Reconstruction of empirical strategies using content analysis - an application to the dairy industry

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The empirical accessibility of company strategies is limited due to the lack of observability and the risk of counter-attacks by competitors. Nevertheless, companies communicate strategically relevant information, for example in the media. We use 3,832 pieces of information and suggest a mixed methods approach to learn more about the reconstruction of strategies. First, we perform a qualitative content analysis. Based on this, we are able to provide various quantitative evaluation possibilities. The dairy sector of a country serves as an example sector. On the basis of our data, we can derive various statements about the nature of the strategies pursued and the consistency of their application. Our approach offers the opportunity to test existing hypotheses of strategic research and to develop new hypotheses.

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Keywords: strategic management, empirical methods, content analysis, mixed methods, food manufacturing

Introduction

Firms in the value chain for food are facing increasing competition within the sector through internationalization and liberalization as well as increasing pressure from upstream and downstream companies. The growing importance of product quality and differentiation as well as tendencies towards more concentration, and vertical coordination are further important trends (Sexton, 2012). These developments offer new opportunities and simultaneously demand new strategies of the involved participants. The increasing interweaving and manifold observable concentration tendencies put not only the own actions but also the actions of the competitors in the interest of the firms. These oligopolistic structures are characterized by an interdependence of entrepreneurial decisions and thus require consideration of the plans of action of the different market participants in the decision-making process of individual companies. In contrast to the model of perfect competition, oligopolistic market structures, in cooperation with different resource potentials, technological conditions, and existing market entry barriers, create scope for action among established companies. Strategic advantages can arise through anticipation of what the

other market participants will do (Levine, Bernard, and Nagel, 2017). The question arises as to how companies and researchers can observe the empirical strategies of these companies.

The principal-agent relationship between manager and owner, as well as the competition from rival firms, suggest that strategies should be kept secret in order to maintain the freedom of action. At the same time, a considerable number of strategically relevant information about companies can be found as a result of publicity obligations, self-presentation (Higgins and Bannister, 1992), signaling (Gao *et al.*, 2008), commitment strategies (Dixit, 1982), or public interest. Various elements of conduct can be observed, such as pricing policy, mergers, advertising, major investments, or new products. However, how and whether a company's strategy can be derived from this information remains unclear.

The uses of different empirical methods as well as their combination possibilities were first discussed fundamentally in a paper by Hambrick and Snow (1980). The limited empirical accessibility of strategies has so far been less discussed. Arora *et al*. (2016) present a variety of new methods of strategic research in a special issue of the *Strategic Management Journal*. However, Durand, Grand, and Madsen (2017) describe the lack of an integrated, empirically validated knowledge base in strategic management research. In their opinion, theory and construct design often do not fit together in empirical studies. Voigt[1] (2011, p. 27) comments on the lack of "*autonomous, consistently applied, and in the course of time evolved survey technology*"[2] in empirical strategic research. Below we want to present such a possible empirical method. As an example, we have chosen the dairy industry, where various developments open up space for strategic actions and their examination.

The dairy industry is the second largest sector in food production in the EU-28, accounting for 12.2 percent of the output value in 2016 (Eurostat, 2017a). The German dairy industry is the largest milk industry within the European Union: an amount 31.98 million tons of cow milk was delivered to dairies in 2016 (Eurostat, 2017b). Different developments and dynamics enable and demand (new) strategies. The CR6 increased from 26.4 percent in 2010 to 34.4 percent in 2014 (German Federal Ministry of Food and Agriculture, 2017) due to mergers, acquisitions, and growth of incumbents and foreign competitors. As a result of the liberalization of European

[1] Unfortunately only available in German.
[2] Own translation.

Common Agricultural Policy, companies are increasingly exposed to fluctuations in world market prices for raw milk. Since the end of the milk quota in 2015, the milk volume is no longer fixed throughout the EU. However, the German market is largely saturated, which is why foreign markets are gaining in importance as alternative sales opportunities. At the same time, German companies are more and more subject to foreign acquisitions. The industry structures are also changing in the downstream sector. Food retailers are increasingly concentrated in Germany, so large traders are increasingly able to use their structural advantages in negotiations with dairy companies (German Federal Cartel Office, 2014). At the same time, consumer spending on food is particularly low on the EU average (Eurostat, 2016). For the above reasons, it is likely that product policies, branding, advertising, and export activities are important strategies for dairies.

These developments increase companies' interest in reconstructing the strategies of their competitors beyond the broad monitoring of competitors in the context of competitive intelligence (for the functions of competitive intelligence, see Bose, 2008). In this connection, the question of one's own strategic positioning arises: "Are you sure you have a strategy?" (Hambrick and Fredrickson, 2001). The recognition of patterns and the prediction of future strategies allow positioning oneself in the best possible way. In the following, we will present a method which, based on content analysis, contributes to the question of the reconstruction of strategies. This is relevant not only for the practice, but also in the research of strategies. What are the strategies of the different companies in response to changes in their environment? How do companies adapt to changing environmental conditions? Can different strategies and types of companies be distinguished? How does the strategy choice influence the success of companies? In order to answer these questions, we first provide a brief overview of the literature on the strategy concept and the empirical assessment of strategies. This is followed by the collection of the data. We will then present various analysis methods. This is followed by a conclusion and discussion.

Literature review

Although a superior strategy is important for firms and although much research has been done about it, there is no consensus in the literature about what strategy actually is (Markides, 2004; Ronda-Pupo, and Guerras-Martin, 2012). Without presenting the entire discussion about the concept of strategy in the past decades, we will take up some classical concepts that are relevant to

our contribution. Mintzberg (1978, p. 935) sees a strategy as a pattern in a stream of decisions. He distinguishes deliberate strategies, unrealized strategies and emergent strategies. According to Idenburg (1993) a company must react flexibly in the context of the emergent strategy due to the unforeseen environment. It is not possible to formulate explicit goals and develop a future perspective. In contrast, Chandler (1962, p. 13) describes the strategy of a company as the "*the determination of the basic long-term goals and the objectives of an enterprise, and the adoption of courses of action and the allocation of resources necessary for carrying out these goals*." This results in a number of relevant action parameters or key areas for ensuring business success, such as price policy, product policy, location selection, or cooperation. The action parameters can be included in the strategy matrix of Ansoff (1957). They can be used to build up resources or exploit existing resources in the sense of the resource-based view (Barney, 1991) and thus gain long-term competitive advantages. MacCrimmon (1993) stresses the dominant role of the environment and the existence of other strategic units.

Dutta and King (1980) interpret strategy formulation in an oligopolistic market as a process in which each firm tries to anticipate the other firms' competitive steps and reacts accordingly. They use metagame analysis to include multiple strategy variables and performance measures. Our contribution also starts with game-theoretical considerations. An industry consists of N players with S possible strategies. A strategy is the sum of the strategic action parameters. Each of the players has a utility function U which provides a utility for each payoff depending on the selected strategies. We distinguish between observable and non-observable strategies. Each participant has common knowledge about the observable strategies of all participants. Each player i can choose action parameters a_i from his / her strategy set. Our participants are assumed to behave rationally. In the Nash equilibrium, the chosen strategy s_i^* maximizes a player's payoff with the given strategy (s^*_{-i}) of the other participants.

$$u_i(s_i^*, s_{-i}^*) \geq u_i(s_i, s_{-i}^*)$$

All players give the best response to the chosen strategies. If one wants to determine the Nash equilibrium, the first step is to list the competitors and their possible strategies. But (how) can the strategies of the competitors be observed and determined empirically?

Snow and Hambrick (1980) discuss four different approaches to empirically capture strategy. Investigator Inference describes the approach that the researcher assesses strategy by using all the information available. Disadvantages are perceptual biases, limited access to information as well as a limited amount of firms that can be studied. Self-typing describes the questioning of managers with the aim that they classify the strategy of their company. Disadvantages are a lack of external confirmation, perceptual biases as well as the tendency to describe intended strategies rather than emergent or realized strategies. The third approach, external assessment, involves asking experts what strategies are being pursued by certain companies. Limitations lie in the fact that external experts could come to other assessments than researchers or insiders. Moreover, their knowledge could be outdated. The fourth approach, objective indicators, does not rely on subjective perceptions, but on external or internal data. Examples are annual accounts or product market data. The disadvantage here is that the necessary documents may not be available. Snow and Hambrick (1980) conclude that each approach has advantages and disadvantages.

MacCrimmon (1993) distinguishes two approaches for discovering strategies of a firm. The direct approach, asking the firms, is in his opinion characterized by misrepresentation and misperception. The second approach, direct inference, is characterized by the subjectivity of the observer and does not allow finding out the intentions behind the observations.

Voigt (2011) conducts a meta-analysis of 1,348 research articles over 30 years (1980 - Vol.1 to 2009 - Vol. 30) of the *Strategic Management Journal* to investigate the use of the survey methods. The questionnaire was the most frequently used data collection method in empirical strategic research. In his literature review, he argues that questionnaires may suffer from a high degree of participation refusal, few possible interview partners as well as the systematic occurrence of distortion effects. In addition, rather intended strategies are queried. In content analysis, he does not see these problems because the process is not reactive. Instead, messages are analyzed. Furthermore, a high number of cases can be recorded independently of time and comparatively inexpensive. It seems to be more appropriate for the investigation of the realized strategies, which can also be observed by the competitors. So far, these have rarely been the content of empirical investigations (Mirabeau and Maguire, 2013).

Duriau, Reger, and Pfarrer (2007) stress that content analysis provides a replicable method and is suitable for many organization-related questions. It is possible to combine qualitative and quan-

titative research. In their study of previous content analyses in organization studies they show that annual reports were frequently used for content analyses. However, these can be influenced by the company. Journals are another possible source, which is increasingly used as a data basis for content analyses.

Voigt (2011) describes observable strategic action parameters as a result of strategic action. These include, for example, innovations, product policy, brand entry, co-operation, acquisitions, or governance structures (see also Camerer, 1991). The empirical accessibility of these action parameters enables the reconstruction of corporate strategies. The discovery of strategies and their changes therefore requires the observation of decisions in organizations over a longer period of time. Based on a theoretical method discussion, he develops a media resonance analysis. Through a systematic, sequential, qualitative and quantitative recording of publicly available information, it is possible to draw conclusions about the company strategy from a retrospective perspective.

In the milk sector, there have been few empirical studies on companies' strategies. Van der Krogt, Nilsson, and Høst (2007) analyze consolidation and collaboration strategies among the 15 largest dairy processors in EU from 1998 to 2002. As data sources, they use annual reports, press releases, internal business reports, journals, and newspapers. They show that cooperatives focused on mergers, licensing, explorative collaboration, and joint ventures. IOFs preferred take-over strategies such as acquisitions and strategic equity share holdings. This study neglects further strategic aspects, such as product policy. The search strategy appears to be very complex and difficult to reproduce as many different sources were searched for each company. Höhler and Kühl (2014) examine the position and performance of dairy marketing cooperatives in the EU-27. The data collection was carried out by experts for cooperatives from the EU member states. Multiple sources have been used, such as databases, interviews, corporate documents, and journal articles. First, the growth strategy was examined. The investigated dairy companies grew largely autonomously and only rarely through M & A. The investigated cooperatives had different marketing strategies. More than half of the cooperatives market predominantly raw milk. The investigation was based on the experts' assessment and is likely to be distorted by their perception. In addition, only cooperatives are examined here.

We want to build on the existing insights and reconstruct the strategies of dairy companies with a content analysis. Since our study is exploratory and is primarily designed to present the method, we will not form hypotheses before. Instead, we focus on the representation of the method.

Data

Data collection

Our dataset consists of articles (n = 2,103) from the leading journal of the consumer goods industry in Germany (Lebensmittel Zeitung, 2017). With 130,000 unique users per month this newspaper is not only relevant to the food industry itself but above all also for the downstream food retailers. The newspaper covers not only national but also regional developments. The target group consists of decision-makers in trade and consumer goods industry as well as industry-related service providers. The articles were retrieved via an online database. The data set ranges from 1.1.2007 to 17.3.2017. The keyword is "dairy". We want to generate the widest possible data set. A link to operators and the use of additional search terms could be used to further narrow down the data set or to find additional articles. In the documents we are interested in the top 10 dairy companies in terms of turnover 2016 (ASSOCIATION OF THE GERMANY DAIRY INDUSTRY, 2017, see Appendix A1).

Coding

Before performing the content analysis, the analytical unit is defined (Berelson, 1952, Weber, 1990). We use sentences and paragraphs that describe the strategic action parameters. However, words or the number of characters as analysis units are also possible. The application of the content analysis requires building categories (Berelson, 1952). Our categories are formed by the strategic action parameters of the actors (for details, see Appendix A2). These are based on the resource-based view as well as on Ansoff's (1957) product market concept. They represent actions to build resources and to use existing resources, to penetrate existing markets, enter new markets, develop new products, or diversify to create long-term competitive advantages. All actions of companies to which this definition applies were chosen. Besides year and firm, the following strategic action parameters are collected by an encoder:

- cooperation

- participation
- merger
- acquisition
- production capacity
- location closure
- market entry
- investment
- price policy
- product policy
- brand policy
- advertising
- product innovation
- organizational design

We differentiate between domestic and foreign in the parameters of cooperation, participation, merger, acquisition, production capacity, and location closure. The distinction is based on Ansoff's (1957) matrix. Domestic is the location of the parent company and describes the existing market. Market entry is recorded for foreign markets. The other action parameters relate primarily to the product: prices, product policy, advertising, innovation. Subsidiaries and their action parameters were allocated to the respective parent company, insofar as the affiliation was specified. If a company in the top 10 emerged during the last 11 years through a merger, the respective participants in the merger were individually coded before the merger and attributed to the subsequent company.[3]

The annual reports are not available because not all companies have to publish these in Germany. Accordingly, there is no balance sheet available for each company in our sample. Some companies are also part of corporate groups (Theo Müller) or are active abroad (Arla from Sweden/Denmark), so that a comparison would be difficult even if the balance sheet were available. Furthermore, the information in the documents could be distorted by the company's balance sheet policy. What unites all companies is that they process milk in Germany and sell dairy products on the German market or on foreign markets. Their activities are addressed by the journal.

The coding is carried out in MaxQDA, software for qualitative and mixed method research (MaxQDA, 2017). The use of the software allows the processing of large amounts of data as well

[3] This approach is critical. However, this allows us to compare the companies better.

as the further processing of the codes in statistical software. Relevant sentences or paragraphs are marked accordingly with the codes. A sentence or paragraph can also be encoded with several codes. The same event can also be encoded several times if it is addressed in several articles. Thus the importance of certain actions implicitly enters into our evaluation. However, a one-time consideration of actions mentioned in several cases is possible in principle. In addition, the coding can also be carried out automatically with the program, by defining corresponding words for each code. We have coded manually, in order to take longer sentences and meaning into account. In addition, it is easier to divide the action parameters into domestic and foreign parameters.

In total, 3,832 mentions of strategic action parameters were identified. These were further processed in the analysis.

Reliability

Intercoder reliability is a measure of how well several coders are consistent in their allocation of codes within the content analysis. There is a large number of possible measuring instruments in the literature (see Lombard, Snyder-Duch, and Bracken, 2002). Cohen's kappa (1960) measures the nominal scale agreement between two coders. With p_0 as the proportion of units in which they agree and p_c, the proportion of units in which they coincide by chance, κ can be calculated as

$$\kappa = \frac{p_0 - p_c}{1 - p_c}$$

In a pilot test, the reliability can be tested before the actual coding. With a representative sample, the reliability can also be verified subsequently. In addition to the researcher, it is advisable to use an uninvolved encoder to check whether the codes can be reproduced by third parties. Lombard *et al.* (2002) suggest about 10 percent of the full sample. In our case, this would be 210 items. Thus, with about 330 words per article and 1.8 codes per article, a second encoder with an average reading speed of 300 words per minute would have to code for about 10 hours. There are different assessments of the minimum required reliability values in the literature (see Lombard *et al.*, 2002 for a detailed explanation). Since we are concerned with the representation of the method, we refrain from further executions.

Analysis of empirical strategies

In the following, we propose different analysis methods for the analysis of the data collected by the content analysis. First we look at the data set as a whole and the frequency distribution of the identified strategic action parameters (see Figure 1).

Descriptive statistics: Strategies of all companies

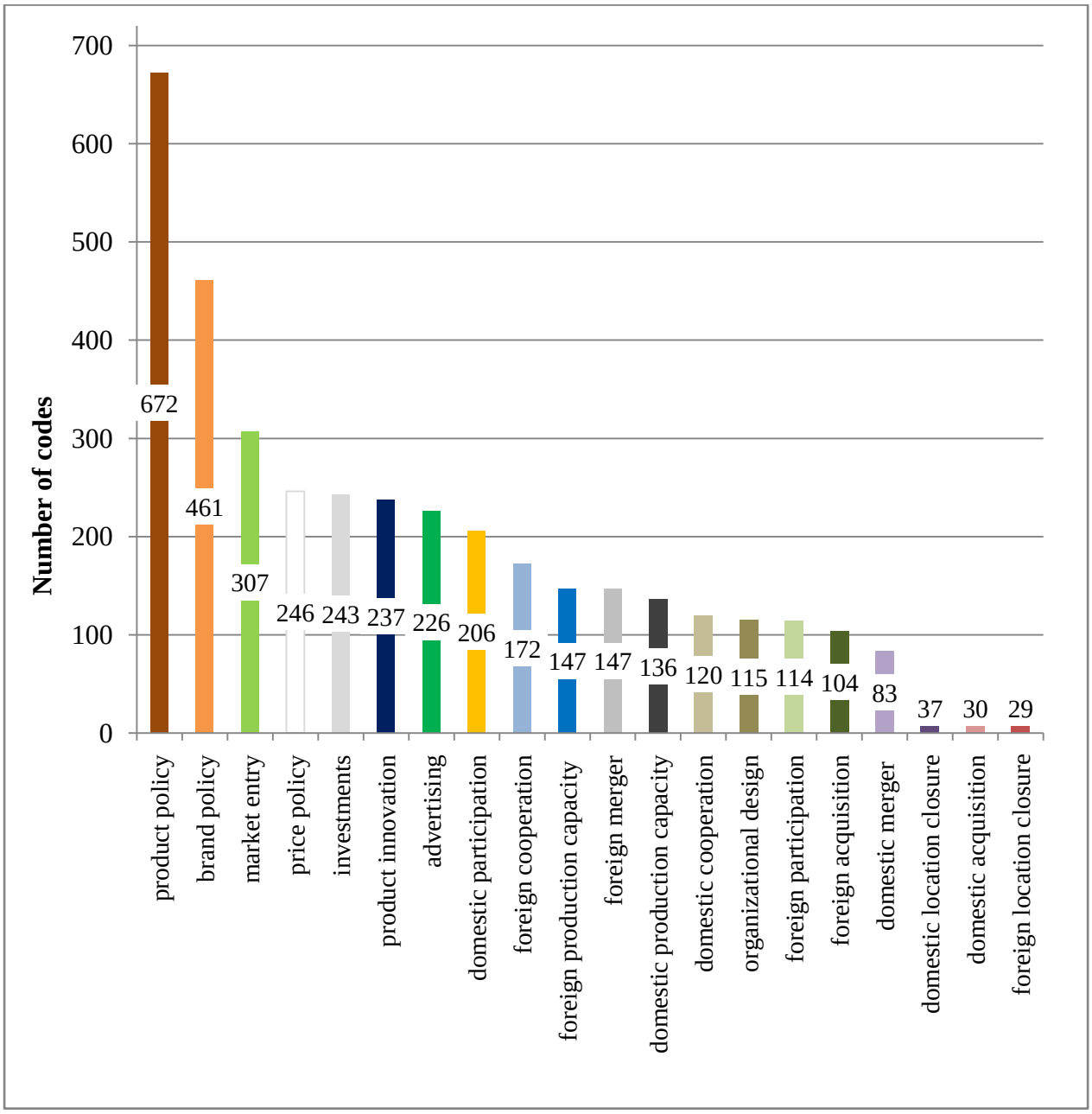

Figure 1: Distribution of strategic action parameters in the sample, 2007 - 2017 (n=3,832)

The distribution is in line with the developments described on the market. The consumer demands for more product differentiation are answered by the companies with product policy. The high number of product policy measures is also in line with the high flop rate in the industry (Dijksterhuis, 2016). At the same time, the negotiating power of the food retailers is countered by brand policy. The market entries into foreign markets can be interpreted as a result of market liberalization.

In addition to consideration over the entire period, the parameters used can also be analyzed for the individual years. As described above, the end of the quota represents an external shock and a new environment for the companies. The quantities of milk are no longer limited and new strategies are possible. However, when looking at the evolution of parameters over the years (see Figure 2) it turns out that no more strategic action parameters were used after the quota end. On the contrary, in 2016 even fewer action parameters (312 in total) were used than in previous years. This could be related to the fact that the situation is new for the dairies and they are therefore reorienting their strategies accordingly. Another explanation is the low milk prices at that time, which may have given less scope for strategic action.

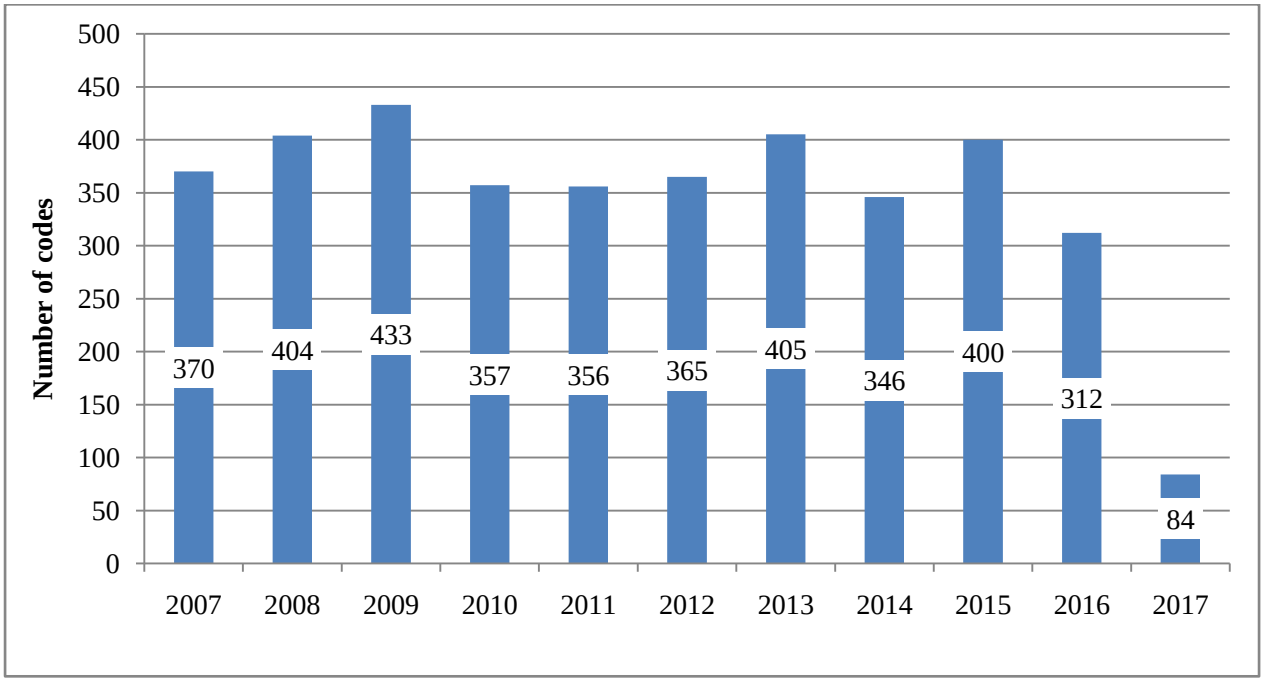

Figure 2: Use of strategic action parameters between 2007 and 2017 (absolute values, n=3,832)

Further statements can be derived by determining the relative importance of individual parameters in the total amount of parameters used. The following figure (Figure 3) shows the development using the example of the years 2007, 2010, and 2014. It becomes clear that in 2014, shortly before the end of the quota, the significance of foreign market entries has doubled compared to 2007. This trend also applies to almost all other strategic action parameters in foreign countries. The share of investments has tripled since 2007 and accounts for 9 percent of the total action parameters used in 2014.

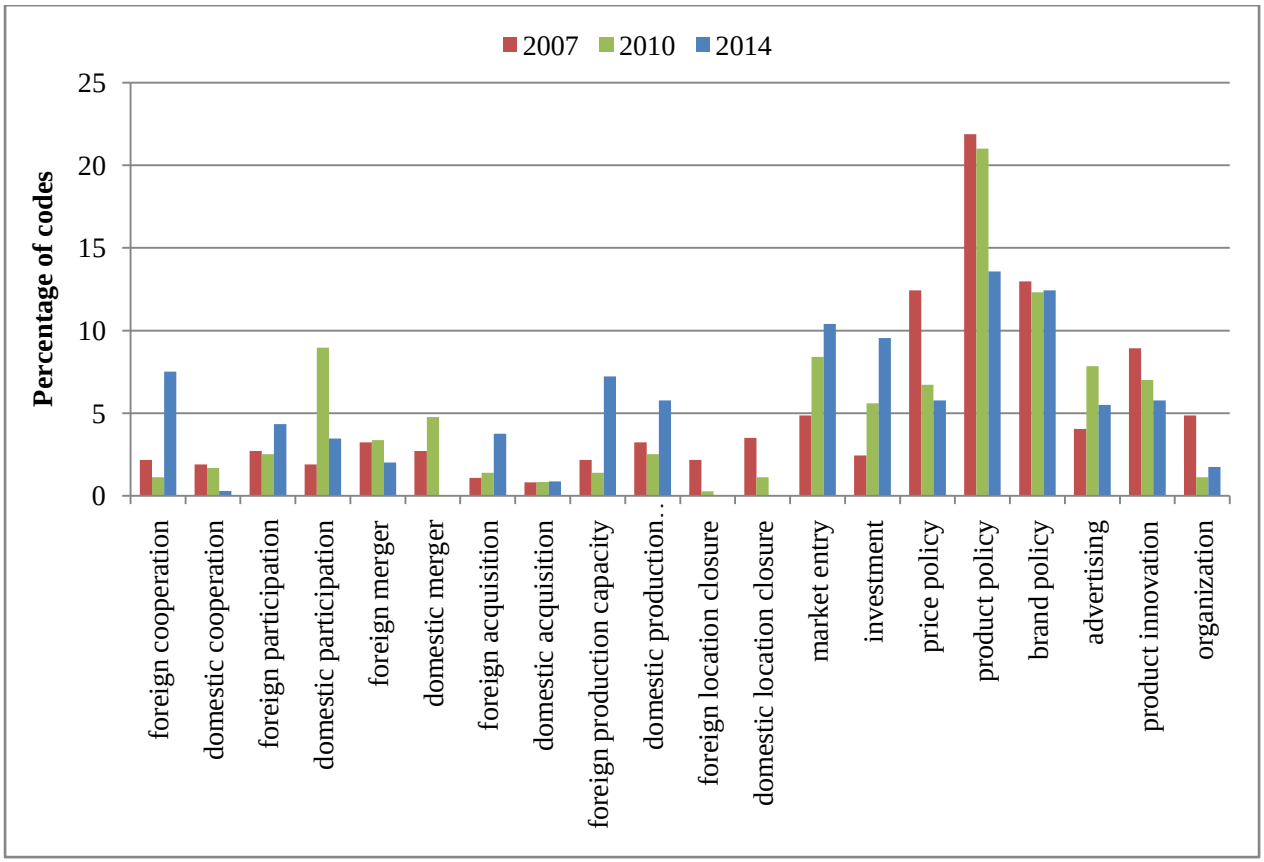

Figure 3: Percentage use of strategic action parameters in 2007, 2010 and 2014

Comparing 2014 with 2016 (not reported), it shows that after the end of the quota again more product and brand policy are used. Activities in foreign markets are declining. The extension of the dataset by additional years would make it possible to check for significant differences in strategic action before and after the end of the quota.

Strategic profiles: Strategies of selected companies

One way of evaluating the information on the company's strategic parameters is the formation of strategic profiles. Under strategic profiles, we want to understand the presentation of all strategic action parameters used by a company within a given period of time. The evaluation is performed descriptive by looking at the boxplots of the various strategic action parameters. Boxplots offer an initial analysis, as at first sight the position and the variance of the various parameters can be assessed. Below and above the median (stroke in the box plot) lies half of the values. It can be used to assess how often parameters have been used and whether companies have adapted their strategies to changing environmental conditions. The spread and the number of outliers (asterisks, circles) show how consistently a strategic action parameter has been applied over the years. A box plot is made over the years of the data collection, which contains all the frequencies of the entries. The year 2017 is excluded because no complete data set was available and the values would be distorted downwards. Using the example of company 2, the following figure (Figure 4) shows a strategic profile:

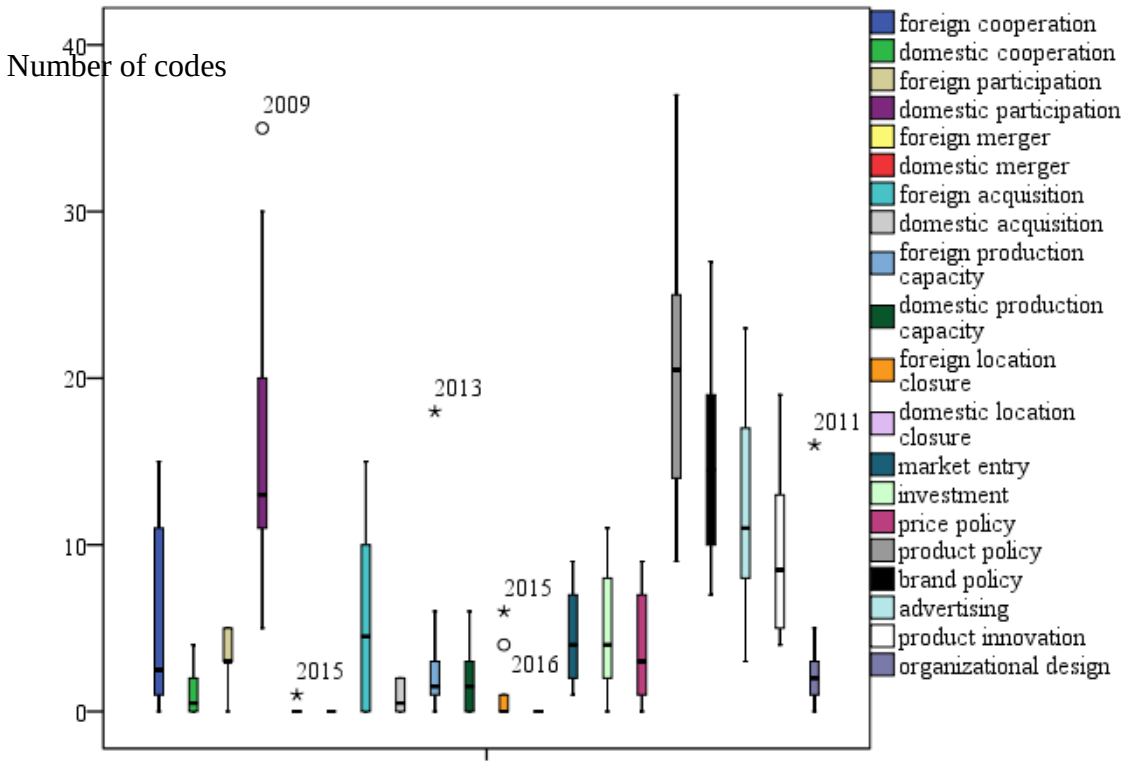

Figure 4: Strategic profile of company 2

For company 2 it can be seen that this company is strongly focused on product policy and domestic participations. Further important action parameters are brand policy and advertising. This profile can now be matched to other profiles, for example with company 3 (see Figure 5).

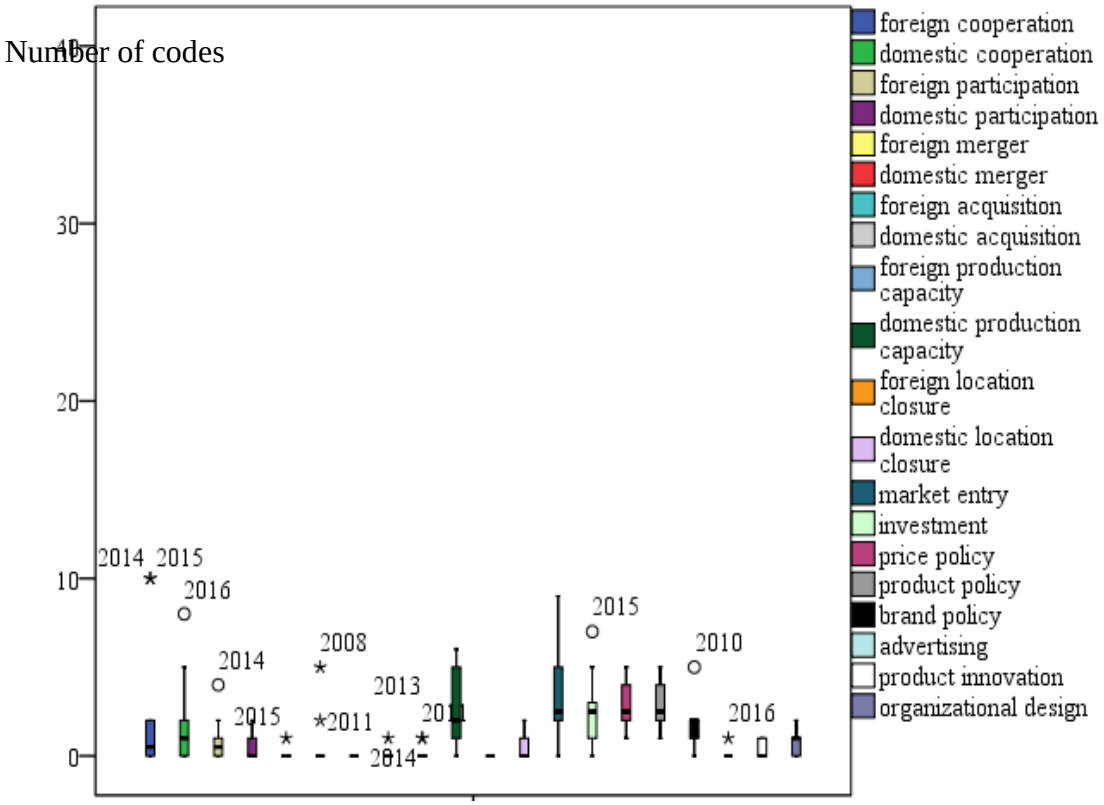

Figure 5: Strategic profile of company 3

Compared to company 2, the differences between the uses of the various action parameters are not large. It is also noticeable that there is a higher number of outliers. The most frequent occurrences are market entry, investments, product policy, and price policy. The company was much less addressed in the media than company 2. It is possible that fewer strategic action partners were used. Alternatively, the company could communicate less externally.

By comparing the boxplots can be judged:

Which strategic action parameters have been used particularly frequently?

On average, company 2 uses product policy most often, and company 3 uses foreign market entry most often. They seem to deal differently with environmental developments and may pursue different goals with their strategies. Company 2 is focused on the domestic market and product

development, company 3 is focused on foreign markets and market development. Company 3 is a cooperative. It is obliged to purchase all the milk of its members. This milk has to be marketed. The strategy is thus also an expression of the use of resources. Company 2 is best known for its brands. These existing resources are used by choosing the action parameters.

Were the strategic action parameters used differently over the observation period or was there a consistent strategy of a company?

Company 2 uses product policy above average every year. Company 4, on the other hand, uses some parameters only in a few years. This could be an indication that company 3 has tried to adapt to the changing conditions or that it has not positioned itself clearly. Reasons could also be personnel changes or different views of member groups about the strategic orientation.

Strategic groups: Similarities and differences of strategies

Based on the occurrence of the action parameters, there is another possibility of evaluation in the formation of strategic groups according to Porter (1980). A strategic group is characterized by the pursuit of similar strategies. The assignment to a strategic group can, for example, involve a higher bargaining power (Porter, 1980). This is particularly relevant given the above-mentioned sectoral developments in the milk sector. For our analysis, we use the two-step cluster analysis in the IBM SPSS program (IBM, 2012). It is suitable for our type of data and the method provides an automatic determination of the number of clusters. In addition, a quality measure is issued for the assessment of the cluster solution (Bacher, Wenzig, and Vogler, 2004). It also makes it easy to see how important the different variables are for the assignment to the groups. This is a criticism of other procedures (Ketchen and Shook, 1996). The method is based on the assumption that the variables are independent and normally distributed. However, it is robust against deviations from these assumptions (IBM, 2012). Based on our observations so far, we choose the variables "brand policy", "product policy", and "foreign market entry" as cluster variables. The cases are clustered with the Bayesian information criterion. The distance measure is log-likelihood. The Silhouette measure of cohesion and separation points to a good solution (see Figure 6). As shown in the figure, a solution with three clusters is obtained.

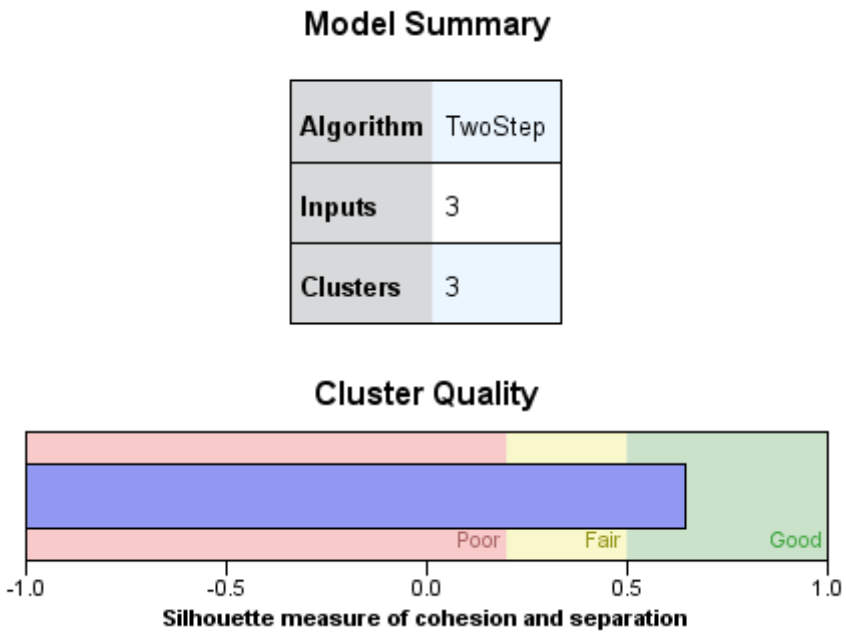

Figure 6: Cluster solution for the TwoStep cluster analysis

In the following, the importance of individual variables for the assignment to the clusters can be determined (see Figure 7).

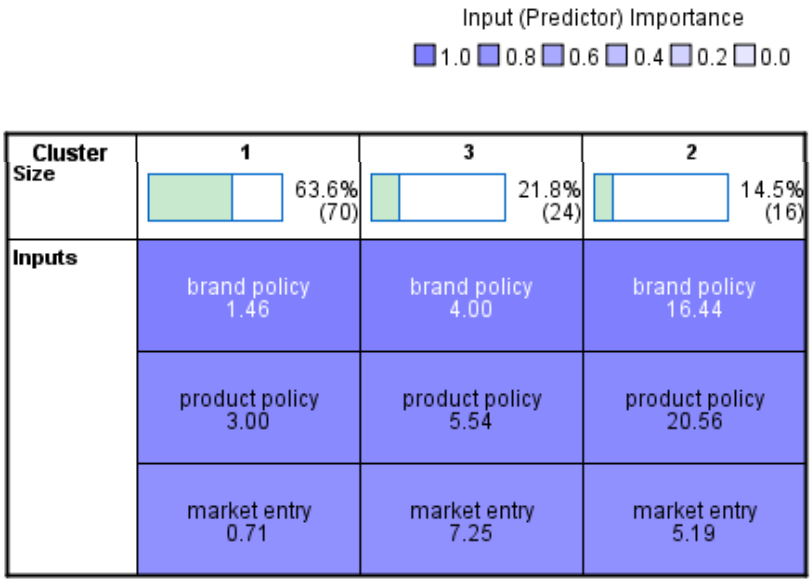

Figure 7: Importance of the input variables for the cluster solution

As can be seen in the figure, brand policy is the most important criterion for distinguishing between clusters. There seem to be companies that have above-average use of branding and other companies with less than average branding. The cases in our analysis are the respective years for

the respective companies (10 companies and 11 years). The cases in cluster 2 (on the right in the illustration) showed an average of 16.44 times with the strategic action parameter brand policy in the news. The cases in cluster 1, on the other hand, showed 1.46 times. Cluster 3 is in the middle. The same applies to the order of product policy: Cluster 2 is the most frequently mentioned that the other clusters. For the entry into foreign markets, cluster 3 (center) is the strongest group. On average, 7.25 hits are available. This parameter is the weakest in cluster 1. In a cross table, we can see the assignment of the company years to the clusters (see Table 1).

Table 1: Company * TwoStep cluster number crosstabulation

			TwoStep Cluster Number			
			1	**2**	**3**	Total
company	**1**	Count	7	0	4	11
		% within company	63.6%	0.0%	36.4%	100.0%
	2	Count	2	8	1	11
		% within company	18.2%	72.7%	9.1%	100.0%
	3	Count	8	0	3	11
		% within company	72.7%	0.0%	27.3%	100.0%
	4	Count	3	3	5	11
		% within company	27.3%	27.3%	45.5%	100.0%
	5	Count	6	3	2	11
		% within company	54.5%	27.3%	18.2%	100.0%
	6	Count	11	0	0	11
		% within company	100.0%	0.0%	.0%	100.0%
	7	Count	9	0	2	11
		% within company	81.8%	0.0%	18.2%	100.0%
	8	Count	4	2	5	11
		% within company	36.4%	18.2%	45.5%	100.0%
	9	Count	11	0	0	11
		% within company	100.0%	0.0%	0.0%	100.0%
	10	Count	9	0	2	11
		% within company	81.8%	0.0%	18.2%	100.0%
Total		Count	70	16	24	110
		% within company	63.6%	14.5%	21.8%	100.0%

It turns out that companies are assigned to the different clusters with different frequency. For example, company 2 is located eight times in cluster 2. Company 1, on the other hand, (the highest-performing company) is allocated cluster 1 in seven years. Companies 4 and 8 are particularly

common in cluster 3 (five times each). It can be stated that the classification into the groups cannot be considered statically. Rather, the group allocation changes over time. Whether this allocation of the company years into the groups happens randomly can be checked with a Chi-square test (see Table 2).

Table 2: Chi-Square tests

	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	63.560[a]	18	0.000
Likelihood Ratio	65.003	18	0.000
Linear-by-Linear Association	4.860	1	0.027
N of Valid Cases	110		

a. 20 cells (66.7%) have expected count less than 5. The minimum expected count is 1.60.

As the table shows, the test is significant. That is, there is a link between companies and allocation to a strategic group. In the same way, other action parameters can also be used for clustering. The findings gained in this way can, for example, be used in the empirical investigation of bargaining power in the distribution channel (see for example Draganska, Klapper, and Villas-Boas, 2010).

To validate our results, as proposed by Ketchen and Shook (1996), we conduct a hierarchical cluster analysis using the average linkage between groups as the clustering algorithm and the Squared Euclidean distance as the measure of distance. We suggest that three clusters be formed to compare the results with the other method. In another cross table, we check the assignment of cases (see Table 3).

Table 3: Average linkage (between groups) and TwoStep cluster number Crosstabulation

	TwoStep Cluster Number	Total

		1	2	3	
Average Linkage (Between Groups)	1	70	0	24	94
	2	0	15	0	15
	3	0	1	0	1
Total		70	16	24	110

As the table shows, the cases in cluster 1 are assigned equally by both methods. Both methods assign the same 15 cases to cluster 2. However, clusters 2 and 3 differ because a cluster was formed with only one case in the hierarchical analysis. The cases could be looked at again more precisely to determine reasons for the different assignment. In addition, clusters could be formed and compared for individual years.

Panel model: Influence of strategies on performance

The ten companies were monitored over a period from 2007 to early 2017. An observation is available for each year and each strategic action parameter. A panel model is therefore suitable for further evaluating the data. If we were to have a success rate (e.g. sales or profit) from the annual financial statements, we could use these as dependent variables to determine the impact of the strategic action parameters on the profit ratio. If we also wish to take into account the heterogeneity of the companies in our estimation, the following equation results (see also Wooldridge, 2010):

$$y_{i,t} = \beta_1 x_{i,t} + \cdots \beta_K x_{i,t} + c_i + u_{i,t}$$

With $y_{i,t}$ as the success of the company i in year t and $x_{i,t}$ as the expression of the strategic action parameters for company i in year t. The variable c_i describes the unobserved heterogeneity of the individuals. The term $u_{i,t}$ describes the error terms that change with company and year. The estimation of a fixed effect model allows c_i to be correlated with $x_{i,t}$ (see also Wooldridge, 2010). The data base must be structured as follows (Table 4):

Table 4: Exemplary data structure for panel data analysis

Company	year	y	x_1	x_2	..	x_K
1	2007	3,200	0	4	..	12
1	2008	3,500	12	3	..	3

1	2009	3,400	2	5	..	0
..	..	..	..	..	..	..

The approach makes it possible to examine the impact of strategies in various business-related questions. One possibility is the investigation of success factors and firm profitability differences (see for example Hirsch *et al.*, 2014). Here, other variables can also be added to the panel model, for example company size, market shares, balance sheet ratios, or R & D expenditures.

Conclusion

The starting points of our investigation were the developments on the food market and, in particular, the milk market. With increasing interdependence and dynamics, the empirical reconstruction of strategies becomes increasingly interesting for competitors. Researchers are also interested in learning how companies adapt to changing environmental conditions. At the same time, we have noted that there are both reasons for and reasons against the publication of strategically relevant information. The aim of our contribution was to use the published information from companies to draw conclusions about their strategies.

There are many different interpretations of the concept of strategy in the literature. Some well-known definitions have been discussed in our literature review. An emergent strategy can be understood as a response to the company's environment. It is observable by the competitors as a pattern of decisions and can be used by them to adapt their own strategies. In the method discussion, we have highlighted the advantages of content analysis in the study of emergent strategies. It offers advantages over other traditional methods, such as a questionnaire or interview, since it is not reactive. The results are less affected by distortions and strategic response behavior. In addition, high case numbers can be collected time-independent and relatively inexpensively.

For the first time we used the content analysis to reconstruct the strategies in the German dairy industry. We have identified 3,832 mentions of strategic action parameters for the top 10 companies in a trade journal. Our results show that companies in the industry are pursuing different strategies by choosing various strategic action parameters. Competitors seem to have different priorities in the choice of strategies. There are also differences over time: Before the end of the milk quota, market entry into foreign markets is gaining in importance. After that, fewer action

parameters are used. Companies also vary their actions differently over time. As was already expected on the basis of the market developments, the companies mainly pursue product policy, brand policy, and market penetration into foreign countries.

We have shown various possibilities to use the qualitative results of content analysis quantitatively in strategic research. The analysis of the applied action parameters by means of box plots showed the consistency of the deployment over the years as well as the differences between different companies (strategic profiles). The use of cluster analysis has provided further insights into strategic groups and their stability over time. Three groups could be isolated, which differ in the application of the action parameters. The result was a group which generally operates a lot of brand and product policy. Here, above all, one company is very active. In addition, there is a group that is characterized by an above-average number of market entries abroad. The third group had rather low values in all the action parameters. The proposed panel model allows further questions to be addressed, such as, for example, the relationship between the chosen strategies and the success achieved by the companies. It offers the possibility to integrate further variables into the analysis and can thus be applied not only in strategic research, but also in success factor research.

Our method makes it possible to derive testable hypotheses that can address various questions about strategy. We have carried out our analysis for a particular sector. We would like to point out that it can be transferred to any other country and sector. The method also provides the ability to use Big Data and automatically capture data. Large data records can be generated. Automatic coding also makes it possible to quickly evaluate the data records.

A problem with the implementation of the method lies in the definitions used for the strategic action parameters. Depending on the definition and delineation (e.g. foreign and domestic), different results are possible. Instead of specifying definitions, an explorative approach would also be possible (see also Duriau *et al.*, 2007). Another criticism could be the determination of the time horizon of one year. A further development of the work could be to compare the applied action parameters for different periods of time and sequences (Kunisch *et al.*, 2017). The available data base and the period of time could also be expanded to give more robust results. In addition, the method can only identify strategies as a pattern. The intended strategy is not fully accessible with our method. Furthermore, the method also reaches its limits due to the limited availability of information and the different communication policies of the companies. Also the

editors as the authors of the journal articles could distort the contents. A combination of methods would be best to track down different areas of strategy and to validate the results (see also Snow and Hambrick, 1980).

Strategy is a complex phenomenon. Depending on the underlying strategy definition, the method shown here can be adapted. The objectives of the strategic action parameters communicated in the articles can be considered. In particular, investment is unclear as to the purpose for which it is intended. Furthermore, it is possible to interpret strategy as a long-term concept. Then it would have to be examined whether the use of the strategic action parameters remains the same over a certain period of time. Here we are concerned with the question of whether a strategy is to be found at all for all companies.

Further research questions, which can be investigated more closely with our method:

- When can the use of strategic action parameters be described as a strategy?
- (How) do companies adapt their strategies to changing environmental conditions?
- Do companies have such a thing as a strategy?
- What is the relationship between the chosen strategic parameters and performance?
- What is the link between industry structure and company strategic parameters?
- When and how does change of strategy take place?
- How do companies react in their strategies to the strategies of the competitors?

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Appendix

Table A1: Investigated dairy companies

Company	Turnover (million EUR, 2016)
Deutsches Milchkontor (DMK)	4,600.0
Müller	1,800.0
Hochwald Foods	1,440.0
Arla	1,400.0
FrieslandCampina	1,100.0
Bayernland	1,000.0
Zott	902.4
Ehrmann	755.0
Fude + Serrahn	647.0
Molkerei Ammerland	638.7

Source: Association of the Germany Dairy Industry, 2017

Table A2: Codes for our empirical survey

Code	Forms	Explanation	Example
year		Year of appearance	
firm		Name of the company, name of a subsidiary, or of one of their brands.	"***Arla** has worked specifically to use more milk for branded products that generate added value […]:*"
Strategic action parameters			
cooperation	foreign domestic	Cooperation with other independent companies without starting a new business.	"*Since the beginning of the year, **the Finnish dairy company** […] has been manufacturing dairy fresh products in the **Russian plant of the dairy** […] in […].*"
participation	foreign domestic	Participation in another independent company. These include subsidiaries.	"*The company group […] increased its **share of the British** […] to just over 3 per cent.*"
merger	foreign domestic	Merger with another company.	"*By announcing two **mergers** with the competitors […] in Germany and […] in the UK, the dairy […] sends a clear signal to the European competition and to the trade.*"
acquisition	foreign domestic	Takeover of another company.	"*The very low milk price, the **takeover** of […] provide for discussions among the members and the committees.*"
production capacity	foreign domestic	Investment in production capacities.	"*At the same time, the **processing capacity was increased** to prepare for further growth.*"
location closure	foreign domestic	Reduction of production capacity by closure of a location.	"***Two factories would have to be closed:** the […] site in […] and […].*"
market entry	foreign	Market entry abroad.	"*[…] has set up a **new business unit for China and Southeast Asia** with offices in*

		Kuala Lumpur."
investment	Investments	"*[…] has now **invested** 120 million euros in the plant at the gates of Moscow*."
price policy	Pricing, both upstream and downstream	"*[…] is clearly **behind the competition in the milk price,** leading to the termination of numerous suppliers.*"
product policy	Products, product lines, or modification of a previous product line.	"[…] *by means of **interesting seasonal concepts and new launches** […]*."
brand policy	Brands of the company and actions in relation thereto.	"*It is not without reason that our strategic goal is to **expand the brand business** more strongly […]*."
advertising	Advertising campaign, prize competition, sales event, sales promotion, or customer loyalty measures.	"[…] *is also investing in **extensive communication measures** in order to tap new customer groups for organic products*."
product innovation	Innovation, new product varieties, research and development.	"*Crispy, crunchy, delicious: the dairy is now expanding its two-chamber range by four **new varieties***."
organizational design	Change of organizational form, such as change of legal form or restructuring of the organization.	"*The Dutch dairy company **restructures** its production […]*."