer IV.1.1  Manually operated / Semi-automatic bagging machine

Answer IV.1.2  Fully-automatic single spout bagging machine

Answer IV.1.3  Fully-automatic carousel multi spout bagging machine

*Manually operated or semi-automatic means that there is at least one operator required in the bagging process (a worker attaches bags to the spout of the machine, and/or removes the bags from the spout etc.)*

*Fully automatic means no operator is required, the bags are supplied automatically from a magazine.*

Do you think about using a fully-automatic bagging machine for bagging wheat flour in industrial quantities ( $\geq 10\text{kg}$ )? (\*) *(only visible if question 4 of the Flour group was answered with YES AND Answers IV.1.2 and IV.1.3 are not checked)*

*(check either YES/NO)*

I would like to have a machine that can handle: (\*) *(only visible if question 2 of the Machinetype group was answered with YES)*

*(choose only ONE of the following answers)*

Answer IV.2.a.1  up to 600 bags/hour

Answer IV.2.a.2  up to 1200 bags/hour

Are you interested in the results of this survey? (\*)

*(check either YES/NO)*

Please state your e-mail address. The results will be sent to you. (\*) *(only visible if question 3 of the Machinetype group was answered with YES)*

*(text field)*

Notes: Questions marked with (\*) are obligational questions  
 Colour of answers: orange  
 Colour of commentary: blue

**Table 5: Rye Production Worldwide in the Year 2012<sup>474</sup>**

Rye Production worldwide 2012		
Rank	Country	Production [tons]
1	Germany	3.893.000
2	Poland	2.874.800
3	Russian Federation	2.131.519
4	Belarus	1.082.495
5	Ukraine	676.800
6	China	659.000
7	Denmark	384.400
8	Turkey	370.000
9	Canada	340.000
10	Spain	256.100
11	Austria	204.700
12	United States of America	176.390
13	France	160.300
14	Lithuania	155.393
15	Czech Republic	146.962
16	Sweden	139.900
17	Latvia	124.200
18	Democratic People's Republic of Korea	90.000

<sup>474</sup> <http://faostat.org>, date of access: 13.08.2013

19	Egypt	90.000
20	Hungary	78.000
21	Finland	64.100
22	Estonia	57.300
23	Slovakia	49.200
24	Argentina	40.000
25	Australia	40.000
26	United Kingdom	33.000
27	Italy	31.200
28	Greece	30.000
29	Bulgaria	22.000
30	Portugal	18.400
31	Romania	18.236
32	Kazakhstan	14.202
33	Bosnia and Herzegovina	10.748
34	Switzerland	10.466
35	Serbia	9.567
36	Uzbekistan	9.400
37	Netherlands	9.225
38	The former Yugoslav Republic of Macedonia	7.288
39	Luxembourg	5.700
40	Norway	5.000
41	Brazil	4.190
42	Slovenia	3.422
43	Albania	3.400
44	Belgium	3.000
45	Croatia	2.426
46	Morocco	2.400
47	South Africa	2.000
48	Chile	1.428
49	Armenia	778
50	Ireland	600
51	Montenegro	490
52	Republic of Moldova	289
53	Georgia	200
54	Tajikistan	115
56	Kyrgyzstan	104
57	Bolivia (Plurinational State of)	100
58	Ecuador	90
59	Peru	81
60	Azerbaijan	45,8
61	Mexico	20

Table 6: Top 20 Wheat Grain Importers in the Year 2009<sup>475</sup>

Top 20 Wheat Importers Year 2009				
Rank	Area	Quantity (tons)	Value (1000 \$)	Unit value (\$/ton)
1	Egypt	9.120.779	2.570.000	282
2	Italy	6.479.094	1.724.938	266
3	Spain	6.413.488	1.306.031	204
4	Algeria	5.719.728	1.830.346	320
5	Iran (Islamic Republic of)	5.460.218	1.076.053	197
6	Brazil	5.445.607	1.208.681	222
7	Netherlands	4.984.687	1.004.086	201
8	Japan	4.702.565	1.445.284	307
9	Indonesia	4.655.286	1.316.112	283
10	Germany	4.068.331	851.975	209
11	Republic of Korea	3.805.077	949.473	250
12	Nigeria	3.803.620	926.425	244
13	Belgium	3.583.802	803.496	224
14	Turkey	3.392.072	901.707	266
15	Pakistan	3.102.634	1.040.465	335
16	Philippines	3.068.268	825.273	269
17	Iraq	3.050.409	796.660	261
18	Yemen	2.798.891	733.906	262
19	Mexico	2.776.926	727.949	262
20	United States of America	2.624.679	723.367	276

Table 7: Top 20 Wheat Flour Exporters in the Year 2009<sup>476</sup>

Top 20 Exporters of Wheat Flour 2009				
Rank	Area	Quantity (tons)	Value (1000 \$)	Unit value (\$/ton)
1	Kazakhstan	2248.035	574.526	256
2	Turkey	1837.835	596.640	325
3	Argentina	961.514	301.575	314
4	France	781.132	321.004	411
5	Belgium	651.352	258.199	396
6	Germany	594.805	243.847	410
7	Russian Federation	392.489	124.699	318
8	United States of America	290.667	138.993	478
9	China	243.033	99.539	410
10	United Kingdom	185.489	103.331	557
11	Japan	185.403	58.270	314
12	Canada	177.432	113.308	639

<sup>475</sup> <http://faostat.org>, date of access: 13.08.2013

<sup>476</sup> Ibidem

13	Spain	174.749	77.315	442
14	Ukraine	174.091	40.960	235
15	Syrian Arab Republic	162.769	76.541	470
16	Italy	157.002	83.444	531
17	Serbia	156.675	42.894	274
18	Hungary	141.679	47.468	335
19	Netherlands	130.671	53.511	410
20	Australia	106.000	51.860	489

Table 8: Wheat Flour Production Worldwide in the Year 2009

Wheat Flour Production Worldwide 2009			
Countries	[tons]	Source	Comment
China	79.371.000	IGC	*2008
United States	18.808.800	UN Stat Division	
Russia	14.188.425	FAO	
Turkey	10.908.032	FAO	
Brazil	7.013.000	IGC	
Egypt	5.624.400	UN Stat Division	
France	5.394.000	UN Stat Division	
Germany	5.149.200	UN Stat Division	
Pakistan	4.870.800	UN Stat Division	
United Kingdom	4.861.000	IGC	
Argentina	4.676.400	UN Stat Division	
Japan	4.558.800	UN Stat Division	
Kazakhstan	4.552.677	FAO	
Italy	3.850.000	IGC	
Ukraine	3.754.528	FAO	
Uzbekistan	3.559.739	FAO	
Indonesia	3.325.000	IGC	
Poland	3.014.205	FAO	
Mexico	2.991.600	UN Stat Division	
Spain	2.700.000	IGC	
India	2.341.200	UN Stat Division	
Canada	2.310.000	IGC	
South Africa	2.260.000	IGC	
Australia	2.252.000	IGC	*2008
Romania	2.158.359	FAO	
Philippines	2.000.000	World Grain	
Korea, South	1.808.400	UN Stat Division	
Sudan	1.750.000	World Grain	*1.5 to 2 Million tons produced *2010
Azerbaijan	1.443.724	FAO	
Chile	1.302.000	IGC	
Belgium	1.185.000	IGC	



Peru	1.071.600	UN Stat Division	
Malaysia	889.200	UN Stat Division	
Hungary	868.598	FAO	
Tajikistan	807.387	FAO	
Taiwan	794.000	IGC	
Turkmenistan	745.526	FAO	
Bulgaria	665.246	FAO	
Kyrgyzstan	546.893	FAO	
Georgia	530.414	FAO	
Serbia	514.800	UN Stat Division	
Belarus	475.518	FAO	
Austria	456.000	UN Stat Division	
Cuba	453.600	UN Stat Division	
Slovakia	439.900	FAO	
Uruguay	400.000	World Grain	
Kenya	358.800	UN Stat Division	
Croatia	342.381	FAO	
Albania	303.267	FAO	
Senegal	297.600	UN Stat Division	
Lithuania	279.161	FAO	
Finland	267.600	UN Stat Division	
Armenia	251.547	FAO	
Moldova	226.121	FAO	
Mongolia	224.419	FAO	
Bosnia and Herzegovina	218.571	FAO	
Latvia	187.675	FAO	
Macedonia	160.014	FAO	
Bangladesh	146.400	UN Stat Division	
Slovenia	142.231	FAO	
Estonia	92.191	FAO	
Fiji	88.800	UN Stat Division	
Bolivia	67.200	UN Stat Division	
Togo	40.800	UN Stat Division	
Montenegro	26.319	FAO	
Rwanda	2.400	UN Stat Division	

Table 9: Yearly Consumption of Wheat per Capita in 2009<sup>477</sup>

Food supply quantity; Wheat, Year 2009	
Country	(kg/capita/year)
Azerbaijan	207,5
Tunisia	206,0
Algeria	199,9
Turkey	199,8
Turkmenistan	194,1
Libya	177,8
Morocco	175,4
Uzbekistan	172,7
Tajikistan	166,3
Syrian Arab Republic	162,8
Iran (Islamic Republic of)	157,1
Georgia	156,2
Kazakhstan	155,7
Egypt	145,2
Italy	144,2
Romania	138,5
Greece	138,0
Albania	131,6
Kyrgyzstan	131,2
Russian Federation	130,8
Mongolia	127,8
Jordan	125,2
Uruguay	123,6
United Arab Emirates	122,7
Ireland	119,9
Bulgaria	117,6
Lithuania	115,1
Hungary	114,8
Pakistan	110,2
Serbia	110,1
Chile	109,1
Ukraine	108,9
Poland	108,1
Israel	107,7
Croatia	107,2
Mauritania	106,4
Slovakia	106,0

<sup>477</sup> Cf. <http://faostat.org>, date of access: 24.10.2013

Belgium	105,9
Portugal	104,9
France	102,1
Norway	101,4
Denmark	100,4
Czech Republic	99,1
United Kingdom	98,6
Luxembourg	98,5
Switzerland	94,4
Slovenia	94,1
Argentina	91,8
Saudi Arabia	89,3
Spain	86,1
Estonia	86,0
Canada	85,6
Trinidad and Tobago	83,7
Dominica	81,4
Austria	81,3
United States of America	81,1
Bosnia and Herzegovina	80,7
Sweden	79,5
Australia	79,1
Germany	77,5
New Zealand	75,6
Netherlands	75,0
Finland	74,8
Iceland	68,6
China	66,4
Malaysia	65,4
Latvia	62,5
South Africa	60,9
India	57,7
Belarus	56,4
Peru	54,8
Brazil	53,5
Congo	51,3
Republic of Korea	49,5
Venezuela (Bolivarian Republic of)	48,9
Japan	48,0
Botswana	34,5
Gambia	33,8
Guatemala	33,8
Angola	32,8
Zimbabwe	32,4

Mexico	32,2
Paraguay	30,4
Nicaragua	25,5
Kenya	25,0
Philippines	23,5
Namibia	23,4
Indonesia	21,0
Nigeria	20,7
Democratic People's Republic of Korea	17,8
Ghana	17,3
Thailand	16,5
Bangladesh	16,0
Uganda	12,9
Zambia	12,8
Rwanda	10,2

**Table 10: Wheat Grain Import in the Years 2009 to 2011<sup>478</sup>**

<b>Country / Import in the Year [tons]</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
Egypt	9.120.779	10.593.506	9.800.061
Italy	6.479.094	7.477.216	7.321.062
Spain	6.413.488	4.595.206	4.355.655
Algeria	5.719.728	5.057.377	7.454.603
Iran (Islamic Republic of)	5.460.218	1.406.197	71.005
Brazil	5.445.607	6.323.216	5.740.453
Netherlands	4.984.687	5.262.085	3.906.390
Japan	4.702.565	5.475.586	6.214.220
Indonesia	4.655.286	4.810.539	5.604.861
Germany	4.068.331	3.992.310	4.410.957
Republic of Korea	3.805.077	4.384.386	4.671.336
Nigeria	3.803.620	3.971.861	4.039.669
Belgium	3.583.802	3.813.394	3.377.584
Turkey	3.392.072	2.554.189	4.754.682
Pakistan	3.102.634	94.058	21.841
Philippines	3.068.268	1.870.827	2.766.569
Iraq	3.050.409	1.854.525	2.888.833
Yemen	2.798.891	2.756.294	2.686.857
Mexico	2.776.926	3.495.480	4.047.832
United States of America	2.624.679	2.494.598	1.999.076

<sup>478</sup> Cf. [www.faostat.org](http://www.faostat.org), date of access 21.10.2013

Table 11: Wheat Flour Export in the Years 2009 to 2011<sup>479</sup>

Country / Export in the Year [tons]	2009	2010	2011
Kazakhstan	2.248.035	2.296.796	1.901.904
Turkey	1.837.835	1.899.057	2.062.730
Argentina	961.514	849.688	938.688
France	781.132	703.926	681.920
Belgium	651.352	641.307	559.791
Germany	594.805	659.965	658.676
Russian Federation	392.489	147.646	604.753
United States of America	290.667	339.934	305.772
China (Mainland + Taiwan)	243.033	287.231	297.431
United Kingdom	185.489	192.902	250.972
Japan	185.403	196.183	191.480
Canada	177.432	196.925	185.460
Spain	174.749	112.359	228.097
Ukraine	174.091	72.561	124.258
Syrian Arab Republic	162.769	60	141
Italy	157.002	153.257	154.661
Serbia	156.675	147.379	121.949
Hungary	141.679	130.003	170.454
Netherlands	130.671	101.130	91.529
Australia	106.000	108.699	51.445

Table 12: List of the Assessed Competitors

Assessment of Competitors			
Company	Country*	Website	Comment
Alapala	Turkey	<a href="http://www.alapala.com">www.alapala.com</a>	
Arodo	Belgium	<a href="http://www.arodo.be">www.arodo.be</a>	
Behn&Bates	Germany	<a href="http://www.haverboecker.com">www.haverboecker.com</a>	Subsidiary of the Haver & Boecker Group
Beumer	Germany	<a href="http://www.beumergroup.de">www.beumergroup.de</a>	
BL (Bag Line)	Italy	<a href="http://www.bl-bagline.it">www.bl-bagline.it</a>	
Bühler	Switzerland	<a href="http://www.buhlergroup.com">www.buhlergroup.com</a>	
Chrotec	Germany	<a href="http://www.chrotec.de">www.chrotec.de</a>	
Concetti	Italy	<a href="http://www.concetti.com">www.concetti.com</a>	
GD Empire	Taiwan	<a href="http://www.gd-empire.com.tw">www.gd-empire.com.tw</a>	
GEA Avapac	New Zealand	<a href="http://www.avapac.com">www.avapac.com</a>	
IMAS/Milleral	North America Turkey	<a href="http://www.imasnorthamerica.com">www.imasnorthamerica.com</a> <a href="http://www.milleral.com">www.milleral.com</a>	
IMECO	Italy	<a href="http://www.imeco.org">www.imeco.org</a>	

<sup>479</sup> Cf. [www.faostat.org](http://www.faostat.org), date of access 21.10.2013

Italpack	Italy	<a href="http://www.italpack.net">www.italpack.net</a>	
Konermaak	Turkey Kazakhstan	<a href="http://www.konermaak.com">www.konermaak.com</a>	
Möllers	Germany	<a href="http://www.moellers.de">www.moellers.de</a>	Subsidiaries: Greif (Valve Baggers), Libra (Open Mouth)
Nagasaki	Japan	<a href="http://www.nagasaki-kiki.co.jp/en">www.nagasaki-kiki.co.jp/en</a>	
Newlong	Japan	<a href="http://newlong.com/english/">http://newlong.com/english/</a>	
Paglierani	Italy	<a href="http://www.paglierani.com">www.paglierani.com</a>	
Payper	Spain	<a href="http://payper.com/">http://payper.com/</a>	
Premiertech Chronos	Canada	<a href="http://www.premiertechieq.com">www.premiertechieq.com</a>	
Sama Packaging	Pakistan	<a href="http://samaengineering.com.pk">http://samaengineering.com.pk</a>	
Technipes Cordano	U.S.A.	<a href="http://www.cordanopackaging.com">www.cordanopackaging.com</a>	
TETA Mühendislik	Turkey	<a href="http://www.tetamuh.com.tr/en/">www.tetamuh.com.tr/en/</a>	
Thiele Technologies	U.S.A.	<a href="http://www.thieletech.com">www.thieletech.com</a>	
TMI	Spain	<a href="http://www.tmipal.com">www.tmipal.com</a>	
Umbrapackaging	Italy	<a href="http://www.umbrapackaging.it">www.umbrapackaging.it</a>	
Webster Griffin	U.K.	<a href="http://www.webstergriffin.com">www.webstergriffin.com</a>	
Windmüller&Hölscher	Germany	<a href="http://www.wuh-group.com">www.wuh-group.com</a>	

\* Country of origin and/or where the company has its headquarters

**Table 13: Country List with Gross Domestic Product per Capita<sup>480</sup>**

<b>Gross Domestic Product (GDP) per Capita in selected Countries in US\$</b>				
<b>Country/Year</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>
Afghanistan	451	561	620	
Argentina	7.674	9.133	10.952	11.452
Australia	42.404	51.586	62.003	67.036
Austria	45.859	44.916	49.581	47.226
Azerbaijan	4.950	5.843	7.190	7.392
Bangladesh	598	664	732	747
Belgium	43.843	43.000	46.513	43.413
Brazil	8.373	10.978	12.576	11.340
Canada	39.659	46.212	51.554	52.219
China	3.749	4.448	5.442	6.188
Egypt, Arab Rep.	2.462	2.804	2.972	3.187
France	40.488	39.186	42.522	39.772
Germany	40.275	40.164	44.021	41.514
India	1.147	1.419	1.534	1.489
Indonesia	2.272	2.947	3.472	3.557
Iran, Islamic Rep.	4.931	5.675	6.816	
Italy	35.073	33.761	36.104	33.049
Japan	39.473	43.118	46.135	46.720
Kazakhstan	7.165	9.070	11.259	11.935
Korea, Rep.	16.959	20.540	22.388	22.590

<sup>480</sup> <http://data.worldbank.org> date of access: 25.11.2013

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Kyrgyz Republic	871	880	1.124	1.160
Libya	10.456			
Malaysia	7.278	8.729	10.012	10.381
Mexico	7.591	8.779	9.699	9.747
Nigeria	1.085	1.432	1.486	1.555
Pakistan	951	1.019	1.196	1.290
Philippines	1.832	2.136	2.358	2.587
Russian Federation	8.616	1.071	13.284	14.037
Saudi Arabia	16.013	19.327	24.116	25.136
South Africa	5.758	7.266	7.943	7.508
Spain	31.714	29.956	31.985	29.195
Sudan	1.186	1.421	1.539	1.580
Tajikistan	668	740	835	872
Thailand	3.979	4.803	5.192	5.480
Turkey	8.626	10.135	10.605	10.666
Turkmenistan	4.060	4.479	5.495	6.511
Ukraine	2.545	2.974	3.576	3.867
United Kingdom	35.331	36.233	38.961	38.514
United States	45.305	46.616	48.113	49.965
Uzbekistan	1.182	1.365	1.545	1.717