

## Internationalization Strategies in the German Dairy Industry and their Influence on the Economic Performance of Firms

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### ABSTRACT

Growing milk production, stagnating domestic consumption and ongoing liberalization of the worldwide milk market have led to the increasing export of milk and milk products out of Germany. This situation increases the competition for German dairies' market share on foreign markets. The German dairy industry, which comprises of some international corporations but also many medium sized companies, including both cooperatives and privately owned companies, therefore has to find strategies to compete successfully on international markets. This study analyses the German dairy industry in the view of different internationalization strategies and their influence on the economic success of the firms. 18 German dairy companies are analysed. We identified different internationalization strategies in reference to Perlmutter's EPRG model. To measure economic success, we analysed annual reports from the dairy companies observed over the years 2010 to 2017 and so calculated different key figures. The influence of different internationalization strategies on economic success is analysed by a random effects model where the EBIT-margin is the dependent variable in our model, representing economic success. We found out that the companies of the German dairy industry pursue different internationalisation strategies and that these have a different influence on the economic success of the companies.

*Keywords: dairy industry; internationalization strategy; economic performance; dairy sector*

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## 1 INTRODUCTION

The dairy industry has been facing a process of rapid internationalization due to trade liberalization and regional imbalances on the world milk market (Guillouzo and Ruffio, 2005; Heyder et al., 2011; Vitaliano, 2016). As a consequence, international trade flows between net exporters, such as New Zealand, the United States and the European Union, and net importers, such as China, the Middle East and Africa, have been increasing. At

the organizational level, this development has resulted in growing export activities on the part of dairy companies located in net export regions like the United States and the European Union (Vitaliano, 2016). This situation can be illustrated by a look at the German dairy sector, which has faced constant increases in milk production in the course of the last decade. During the same time period, domestic demand has remained more or less at a stalemate, leading to a growing milk surplus. This surplus had to be exported, and German dairies were increasingly forced to look for market opportunities abroad (Heyder et al., 2011).

The relevance of exports is even greater when one considers the physical amounts being exported. In 2016, German dairy companies processed 33.8 million tonnes of milk, including 2.5 million tonnes of raw milk imports from neighbouring countries. Of this, 16.6 million tonnes of milk equivalent were exported as cheese, whole or skimmed milk powder and other products, which corresponds to 49.1 % of processed milk (MIV, 2017). Thus, internationalization has become the foremost driver of industry development (Theuvsen et al., 2010). There are different strategies for internationalisation to compete for market share on foreign markets which can be employed by companies. Thereby these internationalization strategies reach from the export from the country of origin to foreign markets until multinational companies with manufacturing plants and offices all over the world. Dutch and Scandinavian dairies lead in internationalisation. Due to their limited domestic market size and high milk production volumes, they were forced to look for marketing opportunities abroad much earlier than German dairies (Theuvsen and Ebneht, 2005; Heyder et al., 2011).

Though there are numerous studies in literature which have investigated internationalization in the dairy sector, there is a research gap examining the influence of the different internationalization strategies employed by firms on their economic performance (Guillouzo and Ruffio, 2005; Heyder et al., 2011; Theuvsen and Ebneht 2005). This study will fill this gap by analysing the influence of different internationalization strategies on the economic performance of firms in the German dairy sector.

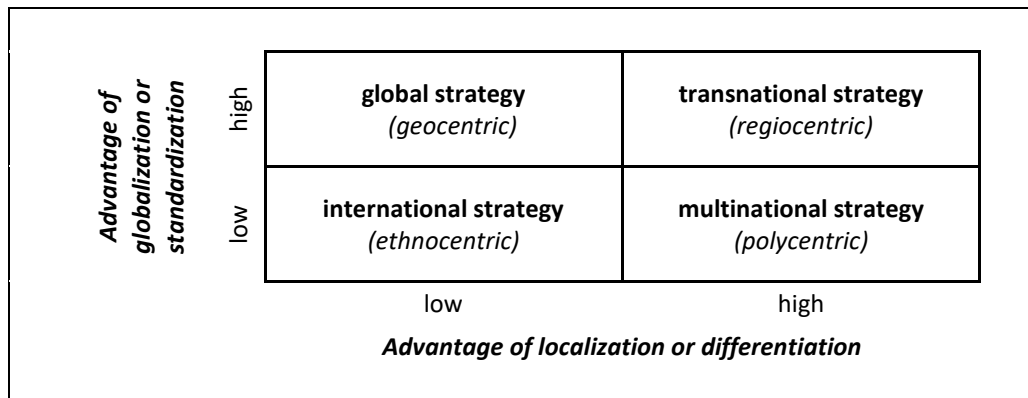
To analyse the effects of different internationalization strategies on financial performance, we examined 15 leading German dairies as well as two foreign dairies which are operating in Germany. Our sample included cooperatives as well as privately operated dairies. The data used was derived from the annual reports and annual financial statements of the companies under analysis for the years 2010 to 2016. To analyse the influence of different internationalization strategies on the economic performance of firms the different internationalization strategies of German dairies are analysed, referring to the EPRG model. To measure the influence of the different internationalization strategies on the economic performance of the considered firms, we used a random effects model to analyse our panel data.

## **2 Theoretical Background**

In the literature, internationalization is defined as the transnational transactions of an organization (Fayerweather, 1989). And the internationalization of the German dairy sector has been analysed in previous studies. Theuvsen and Ebneht (2005) analysed the degree of internalization in cooperatives in the German dairy and meat sector using different uni- and multidimensional key figures. Heyder et al. (2011) analysed the effects of internationalization on economic success in European dairy and meat cooperatives using financial report based key figures while defining the internationalization by the Degree of Internationalization (DOI). To measure economic success, they used the variables return on assets (ROA) and return on sales (ROS). Internationalization was measured using the DOI as a multidimensional key figure calculated of the foreign sales to total sales and the network spread index (NSI). They found out that the degree of internationalization has a significant positive influence on the firms economic success. Widely spread key figures for measuring economic performance are Return on Assets (ROA), Return on Equity (ROE) and EBIT margin (Qian, 2002, Vermeulen and Barkema, 2002; Thomas and Eden, 2004; Heyder et al., 2011; Chaddad and Mondelli, 2013). However, these studies did not define and distinguish between different internationalization strategies. According to Johnson et al. (2016), an internationalization strategy can be defined as the long-term alignment of a firm to compete on foreign markets with respect to resources and market shares. The competitive advantage of internationalization results from two opposing effects: advantages resulting from local adaptation and differentiation, and advantages resulting from global standardization (Johnson et al., 2016). With regard to these two dimensions, one can differentiate between four different internationalization strategies in the EPRG model, which was introduced by Perlmutter (1969). He differentiated between ethnocentric, polycentric and geocentric concepts. Later, this model was extended through the introduction of a regiocentric concept (Wind et al., 1973).

The international strategy (ethnocentric) is also described as an export strategy (Johnson et al., 2016). Subsidiaries, if there are any, are guided by the parent company and seen as additions to international business or as generators of short term profits (Magaziner and Reich, 1985). This strategy can be successfully implemented if there is a competitive advantage in the home country that cannot be achieved in the target countries for the exports (Grant and Nippa, 2006). In the multinational strategy (polycentric), subsidiaries can be led by foreign executives and are less strictly coordinated by the parent company. Thus, national strategies can be implemented and greater efficiency achieved through better adaptation to local demand preferences. Still, economies of scope and synergies resulting from internationalization are restricted when implementing this strategy (Scholl, 1989).

Figure 1: EPRG model



(Source: Authors depiction based on Holtbrügge and Welge, 2015)

The global strategy (geocentric) focuses on economies of scope. This strategy is also known as *global rationalization*. Firms try to formalize and standardize structures, processes and resources, while decision competences are centralized in the parent company. Technology is also transferred from the parent company to the subsidiaries. The advantages that result from realizing economies of scope in this strategy counter the disadvantages of a lack in adaptation to local demand preferences (Negandhi and Welge, 1984). None of the strategies described so far can combine the advantages of local adaptation and differentiation, on the one hand, with standardization and economies of scale, on the other. The transnational strategy (regiocentric) combines these two advantages of internationalization. Advantages from differentiation and standardization are analysed for each business activity. The company’s global alignment and the simultaneous country- or region-specific treatment of markets combines the advantages of the multinational and global strategies (Scholl, 1989). However, in reality, there is not always such a sharp distinction between the different approaches. As a result, firms often develop regional strategies and, in doing so, combine the global and multinational strategies (Johnson et al., 2016). In our study we will refer to Perlmutter’s EPRG model (1969) to define and distinguish the different internationalization strategies employed by the considered firms.

### 3 Data and Methods

This study is restricted to firm level data. All data used derive from the annual reports of the firms. These were either collected on the companies’ websites or in the German Bundesanzeiger<sup>1</sup>. As far as possible, annual reports from 2010 to 2017 were collected for 18 dairies. 16 of the dairies are headquartered in Germany, while two dairies are not originally from Germany. But these two companies process considerable quantities of milk in Germany and have, over time, emerged as major players in the German milk market, so they were also taken into account in this study.

To analyse the influence of different internationalization strategies on the economic performance of firms, we first defined the internationalization strategy for each of the considered firms, referring to Perlmutter’s EPRG model (1969). Different relative and absolute, unidimensional and multidimensional key figures were used to analyse the firms’ financial performances and the development of their international businesses in relation to their varying internationalization strategies.

<sup>1</sup> The German Bundesanzeiger publishes the annual financial reports of German corporations (www.bundesanzeiger.de)

To measure the influence of the different strategies on the economic success of the firms, the profitability measure has to be defined. A widely used profitability measure is the profit margin or return on sales (Qian, 1994; Capar and Katobe, 2003; Li, 2007; Heyder et al., 2011). We use the Earnings Before Interest and Taxes (EBIT) as profitability measure because two dairies are headquartered in foreign countries and therefore do not refer to the German accounting standards in their annual reports. Thus different taxes and level of taxes might bias the results if we were to take them into account. EBIT is a widely used performance indicator because it separates the firm management's financing decisions from the fundamental earning potential of the firm (Kean and Baumann, 2003; Heyder et al., 2011). To make the data of different sized companies comparable we use the EBIT margin (EM) as variable to measure the economic performance of firms. It is calculated as the ratio of EBIT and turnover.

$$EBIT \text{ margin} = \frac{EBIT}{\text{Turnover}}$$

To measure the influence of the different internationalization strategies on the economic performance we implemented the dummy variable "Internationalization Strategy". We coded this with "0" if the company pursues the "international strategy" and with "1" if the company pursues the multinational strategy.. To isolate the relationship and influence of the different internationalization strategies on the firm's economic performance, it is important to control for other variables that are likely to affect the economic performance (Qian, 2002). To isolate the influence of the different internationalization strategies on firm performance we added proxy variables for the firms size, debt level, product price, number of brands, as well as dummy variables for the organizational form and for the products the firms are producing.

Our first control variable is the firm size. Therefore we use the overall turnover of the considered. We use firm size as an independent variable in the model as a surrogate for competitiveness and the firm's advantage within the industry (Qian, 2002; Heyder et al., 2011). As second control variable we use the debt level, whereby we use the "Gearing Ratio" which is calculated as ratio of debt capital and the firm's equity (HURDLE 1974). For comparison we use the liabilities to credit institutes as long term debts. It is a proxy for the ability of a firm to meet long term interests and principal payments on debt, but is also a measure for the financial risk of the firm, which is increasing with a higher gearing ratio (Qian 2002). As third control variable we implemented the FAO Food Price Index for dairy products, as we expect that profitability will increase *ceteris paribus* with increasing product prices. To control for the influence of the firms' organization we implement the dummy variable "Legal Form" in the model. It differs between "private" (code = 1) and "cooperative" (code = 0) to control for the influence of the organizational form on the economic performance. This is important, especially in the German dairy industry, which is characterized on the one hand by a large dairy cooperative and, on the other hand, by many medium sized cooperative and private dairies (Theuvsen and Ebneth, 2005). Thus dairies are often linked to poorer economic performance, compared to privately owned competitors, due to conflicting goals of the dairy and its members, a lack of management competences and so on (Anderson and Henehan, 2005). In order to check the influence of the product portfolio of the companies on their profitability, dummy variables for the product categories "fresh milk", "fresh milk products", "dried milk products", "cheese" and "butter" were included in the model.

Due to the non-existence and in large parts very incomplete data on the quantity of milk consumed and processed as well as other intermediate products and also no complete and comparable data on output quantities, it is not possible to investigate the effects of different productivity ratios on the economic success of companies, even if there are clear indications in the literature of their influence (Helpman et al., 2003). To analyse our micro panel data we use the Stata 15 software. Due to the time invariant variables such as the dummy variable "organizational form" or the internationalization strategies, no fixed effects model can be used for analysis, as these variables would be omitted automatically. To test whether a pooled OLS regression or a random effects model should be used to analyse the panel data, a Breusch-Pagan Lagrange multiplier test was performed. Since we can reject the null hypothesis that there are no significant differences between the entities (no panel effect), we use a random effects model for the analysis of our panel data set.

$$Y_{it} = \mu + X_{it}\beta_{it} + (\alpha_i + \varepsilon_{it})$$

Thereby  $Y_{it}$  is the dependent variable of firm  $i$  at time  $t$ .  $\mu$  denotes the intercept term,  $\beta_{it}$  is the coefficient for the independent variable  $X$  of firm  $i$  in period  $t$ .  $\alpha_i$  is the first, time-invariant term of the error term, while  $\varepsilon_{it}$  denotes the remainder component of the error term which is uncorrelated over time (Verbeek, 2004).

## 4 Results

### 4.1 Internationalization strategies in the German dairy industry

Referring to Perlmutter's EPRG model (1969), we can identify three different internationalization strategies followed by the firms in this study. Ten of the firms—the majority—employ the international strategy (Table 1). Seven are cooperatives, and the other three are privately owned. All ten firms are characterized by the fact that they have processing facilities only in Germany. Some of these firms do have subsidiaries in foreign countries. The number of countries in which they operate subsidiaries ranges from 1 (frischli, Omira, Uelzana, Rucker Wismar) to 10 (DMK) in 2017. But these subsidiaries are only engaged in marketing and distribution but do not process milk. On average the firms in this group had subsidiaries in 3 countries including Germany.

Table 1: Overview of analysed firms

Strategy/Firms name	Country of origin	Legal Form	No. of countries with subsidiaries (2017)*	No. of brands (2017)	FSI (2017)
<b>International strategy</b>					
Ammerland	Germany	cooperative	5	1	40.8%
Bayernland	Germany	cooperative	2	2	43.0%
BMI	Germany	cooperative	3	6	44.2%
DMK	Germany	cooperative	10	11	43.1%
frischli	Germany	private	1	6	18.4%
Goldsteig	Germany	cooperative	2	2	32.9%
Käserei Champignon	Germany	private	5	10	40.0%
Omira	Germany	cooperative	1 <sup>1</sup>	6 <sup>1</sup>	37.2% <sup>1</sup>
Rücker Aurich	Germany	private	2	1	47.7%
Rücker Wismar	Germany	private	1	1	0.0%
Uelzena	Germany	cooperative	1	8	19.5%
∅			3.0	4.9	33.3%
<b>Global strategy</b>					
Hochwald	Germany	cooperative	5	15	45.6%
Zott	Germany	private	10	16	56.5%
∅			7.5	15.5	51.1%
<b>Multinational strategy</b>					
Arla	Denmark	cooperative	44	30	75.3%
Ehrmann	Germany	private	8	16	49.7%
FrieslandCampina	Netherlands	cooperative	30	46	76.6%
Hochland	Germany	private	8	6	58.1%
Meggle	Germany	private	20	1	50.3%
∅			22.0	19.8	62.0%

\* including Germany <sup>1</sup>2016

(Source: Ammerland, 2018; Bayernland, 2018; BMI, 2018; DMK, 2018; frischli, 2018; Goldsteig, 2018; Käserei Champignon, 2018; OMIRA, 2018; Rücker, 2018; Uelzena, 2018; Hochwald, 2018; Zott, 2018; Arla, 2018; Ehrmann, 2018; FrieslandCampina, 2018; Hochland, 2018; Meggle, 2018)

Therefore, foreign sales only result from export activities out of Germany. In average the dairies employing the international strategy had 4.9 brands in 2016, but the number reaches from 1 to 11. The foreign sales index (FSI), measured as foreign sales to total sales, was 33.3 % on average in 2017 in this group, and it ranges from 0 % at Rücker Wismar to 47.7 % at Rücker Aurich. Two of the firms in the study, one cooperative and one privately owned company, have implemented a global strategy. These firms operate processing facilities

outside Germany, which are located in neighbouring countries. On average these firms have subsidiaries in 7.5 countries. Although some national brands are used in foreign countries, the relevant firms have introduced special brands for their foreign markets. On average these firms have 15.5 national and international brands to adapt to market demands. The short distance from Germany to the neighbouring countries ensures great control to the parent company where decision competences are located. In 2017 the average FSI in this group was 51.1 %, whereby the FSI of Zott (56.5 %) was higher than that of Hochwald (45.6 %).

The third group, consisting of five firms, uses the multinational strategy. These firms have processing locations in several countries, some of which are far from their domestic market. On average the firms employing the multinational strategy had subsidiaries in 22 countries in 2017. These firms manage several brands for the markets they supply. On average this group of firms had 19.8 brands in 2017, and the number reaches from 1 at Meggle to 46 at FrieslandCampina. Of these five firms, two are cooperatives, and three are privately owned. Two firms are not originally from Germany: FrieslandCampina is based in the Netherlands, and Arla's home country is Denmark. It should be pointed out that these two firms are the only two cooperatives in the group employing a multinational strategy. The three firms headquartered in Germany that follow a multinational strategy—Ehrmann, Hochland and Meggle—are privately owned and based in the south of Germany. The average FSI in this group was 62%, whereby it ranges from 49.7% (Ehrmann) to 76.6 % (FrieslandCampina). Because of the greater geographical distance and more complex firm structure, the management of these firms is influenced – as can be seen for example at FrieslandCampina which, since 2016, has been managing its activities in China through a new business group “Consumer Products China” since 2016 (FrieslandCampina 2016).

#### 4.2 Empirical results

Table 2, below, shows the development of the EBIT margin (EM), turnover (T) and gearing ratio (GR) of the firms considered in this study. Some data were not available. Data for DMK for the years 2010 and 2011 are not available because DMK was only founded in 2012. For Bayernland eG, the consolidated financial statements are only available from 2013 onwards. In the preceding years, only the financial accounting information of the individual firms which merged into Bayernland eG is available, but these are not comparable to consolidated financial statements. Data for Omira are only available until 2016, as the dairy was taken over by the French Lactalis Group in 2017.

The small group of firms that employ a global strategy had an average EBIT margin of 1.1% in 2017 (Zott: 1.4%; Hochwald: 0.8%). This margin decreased by 1.1 percentage points on average from 2010 to 2017. During the observed period the average EBIT margin in this group was 2.7%. Zott's average EBIT margin was 4.7% — noticeably higher than that of Hochwald (0.8%).

The average EBIT margin in the group of firms that use a multinational strategy increased from 3.5% in 2010 by 0.1 percentage points to 3.6% in 2017. The most profitable companies in 2017 were Hochland (4.9%), FrieslandCampina (4.3%) and Arla (3.7%). The lowest EBIT margins in this group were seen at Meggle (3.8%) and Ehrmann (3.2%). Over the observed time period, the average EBIT margin in the group of firms employing the multinational strategy was 3.9%. Regarding the EBIT margin, and thus the economic performance of firms, we find the highest average EBIT margins over the observed time period in the group of firms employing the multinational strategy (3.9%), followed by those employing the global strategy (2.7%) and then employing the international strategy (1.4%). Thereby the average EBIT margin increased from 2010 to 2017 only in the group of firms employing the multinational strategy (+0.1 percentage points) while it decreased in the group of firms following the global strategy (-1.1 percentage points) and in the group of firms following the international strategy (-0.5 percentage points).

One of the control variables taken into account in this study is the overall turnover of the firms. The firms employing the international strategy had an average turnover of € 782.8 million in 2010 whereby it increased by € 267.6 million to € 1,050.4 million in 2017. The highest turnovers in 2017 can be seen at the DMK (€ 5.8 billion), followed by Ammerland (€ 889.5 million), the lowest at Rucker Wismar (€ 171.5 million) and Käserei Champignon (€ 345.5 million) in 2017. Over the observed time period the average turnover was € 896.4 million in this group of firms. The two firms that implemented a global strategy had an average turnover of € 1.3 billion (Zott € 1.0 billion; Hochwald: € 1.5 billion) in 2017. The average turnover of € 958.5 million in 2010 increased by € 309.3 million to € 1.3 billion in 2017. Over the observed time period the average turnover was € 1.1 billion in the group of firms following the global strategy. The average turnover in

the group of firms following the multinational strategy in 2017 was € 5.1 billion. It increased by € 1.5 billion since 2010. The highest turnovers in 2017 can be observed at FrieslandCampina (€ 12.1 billion), Arla (€ 10.3 billion) and Hochland (€ 1.4 billion), while the lowest can be seen at Ehrmann (€ 767.1 million) and Meggle (€ 958.0 million). Over the observed time period the group of firms employing the multinational strategy had an average turnover of € 4.5 billion.

Table 2: Development of EBIT margin (EM), turnover (T) and gearing ratio (GR) for dairy firms with different internationalization strategies

Strategy/Firms name	EBIT margin 2010	EBIT margin 2017	EBIT margin $\bar{\phi}$ 2010-2017	Turnover 2010 (m. €)	Turnover 2017 (m. €)	Turnover $\bar{\phi}$ 2010-2017	Gearing Ratio 2010	Gearing Ratio 2017	Gearing Ratio $\bar{\phi}$ 2010-2017
<b>International strategy</b>									
Ammerland	1.5%	1.0%	1.2%	489.9	889.5	672.9	143.5%	159.4%	137.4%
Bayernland	1.0% <sup>2</sup>	0.5%	0.9%	786.7 <sup>2</sup>	685.3	699.7	224.0% <sup>2</sup>	220.9%	210.0%
BMI	3.8%	0.7%	2.3%	420.1	622.8	535.3	496.3%	182.7%	241.9%
DMK	1.4% <sup>1</sup>	1.1%	1.5%	4438.5 <sup>1</sup>	5,795.6	5,089.8	179.4% <sup>1</sup>	221.1%	186.2%
frischli	0.0%	1.9%	1.1%	379.1	573.4	449.2	164.1%	206.4%	184.1%
Goldsteig Käserei	1.8%	2.8%	2.2%	357.2	496.2	444.4	264.9%	191.5%	202.3%
Champignon	2.8%	-0.2%	3.1%	302.6	345.5	345.5	193.4%	210.5%	191.7%
Omira	0.5%	0.6% <sup>3</sup>	0.2%	503.1	420.1 <sup>3</sup>	548.3	130.9%	141.1% <sup>3</sup>	186.1%
Rücker Aurich	0.1%	0.7%	0.7%	365.1	374.8	383.2	680.9%	443.2%	526.2%
Rücker Wismar	2.8%	2.1%	0.8%	188.9	171.5	183.6	450.9%	756.8%	657.3%
Uelzena	1.6%	2.1%	1.9%	379.8	703.0	508.4	289.0%	156.0%	232.5%
$\bar{\phi}$	<b>1.6%</b>	<b>1.1%</b>	<b>1.4%</b>	<b>782.8</b>	<b>1,050.4</b>	<b>896.4</b>	<b>276.2%</b>	<b>262.7%</b>	<b>268.7%</b>
<b>Global strategy</b>									
Hochwald	0.5%	0.8%	0.8%	1,162.5	1,534.2	1,386.9	175.7%	218.0%	221%
Zott	3.8%	1.4%	4.7%	754.4	1,001.4	879.0	317.8%	217.9%	244%
$\bar{\phi}$	<b>2.2%</b>	<b>1.1%</b>	<b>2.7%</b>	<b>958.5</b>	<b>1,267.8</b>	<b>1,133.0</b>	<b>246.8%</b>	<b>218.0%</b>	<b>232.7%</b>
<b>Multinational strategy</b>									
Arla	3.4%	3.7%	3.7%	6,577.6	10,338.0	9,133.9	246.1%	171.1%	237.9%
Ehrmann	1.9%	3.3%	3.2%	582.6	767.1	710.6	79.0%	104.8%	122.0%
FrieslandCampina	4.8%	3.7%	4.3%	8,972.0	12,110.0	10,756.1	170.2%	157.6%	169.0%
Hochland	2.3%	4.8%	4.9%	1,055.0	1,445.9	1,202.8	51.4%	52.3%	50.8%
Meggle	5.0%	2.6%	3.5%	725.3	958.0	929.1	176.8%	171.5%	165.7%
$\bar{\phi}$	<b>3.5%</b>	<b>3.6%</b>	<b>3.9%</b>	<b>3,582.5</b>	<b>5,123.8</b>	<b>4,546.5</b>	<b>144.7%</b>	<b>131.5%</b>	<b>149.1%</b>

<sup>1</sup>2012 <sup>2</sup>2013 <sup>3</sup>2016

(Source: Ammerland, 2018; Bayernland, 2018; BMI, 2018; DMK, 2018; frischli, 2018; Goldsteig, 2018; Käserei Champignon, 2018; OMIRA, 2018; Rücker, 2018; Uelzena, 2018; Hochwald, 2018; Zott, 2018; Arla, 2018; Ehrmann, 2018; FrieslandCampina, 2018; Hochland, 2018; Meggle, 2018)

With regard to the turnover of the companies, we find clear differences between the pursued internationalization strategies. The firms following the international strategy show the lowest average turnover in 2017 (€ 1,050.4 billion) followed by the firms employing the global strategy with an average turnover of € 1.3 billion in 2017. The average turnover in both groups increased comparably by 34.2% in the group of firms following the international strategy and 32.3% in the group of firms following the global strategy in the 2010 to 2017 time period. The highest average turnover can be seen at the group of firms following the multinational strategy. In 2017 it was € 4.5 billion, increasing 43% from 2010.

Another control variable is the gearing ratio. The group of firms following the international strategy had an average gearing ratio of 276.2% in 2010 which decreased by 13.5 percentage points to 262.7% in 2017. After that, the highest values in 2017 can be observed at Rücker Wismar (756.8%) and Rücker Aurich (443.2%), while

the lowest can be seen at OMIRA (141.1 %) and Uelzena (156.0 %). Over the observed time period the average gearing ratio of this group of firms was 268.7%. The firms employing the global strategy had an average gearing ratio of 218.0% in 2017, with nearly exact gearing ratios at Hochwald (218.0 %) and Zott (217.9 %). The average gearing ratio over the observed time period in this group of firms was 232.7%. On average the gearing ratio in this group of firms decreased by 28.8 percentage points from 2010 to 2017. The group firms employing the multinational strategy had an average gearing ratio of 131.5% in 2017 which decreased by 13.2% from 2010 to 2017. The highest gearing ratios within this group of firms in 2017 can be observed at Arla (237.9%), FrieslandCampina (169.0%) and Meggle (165.7%), while the lowest can be seen at Ehrmann (122.0%) and Hochland (50.8 %). Over the observed time the average gearing ratio in this group of firms was 149.1 %.

Regarding the gearing ratios we find the highest values on average over the observed time in group of firms following the international strategy (268.7%), followed by the firms employing the global strategy (232.7%) and that employing the multinational strategy (149.1%). In all groups the gearing ratio decreased from 2010 to 2017. The strongest decrease can be observed in the group of firms employing the global strategy (-28.8 percentage points), followed by the firms with a international strategy (-13.5 percentage points) and multinational strategy (-13.2 percentage points).

**4.3 Relationship between internationalization strategies and economic performance**

Table 3 shows the correlation coefficients of the variables used in the model. As the results show there is not too strong correlation between the coefficients to expect substantial problems with multicollinearity. Moreover, Stata would have omitted the variables in case of too strong multicollinearity. Further descriptive statistics on the variables can be seen in Table 1 in the Appendix.

Table 3: Correlation analysis

	1	2	3	4	5	6	7	8	9	10	11
1 EBIT-margin	1										
2 Intern. Strategy	,520**	1									
3 Legal Form	,191*	,175*	1								
4 Turnover	,302**	,540**	-,388**	1							
5 Gearing Ratio	-,143	-,289**	,163	-,113	1						
6 Dairy-Price-Index	-,078	,009	,013	-,004	-,022	1					
7 Fresh milk	-,040	-,156	-,506**	,409**	-,159	,011	1				
8 Fresh milk products	,004	,079	-,527**	,265**	-,329**	,041	,609**	1			
9 Cheese	,034	-,168*	-,389**	,158	,156	-,005	,016	-,211*	1		
10 Dried milk products	,004	-,190*	,038	-,145	-,135	,005	,108	,249**	-,219**	1	
11 Butter	-,128	,008	-,652**	,318**	-,006	-,012	,154	,332**	,438**	,299**	1

\*p<0.05 \*\*p<0.01

Table 4 shows the results of our random effects estimation. The regression results of our random effects model show a positive, highly significant influence of the multinational strategy on the economic success of firms analysed in this study with a coefficient of 2.578 as shown in table 4. The Dairy-Price-Index has a negative significant effect on the firms economic success. However, the coefficient of -0.008 shows that there is nearly no real impact on the firms economic performance due to a change in the global dairy price index. The production of cheese ha a positive, high significant influence on the EBIT-margin of the analysed firms as the coefficient of 2.785 indicates. In addition, the production of dried milk products also has a positive effect on the economic performance of the firms surveyed, as can be seen from the significant coefficient of 1.342. Against this the production of butter significantly influences the firms economic performance in a negative way as can be seen at the coefficient of -2.029.

The overall R-squared of our model is 0.4668, meaning that 46.7% of observations can be explained by our model. Our analysis shows no significant influence of the organizational form on the economic success of the companies. Nor does the size of the company have any influence on the economic success of the 18 companies we examined over the period under review. We have checked the result in further calculations. Even if, for example, we exclude the internationalization strategy as a control variable, as it correlates relatively strongly



with sales at 0.54, we found no significant influence of the company size on the economic success of the companies.

Table 4: Results of the random effects estimation

EBIT margin	Coef.		Std. Err.	P>z
Intern. Strategy	2.578	***	0.858	0.003
Legal Form	0.151		0.955	0.875
Turnover	0.000		0.000	0.637
Gearing Ratio	0.001		0.001	0.238
Dairy-Price-Index	-0.008	**	0.004	0.022
Fresh milk	-0.165		0.669	0.805
Fresh milk products	0.764		0.765	0.317
Cheese	2.785	***	1.049	0.008
Dried milk products	1.342	*	0.731	0.067
Butter	-2.029	**	0.905	0.025
Constant	0.166		1.565	0.916

\*p<0.1 \*\*p<0.05 \*\*\*p<0.01

R-squared: within = 0.0609, between = 0.7571, overall = 0.4668; Wald chi2(10) = 34.03; Prob>chi2 = 0.0002

The gearing ratio of the companies also has no statistically significant influence on the economic success of the companies. Due to multicollinearity problems with turnover, we were unable to examine the influence of the FSI and the number of brands on corporate success. As with sales, however, we found no real effect on corporate success in further calculations if we used these variables as control variables for turnover.

## 5 Discussion

The analysis shows clear positive effects of the multinational strategy on the economic performance of the considered firms compared to the international strategy. Higher performance in this case also includes a risk premium for investing abroad (Busse and Hefeker, 2007). This result is supported by the study of Heyder et al. (2011) and Qian (2002) who showed positive influence of internationalization on the economic performance of firms. The results of Helpman et al. (2003) also underline the results of the study. According to the study, only the most productive companies serve foreign markets through foreign direct investments and local subsidiaries. Although the data basis does not allow us to measure productivity directly, we can assume that the higher productivity of the companies is reflected in the higher EBIT margins.

With regard to key figures, the global strategy is, as observed above, “stuck in the middle” between the international and multinational strategies. This can be explained by the Process Model of Internationalization described by Meißner and Gerber (1980). In this model, internationalization is seen as a multi-step process in which companies incrementally transfer capital and management from their country of origin to subsidiaries in foreign countries. Based on this theory, adopting a global strategy would be a step on the way from an international strategy to a multinational strategy, which is also reflected in key performance figures.

How can we explain the results and what do we learn from them? According to the theory of the management of multinational enterprises, a firm should use exports if doing so offers an advantage compared to its home country (Grant and Nippa, 2006). Because many export products, such as butter and milk powder, are undifferentiated and therefore compete through price margins which are likely to be low. Furthermore, more differentiated milk products, such like yoghurt, drinks and fresh cheese are often limited in exporting over great distances or have higher demands in regards to durability. Firms employing the multinational strategy are not limited by durability and thus seem better equipped to fully exploit the potential of foreign markets, since they can better adapt to local demand conditions and build brands for local markets that will lead to higher turnovers (Harzing, 2000). We can see the highest number of brands at the firms employing the multinational strategy (table 1) – underlining this result. This is also underlined by the results of Qian 2002 who showed the positive interactive effects of multi-nationality and product diversification on the economic performance of firms.

An aspect that limits the implementation of a multinational strategy is its factor demands. These, of course, include a higher capital demand compared to other strategies, especially the international strategy, which is based mainly on exports, but also on soft factors such as management competencies as well as the availability of sufficient marketing, distribution and sales resources (Grant and Nippa, 2006; Theuvsen et al., 2010). Therefore, the sunk costs of foreign investments in subsidiaries are higher than those of simple exports, but the per unit costs are also lower than those of simple exports (Helpman et al., 2003). It is therefore not surprising that the multinational strategy is employed by the on average larger firms considered in this study. However, in regards to capital demands, it is surprising that the companies employing the multinational strategy have the lowest average gearing ratios, in contrast to the other groups. Referring to the literature, one would expect higher gearing ratios in this group of dairies due to higher capital demands. Furthermore, the high number of brands within this group would expect a higher gearing ratio, compared to others, as there are higher production, marketing and legal costs for branding (Onkvisit and Shaw, 1989).

Interestingly, the price index for dairy products has no significant positive impact on the economic situation of dairy companies. This does not seem comprehensible at first, since rising product prices would, *ceteris paribus*, lead to the assumption of higher revenues and greater economic success. However, dairies will pass on a substantial part of the higher prices to their farmers in the form of higher prices for raw milk. Furthermore, for many products, contracts are often concluded with customers for a certain period of time. Assuming that a company still has to service old contracts from a period of poor prices, but at the same time has to increase the payout prices to its suppliers in order to follow with the companies in its neighbourhood, this can have a negative impact on economic success. The same applies, of course, the other way around, when prices for dairy products are falling, when contracts from times of high prices are still being served, but the payout price is already falling at the same time.

Compared to other studies, however, we found no significant influence of the different legal forms of companies on economic success. Other studies (Ebneht, 2006, Anderson and Henehan 2005, Jürgens et al., 2015) point to the poorer economic performance of cooperatives compared to private companies and corporations. This is justified in the studies by corporate governance deficits (Ebneht, 2006, Anderson and Henehan, 2005) as well as by the focus on less differentiated mass products with little added value (Jürgens et al., 2015). On the other hand, we can confirm the results of et al. 2015 to the effect that all German cooperative dairies, with the exception of Hochwald, focus on simple exports. The two cooperative dairies pursuing the multinational strategy are Arla and FrieslandCampina and thus two cooperatives from abroad. This might be due to the small domestic market of these dairies. But this alone does not explain why these dairies built up production plants worldwide and merged with foreign companies (Ebneht, 2006).

However, there are likely to be more factors that influence the economic performance of firms, such as product spectrum and competitive strategy that have not been considered in this study. In addition, the sample size is rather small due to non-availability of data. Indeed, the dairy companies headquartered in Germany considered in this study represent 60% of the total turnover of the German dairy industry and their foreign sales amount for 90.4% of the total foreign sales of the German dairy industry (Destatis, 2018). Future studies should be extended to other countries to check for the robustness of the results as far as data are available. Nevertheless, internationalization and thus the right internationalization strategy will become more important. OECD and FAO forecasts predict 73% of future milk production growth in China and Asia until 2025, while sales of fresh dairy products will increase versus concentrated products such as butter and cheese (OECD and FAO 2016). This development can further favour the multinational strategy through localization – a fact that can be seen in the German dairy market's exports. Although the member states of the European Union are by far the most important customers of German dairy products across all dairy products, there are clear differences between the individual product groups. For example, exports of concentrated milk products to the European Union amounted to 67.3%, while exports of fresh products like buttermilk, curdled milk and yoghurt to the European Union accounted for 91.8% (Trademap, 2018).

In addition to these "hard facts", the implementation of a multinational strategy can offer a further advantage. By producing "locally", the criticism of food exports from industrialized countries can be avoided, especially in many developing countries. A prerequisite, however, is a certain degree of professionalism in existing milk production and, if necessary, support from politicians and administrations in these countries.

## 6 Conclusion

The study shows that there are significant differences regarding the influence of the different internationalization strategies on the firm's economic performance. The results show a positive influence of the multinational strategy on the economic performance, compared to the other observed strategies. Therefore, we can conclude that dairy companies can gain economic advantages from localization and market adoption when internationalizing. Despite its higher requirements, especially of capital and management of the multinational strategy, these pay off in the form of higher economic performance.

In the future, internationalization and thus the right internationalization strategy will become more important as OECD and FAO forecasts predict 73% of future milk production growth in China and Asia until 2025, while sales of fresh dairy products will increase versus concentrated products such as butter and cheese (OECD and FAO, 2016). In addition, increasing requirements with regard to animal husbandry and environmental protection lead to rising costs in domestic production. Although these additional costs on the domestic market can be partially offset by price premiums, e.g. for animal welfare standards, on the international, often price-oriented markets, this is by no means certain. Against this backdrop, German cooperative dairies in particular should review their internationalization strategy.

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## Appendix

Table 1: Descriptive Statistics

Variable		Mean	Std. Dev.	Min	Max	Observations
ID	overall	9.54	5.28	1	18	N = 138
	between		5.34	1	18	n = 18
	within		0	9.54	9.54	T-bar = 7.67
Year	overall	4.57	2.27	1	8	N = 138
	between		0.44	4	6	n = 18
	within		2.24	1.07	8.07	T-bar = 7.67
EBIT-margin	overall	2.33	1.98	-5.2	8.7	N = 138
	between		1.50	0.2	4.8625	n = 18
	within		1.323685	-3.70	6.28	T-bar = 7.67
Internationalization- Strategy	overall	0.29	0.46	0	1	N = 138
	between		0.46	0	1	n = 18
	within		0.00	0.29	0.29	T-bar = 7.67
Organization	overall	0.46	0.50	0	1	N = 138
	between		0.51	0	1	n = 18
	within		0	0.46	0.46	T-bar = 7.67
FSI	overall	42.45	18.63	0	78	N = 138
	between		18.43	0	76.4	n = 18
	within		3.16	32.50	50.57	T-bar = 7.67
Gearing Ratio	overall	229.82	180.05	47.1	1790.80	N = 137
	between		141.32	50.85	657.27	n = 18
	within		117.64	-82.25	1363.35	T-bar = 7.67
Dairy-Price-Index	overall	201.18	30.24	153.77	242.75	N = 138
	between		1.69	196.13	201.60	n = 18
	within		30.21	153.35	247.80	T-bar = 7.67
Fresh Milk	overall	0.52	0.50	0	1	N = 138
	between		0.50	0	1	n = 18
	within		0.12	0.15	1.15	T-bar = 7.67
Fresh Milk Products	overall	0.75	0.44	0	1	N = 138
	between		0.43	0	1	n = 18
	within		0.12	0.12	1.12	T-bar = 7.67
Cheese	overall	0.88	0.32	0	1	N = 138
	between		0.32	0	1	n = 18
	within		0	0.88	0.88	T-bar = 7.67
Dried Milk Products	overall	0.73	0.44	0	1	N = 138
	between		0.46	0	1	n = 18
	within		0.00	0.73	0.73	T-bar = 7.67
Butter	overall	0.59	0.49	0	1	N = 138
	between		0.50	0	1	n = 18
	within		0.00	0.59	0.59	T-bar = 7.67