Dairy farmers’ business strategies in Central and Eastern Europe based on evidence from Lithuania, Poland and Slovenia

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ABSTRACT
To evaluate market-oriented strategic decision-making by farmers in Central and Eastern Europe (CEE) farm development paths of dairy farmers in Slovenia, Poland and Lithuania were analysed. The influence of internal strengths and weaknesses, external opportunities and threats, and farmer goals on strategic choices and performance were explored. Principal component, hierarchical cluster and regression analyses were performed to test the conceptual framework. Seven strategic groups emerged with specific development paths, that is, Wait and see, Movers, Chain integrators, Specializers and Diversifiers. The latter two split into cooperative and independent groups. Maximisation of profit and sustainable farming ranked highest as farming goals. Availability of land and labour were weaknesses for all strategic groups in all countries. External opportunities and threats varied between countries and to a lesser degree between strategic groups. The Wait and see and Cooperating diversifier groups gave less optimistic scores than other strategic groups. The attitudes of CEE farmers towards the market and future Common Agricultural Policy remain more negative than those of a group of Western European farmers. The results of this study confirm that internal strengths and weaknesses, external opportunities and threats, together with farmers’ goals and strategies influence farmer performance, but independently of each other. Strategies do not appear to be a mediating variable between the internal and external environment of the farm and the performance of the farm. Policy makers, companies and extension workers should take the heterogeneity in strategic development into account when dealing with these and similar groups of farms.

Introduction
Support for farmers via the Common Agricultural Policy (CAP) is gradually being reduced. Price mechanisms are expected to reflect supply and demand so market oriented business strategies will be increasingly important for the performance of farms in the EU (Knudson et al. 2004). Farmers’ market orientation, however, is not yet well understood because strategic decision making on farms is different from that in large firms (Bjerke and Hultman 2002). Thus generalisations from large firms should first be tested before being considered to apply to farms.

According to SWOT (Strengths, Weaknesses, Opportunities and Threats) analyses, businesses choose strategies that match their internal strengths and weaknesses with external opportunities and threats (O&T), because this improves their performance. In a farming context, this means that strategic choices should exploit the farm’s strengths taking advantage of opportunities and circumventing threats posed by the business environment to achieving the farmer’s goals. Farmers develop strategic plans considering changes in the business environment, including EU agricultural policies, national and local regulations, markets and technological and societal developments. Characteristics such as farmers’ capabilities, farm size and partnerships also influence strategic decisions (Edwards-Jones 2006; Farmar-Bowers 2010; Darnhofer 2010). Farms, especially in Europe are small businesses...
with usually only family labour or with one or a few employed labourers. Compared to large firms, strategic planning is informal and more intuitive (or subjective), and characterised by fewer procedures, less rational and less support from market research, but more rapid and well-coordinated decision-making (Bjerke and Hultman 2002; Darnhofer 2010).

Notwithstanding the common EU regulations and global markets, farming in Europe is characterised by differences in the business environment – natural, economic and social. This has influenced the direction of agricultural development in the past but nowadays agriculture operates under the umbrella of CAP with legislation, such as on cross-compliance for example, aimed at more sustainable farming. Farms in the newly acceded EU countries are even more affected by these developments than those in the older EU countries. They had to rapidly transition from public to private businesses, and from centrally planned to market economies, while complying with social and economic policy demands (Peters et al. 2009; Kuipers et al. 2014). Attitudes towards EU policies and farmer choices have been studied mostly in Western Europe (Willock et al. 1999; Defrancesco et al. 2008; Lobley and Butler 2010; Castro et al. 2015), although Gorton et al. (2008) did include new member states. Sturaro et al. (2009) studied livestock systems and farming styles in the Italian Alps. Consequently, little is known about strategic decision making by farmers in the CEE countries (Gorton et al. 2009). The aim of this study was to better understand CEE farmer strategic choices in developing their farms and the influences affecting their decisions. To facilitate comparison of results across countries, we confined our analyses to one sector only – the dairy sector. The following research questions were addressed:

- What strategies do dairy farmers in CEE countries choose to develop their farms?
- What goals do these farmers have, how do they perceive the availability of resources and what opportunities and threats do they see?
- Do farmers’ goals and the farm’s internal and external environment influence their strategic choices?
- Do the strategic choices of dairy farmers in CEE countries affect their farm performance?

Materials and methods

Conceptual framework

Ondersteijn et al. (2003) described a conceptual framework relating the business environmental goals to the performance of dairy farms. A similar kind of model was applied by Hansson (2007) to describe the dairy farm economic performance. Both models formed the theoretical base for our study. In the conceptual framework, farmers’ goals (mission), farmers’ resources (internal environment), O&T perceived by the farmer (external environment), and the strategic direction (strategy) chosen by the farmer, influence the perceived performance of the farmer (Figure 1). The model assumes that farmers (entrepreneurs in general) make strategic choices to improve their future performance. Thus, making strategic choices improves future prospects compared to a wait and see strategy. The model also assumes that making strategic choices improves future prospects by aligning the internal and external environment. More specifically, strategic choices exploit the available resources to take advantage of opportunities in the environment and circumvent threats posed by the environment to reach the farmer’s goals. Thus, strategy mediates between the model elements resources, goals and O&T on the one hand and future prospects, that is, performance on the other. Finally, because the particular region and country can affect O&T, available resources and farming goals, and indirectly, the strategies and performance, they are also included in the model (Figure 1).

Sample

The study was based on 1028 questionnaires on strategic goals completed by dairy farmers: 339 from Lithuania, 334 from Poland and 355 from Slovenia. All three countries have predominantly small scale farming, representing European regions with varying climatic, natural and landscape conditions. In Poland, the farmers were from the central region of Mazovia, while in Slovenia and Lithuania they were widely distributed geographically. The questionnaires were gathered in the years 2011/2012 by extension workers during farm visits or in group meetings for extension activities. In each country, respondents were selected on the basis

Figure 1. Model expressing the relationships of internal and external elements with strategies and performance.
that more than half of the family income came from dairy farming and farmers sold their milk or dairy products. On the basis of the farm structures in the three countries, the stratification of the sample was determined beforehand: 10% of participating farmers should have 5–9 dairy cows, 50% should have 10–19 cows, 30% should have 20–49 cows, and 10% should have 50 or more cows. The sample was representative in each country of the number of farmers with 10–49 cows, but the number of farms with 5–9 cows was underrepresented and the number of farms with 50 or more cows was overrepresented (Agricultural Information and Rural Business Development Centre, Lithuania, 2011; Agricultural Market Agency, Poland, 2011; Quota Agency, Slovenia, 2011).

The characteristics of the farms and farmers in the full sample for the three countries are described in Table 1. The sample expresses small-scale farms in all three countries, but in Lithuania a small group of former state farms with more than 150 cows were included in the sample. These are presented separately. Excluding these, farm size averaged 95 ha for Lithuania, 41 ha for Poland and 36 ha for Slovenia. The majority of land in the Lithuanian and Slovenian farms was rented. Farms were very fragmented, especially in Slovenia. Milk yield per cow was highest in Slovenia.

**Analyses**

Data were collected to operationalise the model as illustrated in Figure 1. To measure strategies, farmers were asked to indicate in a list of 10 strategies what their first, second and third choices were for the development of their farms over the next five years. After recoding, 3 indicates their first choice, 2 their second choice and 1 their third choice. A principal component analysis (PCA) was conducted to summarise the data.

Farmer segments were identified based on their strategies, using the complete set of 1028 respondents. These farmer segments are called strategic groups. First, a hierarchical cluster analysis (i.e. Ward’s method) was applied. Based on the agglomeration coefficient and authors’ expertise of the sector, seven strategic groups were selected as a possible solution. Then, a non-hierarchical cluster analysis was performed (i.e. K-means in SPSS) with the cluster centroids of the hierarchical cluster analysis as initial cluster centres.

To measure goals, a list of 27 potential farming goals was composed. Respondents were asked to indicate how important each farming goal was to them. A 7-point Likert scale anchored by ‘not important’ to 7 ‘very important’ was used. One of the farmer goals ‘to provide employment to others’ was rarely answered in Poland. This option was apparently not well understood, and thus, this goal was deleted from subsequent analyses.

To measure resources, a list of 13 resources available on a farm was compiled. Respondents were asked to indicate the degree of difficulty in obtaining them. A 7-point Likert scale anchored by ‘very difficult to obtain’ to 7 ‘very easy to obtain’ was used. Two resources were deleted from the analysis: ‘rent of quota’, and ‘advice of private consultants’. A high number of ‘do not know’ answers indicated that these questions were not relevant or applicable in these countries.

To measure O&T, a list of 26 economic and social issues in a farm’s external environment was composed. Respondents were asked to indicate whether they considered it a threat or an opportunity. A 7-point Likert scale anchored by −3 ‘a big threat’ and +3 ‘a big opportunity’ was used. For presentation purposes, this scale was transformed to 1–7, equal to the scale used for the other elements in the model.

To measure performance, five indicators for performance, that is, expectations about success, future and economic prospects of the farm were listed as statements. Respondents were asked to indicate whether they agreed with the statements. A 7-point Likert scale anchored by 1 ‘fully disagree’ to 7 ‘fully agree’ was used.

**Table 1. Characteristics (mean and standard deviation) of the samples of dairy farms in Lithuania, Poland and Slovenia.**

| Characteristics                   | Lithuania (<150 cows) | Lithuania (≥150 cows) | Poland N = 334 | Slovenia N = 355 |
|-----------------------------------|-----------------------|-----------------------|----------------|-----------------|
| **Age of farmers (years)**        | Mean: 46.3, SD: 10.5  | Mean: 42.9, SD: 8.4   | Mean: 41.4, SD: 10.5 | Mean: 48.3, SD: 12.3 |
| **Land owned (ha)**               | Mean: 38.8, SD: 36.9  | Mean: 175.3, SD: 106.3 | Mean: 32.6, SD: 96.2 | Mean: 14.5, SD: 12.4 |
| **Land rented (ha)**              | Mean: 55.9, SD: 69.5  | Mean: 468.8, SD: 859.7 | Mean: 8.5, SD: 14.3 | Mean: 21.0, SD: 57.6 |
| **Number of parcels of land**     | Mean: 14.4, SD: 11.8  | Mean: 25.3, SD: 9.0   | Mean: 15.4, SD: 11.9 | Mean: 30.7, SD: 21.3 |
| **Number of dairy cows**         | Mean: 31.3, SD: 26.0  | Mean: 272.1, SD: 169.1 | Mean: 24.2, SD: 18.4 | Mean: 33.8, SD: 42.5 |
| **Milk production per cow (kg in 2010)** | Mean: 5441, SD: 1205 | Mean: 6894, SD: 1219 | Mean: 5216, SD: 1464 | Mean: 6745, SD: 1565 |

*Parcels of land and milk production are based, respectively, on 289 and 335 Lithuanian farms, 291 and 320 Polish farms and 320 and 354 Slovenian farms.*
To obtain a fair reply to all of the above questions, the choice 'don’t know' was allowed as an 8th answer. Such an answer was interpreted as a missing value in the analysis.

PCAs with the Varimax rotation method were conducted to see if the questions could be summarised. Separate PCAs were conducted for farming goals, resources, O&T and performance. A scree plot (sharp increase in Eigen value going from last to the first component), latent roots (should be above 1), and total variance accounted for (above 60%) were used as criteria. Second, PCAs were conducted with the variables that had high loadings on the same component of the first PCAs. Three criteria were used to assess whether these variables represented a single dimension: (1) a scree plot with a sharp decrease in latent root from the first to the second component and a gradual decrease in latent roots from the second component onwards; (2) a latent root of the second component, which is smaller than one, and (3) a first component that accounts for a minimum of 60% of the variance in the items belonging to the concept (Hair et al. 1992). Moreover, variables should have a loading on the first component (before rotation) higher than 0.60 and the reliability of the measure as indicated by Cronbach’s Alpha should be higher than 0.60. The scores of each measure on these criteria are listed in Table 2. A few components did not meet all the criteria, but considering the exploratory nature of the research, all components were used in the analyses. An overview of the components and number of questions (variables) included are presented. Average scores across the variables in each component were used in the subsequent analyses.

Farmer goals, resources, O&T and performance were considered as continuous variables based on the 7-point Likert scale values. Impressions on normality were obtained from the mean, SD, skewness and kurtosis statistics (Table 2). Farming goals appeared to be slightly skewed to low scores. The components ‘sustainability’ and ‘maximise profit’ were more significantly skewed and had a stronger peak. Strategic group and country were treated as categorical (nominal) variables. Analyses of variance (ANOVA) were used to test whether strategic groups and countries had an effect on farmers’ goals, resources and O&T. Statistical differences between strategic groups and between countries were assessed using the LSD and SNK test.

Next, farmer goals, resources and O&T were regressed on performance. However, a proportion of the respondents answered ‘don’t know’ as 8th answer to the questions in the questionnaire. This resulted in 424 farms with complete data – 125 from Lithuania, 171 from Poland and 128 from Slovenia. This group of farms was used to test the relationships in our model. F-tests were used to determine whether these elements of the model influenced performance. Subsequently, strategic groups were included in the regression analyses to see whether strategies mediate the influence of goals, resources and O&T on performance (Baron and Kenny 1986). Countries were included

| Elements of model and underlying components | Variables | Eigen value second component | Variance explained % | Lowest variable loading | Cronbach’s Alpha | Mean | SD | Skewness | Kurtosis | N |
|-------------------------------------------|----------|-------------------------------|---------------------|------------------------|-----------------|------|----|----------|---------|---|
| Farming goals                             | Improve management | 4 | 0.86 | 46.32 | 0.69 | 0.59 | 5.64 | 1.05 | −0.91 | 0.97 | 836 |
|                                            | Dairy tradition   | 5 | 0.95 | 58.47 | 0.72 | 0.64 | 5.26 | 1.06 | −0.72 | 0.33 | 953 |
|                                            | Work environment  | 4 | 0.77 | 48.81 | 0.70 | 0.65 | 5.72 | 0.94 | −0.86 | 1.36 | 936 |
|                                            | Sustainable      | 6 | 0.77 | 57.21 | 0.67 | 0.84 | 6.26 | 0.77 | −1.46 | 3.56 | 948 |
|                                            | Maximize profit   | 5 | 0.86 | 49.25 | 0.50 | 0.70 | 6.30 | 0.68 | −1.56 | 5.88 | 946 |
| Resources                                 | Land            | 2 | 0.44 | 78.13 | 0.88 | 0.71 | 2.63 | 1.36 | 0.82 | 0.18 | 1002 |
|                                            | Labour           | 2 | 0.36 | 81.93 | 0.90 | 0.78 | 2.66 | 1.33 | 0.60 | −0.31 | 866 |
|                                            | Capital          | 5 | 0.83 | 49.80 | 0.58 | 0.74 | 4.60 | 1.13 | −0.21 | −0.02 | 770 |
|                                            | Know-how         | 2 | 0.56 | 72.14 | 0.85 | 0.61 | 5.50 | 1.18 | −0.85 | 0.75 | 957 |
| Opportunities and Threats                 | Future CAP       | 3 | 0.83 | 45.50 | 0.66 | 0.40 | 2.99 | 1.11 | 0.30 | 0.00 | 895 |
|                                            | Regulations      | 4 | 0.66 | 67.18 | 0.68 | 0.83 | 4.12 | 1.29 | 0.01 | −0.22 | 976 |
|                                            | Market           | 3 | 0.79 | 60.37 | 0.61 | 0.69 | 4.21 | 1.18 | −0.04 | 0.19 | 934 |
|                                            | Local situation  | 3 | 0.74 | 51.47 | 0.70 | 0.52 | 4.35 | 1.10 | −0.06 | −0.05 | 940 |
|                                            | Schemes          | 3 | 0.81 | 50.98 | 0.68 | 0.52 | 4.50 | 1.01 | 0.17 | 0.37 | 867 |
|                                            | Consumer orientation | 2 | 0.76 | 61.91 | 0.78 | 0.38 | 4.93 | 0.95 | 0.24 | −0.02 | 945 |
|                                            | EU membership    | 2 | 0.47 | 76.28 | 0.87 | 0.69 | 5.20 | 1.36 | −0.70 | 0.28 | 977 |
|                                            | Services         | 3 | 0.59 | 62.41 | 0.71 | 0.70 | 5.27 | 1.03 | −0.42 | 0.42 | 973 |
|                                            | New technologies | 3 | 0.77 | 62.66 | 0.62 | 0.68 | 5.62 | 0.98 | −0.63 | 0.48 | 957 |
|                                            | Future prospects  | 5 | 0.97 | 53.01 | 0.54 | 0.76 | 4.57 | 1.03 | −0.14 | 0.39 | 960 |
as dummy variables to reduce the error term variance. The effects of strategy and country as categorical variables were obtained by comparing each to one of the existing strategies or countries. The proportion of the variation explained by the regression procedure is expressed by the coefficient of determination (R²). Calculations were performed with the IBM-SPSSstatistics19 package. Statistical significance was set at 1% and 5% probability levels.

**Results**

**Strategic groups**

 Farmers were asked to indicate in a list of 10 strategies their preferred choice for development of their farms. A PCA was conducted to summarise the data. The sixth component had an Eigen value below one, indicating that five components which explained 67% of the variance in the answers might be an appropriate solution. Each component represents a potential development path. The Wait and see component was positively correlated with wait and see and downsacleing, and negatively correlated with expanding production (r’s respectively 0.79; 0.72; −0.71). The Move component was positively correlated with relocation of the farm and starting a new farm (r’s 0.82 and 0.67). The Diversify component was positively correlated with diversifying into other agricultural and/or non-agricultural branches and, as expected, negatively correlated with specialisation in dairying (r’s 0.68; 0.72; −0.69). The Cooperate and Chain Integration components positively correlate with cooperation with other farmers and cooperation within the dairy chain, respectively (r’s 0.91 and 0.93).

Table 3 shows the strategic groups identified based on their different development path components (in left side column), together with the average development path scores for each group. These average scores were used to differentiate the various strategic groups and label them as shown. The number and percentage of farmers in each group is listed in the bottom row of Table 3.

The largest percentage of farmers (42%) choose the Independent specialisers development path (Table 3). These farmers had the most negative score for diversifying as a route of choice, which indicates they intended to focus on dairy farming. Moreover, they also had the most negative score for wait and see, indicating that they are more pro-active than the others in seeking to expand their farm operations. Related to this group were Cooperating specialisers (13%) who also focus on dairy farming. However, they emphasise cooperation with other farmers. The Chain integrators, who focus on activities associated with dairy farming, and the Wait and see groups each represented about 13% of all farmers. The latter group was more likely to scale down than to increase their operations. Diversification was an important strategy for 15% of the farmers; 10% pursue this strategy independently while 5% cooperate with other farmers or partners connected to dairy farming. Relocating the farm and/or starting a new farm was the strategy of choice for 5% of the farmers.

Table 4 shows the percentages of farmers in each strategic group for Lithuania, Poland and Slovenia. The strategic groups were not equally distributed across countries, although all strategic groups were represented in each country. In all three countries, most farmers are Independent specializers, but this group is more prominent in Poland (49%) and Lithuania (45%) than in Slovenia (31%). Likewise, Cooperating specialisers are more prominent in Slovenia (16%) and Poland (15%) than in Lithuania (8%). Farmers who wait and see are more common in Lithuania (19%). Chain integration is well developed in Poland (20%) and, to a lesser extent, in Slovenia (14%), but hardly at all in Lithuania (4%). Diversifying is an important strategy in Slovenia and Lithuania (about one-fifth of farmers), but not in Poland. In Lithuania farmers mainly diversify

| Development Paths (components) | 1 Wait & see Farmers N of farmers | 2 Movers Coop specializers | 3a Cooperating diversifiers N of farmers | 3b Independent diversifiers | 4 Chain integrators | 5a Cooperating specializers N of farmers | 5b Independent specializers |
|-----------------------------|---------------------------------|--------------------------|---------------------------------------|---------------------------|------------------|--------------------------------------|--------------------------|
| Wait & see                  | 2.12                            | −0.04                    | −0.14                                 | −0.50                     | −0.17            | −0.18                                | −0.23                     |
| Independent / Cooperate    | −0.30                           | −0.13                    | 1.88                                  | −0.30                     | −0.17            | 0.70                                 | −0.66                     |
| Diversify                  | 0.45                            | 0.09                     | −0.28                                 | −0.63                     | −0.17            | 2.58                                 | 1.19                      |
| Chain integration          | −0.52                           | −0.03                    | −0.11                                 | −0.37                     | 1.96             | 0.76                                 | −0.74                     |
| Move                       | −0.16                           | 4.16                     | −0.19                                 | −0.25                     | −0.27            | −0.07                                | −0.15                     |
| N of farmers               | 136                             | 132                      | 426                                   | 131                       | 57               | 98                                   |                           |
| Percentage                 | 13.2%                           | 4.7%                     | 12.8%                                 | 41.5%                     | 12.7%            | 5.6%                                 | 9.5%                      |

Underlined coefficients show highest absolute averages for the various strategic groups (N = 1028).

Table 3. Average scores on the development paths for each strategic group.
independently, whereas in Slovenia cooperative diversification is preferred.

**Farming goals across strategic groups and countries**

The PCA for the 26 usable farmers’ goals resulted in five components, labelled as Maximize profit, Sustainable farming, Work environment, Dairy tradition and Improve management. Two farming goal questions not included in the analysis were ‘work with animals’ and ‘improvement of grassland’. The former loaded similarly on the sustainability and the dairy tradition components, while the latter loaded similarly on sustainability and improvement of management.

Differences in farming goals between strategic groups were small, because the order of the goals, most important to least important, was rather similar (Table 5), but all goals were seen as important. Maximization of profit, that is earning sufficient money to support family, and running the farm efficiently and simply while keeping costs low, were the most important goals for all strategic groups. Improved management, that is, improvement of maize production, high milk production and high tech, scored lowest in importance. The Wait and See and the Cooperative diversifier groups found Dairy tradition, that is, keep farm in family, work together with family and work in the field, and Improve management less important than the other strategic groups.

The five farming goal components ranked similarly across the three countries (Table 6). In Poland, however, three of the farming goals were ranked lower than in the other two countries whereas Improve management was ranked higher. In Slovenia, Sustainability, that is, good animal welfare, nature and landscape, safe and best quality product, and sustainable cows, was ranked of higher importance and, conversely, Work environment, that is, own boss and working time, rural lifestyle and respected by community, was ranked of lower importance than in the other countries.

Overall, there were only small differences in appreciation of the farmers’ goal components. The Wait and See and Cooperating diversifier groups scored lower on some of the components, while the Polish and Slovenian farmers deviated in appreciation for four and two of the components, respectively.

**Resources across strategic groups and countries**

The PCA outcome for the 11 resources used resulted in four components labelled as Land, Labour, Capital and Know-how. Differences in availability of resources between strategic groups were small because the ranking of the resources, that is, from very difficult to obtain to very easy to obtain, was almost similar for all (Table 7). Land and Labour were the most difficult resources to obtain. The Cooperating diversifiers scored lower on availability of Capital, that is, EU subsidies, credit, machinery and milk quota and Know-how, that is, useful knowledge and advice.
Available resources were ranked similarly across countries (Table 8). But farmers in Poland were more optimistic on availability of resources than those in Lithuania, while those in Lithuania were more optimistic than those in Slovenia, except for Labour which is easier to obtain in Slovenia.

Overall, the ranking of the resource components by both the strategic groups and countries was broadly similar. However, there were some differences in scores for separate component across countries and to a lesser extent across strategic groups.

### Opportunities and threats across strategic groups and countries

The PCA procedure for the 26 opportunities and threats (O&T) yielded nine components, that is, Future of CAP, EU membership, Market, Regulations, Local situation, Schemes, Consumer orientation, Suppliers and New technologies. Future of CAP, that is, the new policies after 2015 and milk quota abolition, the Market, that is, for milk both international and local, Regulations, that is, veterinary, animal welfare, manure and fertiliser standards and inspection services, in this order, were considered big threats. New technologies, that is, information and communication technology, the Internet and associated technical developments, Suppliers, that is, farm services, and EU membership, that is, membership and subsidies, in this order, were the biggest opportunities.

Differences in the ranking of O&T between strategic groups existed, although they were rather small (Table 9). However, Movers saw the Local situation, that is, location of farm and land, more of a threat than do the other strategic groups, while the Chain integrators saw the Local situation more favourably. The Cooperating diversifiers were more negative about the Market (for milk) and Service suppliers than the other strategic groups, but expressed more enthusiasm towards Consumer orientation.

Differences in the scores for the various O&T components existed across countries (Table 10). In Slovenia, EU membership, the Market (for milk) and the Suppliers were scored lower, while in Lithuania farmers looked more optimistically on these components. Farmers in Poland judged their Local situation rather positively but were less enthusiastic about Consumer orientation, that is, their attention for the consumer and colleague farmers, whereas farmers in Slovenia were more positive towards Consumer orientation.

Overall, the ranking of the components from threat to opportunity was almost the same for all strategic groups and countries. Only small differences existed between strategic groups in appreciation of the O&T components. However, significant country effects on these components did exist.

### Model explaining performance

The PCA outcome for the five statements about future expectations resulted in one component called performance. The results of (OLS) regressing of farming goals, resources and O&T on performance are shown in Table 11. The components as explanatory variables (listed in Table 11, left column) did not show signs of collinearity (Variation Inflation Factor varied between 1.2 and 1.8). Strategies and countries were inserted as dummy variables. An F-test shows whether the model deteriorates when coefficients for a group of variables are fixed to zero. The F-statistics in Table 11 indicate that all elements in the model influence performance. Each element is discussed in more detail hereafter.

Strategy influenced future prospects of farmers ($F = 4.36; p < .01$). All strategic groups, except the Movers and Cooperating diversifiers had significantly
Table 9. Strategic groups described by the average scores for opportunities and threats.

| Opportunities & threats | 1 Farmers who Wait & see | 2 Movers | 3a Cooperating specializers | 3b Independent specializers | 4 Chain integrators | 5a Cooperating diversifiers | 5b Independent diversifiers |
|-------------------------|--------------------------|----------|----------------------------|-----------------------------|---------------------|-----------------------------|-----------------------------|
| Future CAP              | 3.12 (1)                 | 3.28 (1) | 3.00 (1)                   | 2.97 (1)                    | 2.79 (1)            | 2.87 (1)                    | 3.09 (1)                    |
| Regulations             | 3.91 (2)                 | 4.39 (3) | 4.21 (2)                   | 4.17 (2)                    | 4.14 (2)            | 3.82 (3)                    | 4.04 (2)                    |
| Market                  | 4.16 (4)                 | 4.44 (5) | 4.38 (3)                   | 4.20 (3)                    | 4.24 (3)            | 3.65 (2)                    | 4.27 (4)                    |
| Local situationb        | 4.06 (3)                 | 3.96 (2) | 4.46 (4)                   | 4.46 (4)                    | 4.53 (4)            | 4.28 (4)                    | 4.12 (3)                    |
| Schemes                 | 4.41 (4)                 | 4.42 (4) | 4.61 (5)                   | 4.47 (5)                    | 4.28 (5)            | 4.51 (5)                    | 4.41 (5)                    |
| Consumer orientationc   | 4.84 (6)                 | 5.19 (7) | 5.05 (6)                   | 4.87 (6)                    | 4.90 (6)            | 5.19 (8)                    | 4.86 (8)                    |
| EU membership           | 5.12 (7)                 | 4.90 (6) | 5.25 (7)                   | 5.25 (7)                    | 5.33 (8)            | 4.87 (6)                    | 5.20 (6)                    |
| Suppliers               | 5.25 (8)                 | 5.24 (8) | 5.30 (8)                   | 5.33 (8)                    | 5.32 (7)            | 4.78 (7)                    | 5.24 (7)                    |
| New technologies        | 5.29 (9)                 | 5.72 (9) | 5.65 (9)                   | 5.68 (9)                    | 5.71 (9)            | 5.57 (9)                    | 5.61 (9)                    |

| Countries (versus Lithuania) | Slovenia | Poland | Lithuania |
|-----------------------------|---------|--------|-----------|
| Future CAP                  | 2.78 (1)| 2.95 (1)| 3.25 (1) |
| Regulations                 | 3.93 (2)| 3.97 (2)| 4.44 (4) |
| Market                      | 3.94 (3)| 4.18 (3)| 4.53 (5) |
| Local situation             | 4.15 (4)| 4.65 (6)| 4.25 (2) |
| Schemes                     | 4.67 (5)| 4.51 (4)| 4.30 (3) |
| Consumer orientation        | 5.20 (8)| 4.63 (5)| 4.95 (6) |
| EU membership               | 4.74 (6)| 5.19 (7)| 5.68 (8) |
| Suppliers                   | 4.85 (7)| 5.36 (8)| 5.62 (7) |
| New technologies            | 5.59 (9)| 5.57 (9)| 5.71 (9) |

*aUnderlined significantly higher, that is, more an opportunity; Bold significantly lower, that is, more a threat, using LSD/SNK test (p < .05).
*bChain integrators not significantly different from cooperating and independent specialisers; movers not significantly different from farmers who wait & see and independent diversifiers.
*cCooperating diversifiers and movers not significantly different from cooperating specialisers.

higher future prospects than the Wait and see group.
The differences in future prospects scores between on one side the Specialisers, Independent diversifiers and Chain integrators and on the other side the Wait and see farmers ranged from 0.49 to 0.70. Farming goals influenced future prospects of farmers (F = 6.82; p < .01). Farmers who intend to improve farm management and sustainability are more positive about the future of their farm; a 1 unit improvement in management or sustainability resulted in a 0.12–0.18 improvement in performance. Resources also influenced future prospects of farmers (F = 6.27; p < .01) with EU membership being particularly important (b = 0.12). Finally, future prospects are influenced by O&T (F = 3.16; p < .01) with EU membership and New technologies both significantly positive (b = 0.08 and 0.19, respectively).

Strategy did not reduce the influence of farming goals, resources and O&T on future prospects (Table 11 compare left to right column) indicating that strategy is not a mediating variable. Thus, dairy farmers seem unable to make strategic decisions that make the best use of their resources, mitigate threats and take opportunities to achieve their personal goals. Instead, strategy, farming goals, resources and O&T influence farmers’ future prospects directly. Whether farmers consider themselves successful depends on their strategies, goals, resources and O&T. Therefore, our results do not provide evidence that farmers choose strategies to align their farm with the internal and external situation and thus improve their performance in this manner.
Discussion

Robustness of data and model

The data for this research have a subjective component because they were derived from opinions and expectations of farmers. Because of this, the timing of the interviews may have influenced the answers and the results may not be repeatable over time. To evaluate this, a proportion of the respondents (420 out of the 1028 farmers) were asked to answer exactly the same questions one year later. An analysis of the responses showed that the change in opinion in the interim year was small (Beldman et al. 2013, p. 79–81). This provides confidence for the robustness of the findings.

Similar models to that used in the present study were employed by Hansson (2007) and Ondersteijn et al. (2003). However, the variables behind the internal and external environments in Hansson’s (2007) study differed from ours. The internal environment consisted of farm layout, type of barn, conventional or organic production, and the micro-social environment with elements like presence of a successor and personal problems. The external environment was represented by the geographic location of the farm. Farm performance was studied in terms of efficiency scores. Ondersteijn et al. (2003) studied farm performance over a certain implementation period (thus change in performance), while our study is based on one year data.

In our study, strategies did not appear to be an intermediate factor between farming goals, available resources, perceived O&T and performance. The model that best fitted the data is shown schematically in Figure 2. Performance was similarly and independently related to strategies, farming goals, resources and O&T. All four of these elements in the model were also affected by the observed countries, i.e. differences between countries existed. Lack of support for our original model is in line with literature results showing that strategic decision making is not a linear but a more complicated process which takes place in a complex system (Hansson and Ferguson 2011; Hansen and Greve 2014). Also Hansson (2007) did not really differentiate between farm strategies and the internal components in their model. It was visualised as one complex expressing the farmer’s mission and vision.

Chosen strategies

Specialisation in dairy farming was the most common development path chosen. This is in line with the studies of Walford (2003), Chaplin et al. (2004) and Gorton et al. (2008), who described a production oriented mind-set of farmers in Europe. Nevertheless, in our study diversification into other agricultural branches was of some importance in Lithuania and Slovenia, while diversification into non-agricultural branches was only relevant in Slovenia. In 2005/2006, 1114 out of a total of 10,000 dairy farmers in Slovenia participated in a survey on future farm strategies (Klopcič et al. 2010). Half of the farmers planned to develop their farm business further, of which 56% proposed to do so by increasing the number of cows and 47% by starting or expanding into another branch of farming e.g. agri-tourism or special products (double choices were possible). Of the total sample of farmers, about 24% considered diversification compared with 22% in the present study. Six percent of the Slovenian farmers in the study of Klopcič et al. (2010) expressed interest in off farm employment while other studies also showed some interest in non-agricultural employment in Central Europe (Chaplin et al. 2004) and in Europe generally (Gorton et al. 2008). This interest in off-farm employment questions the belief that farming is the economic driver in rural areas (Chaplin et al. 2004). Hansson et al. (2013) studied family factors affecting the choice for diversification in Sweden, while Barbieri and Mahoney (2009) studied farmers who diversified their farm business in Texas, USA. This latter study showed that almost half of the diversified farmers were new entrants to agriculture and retired from another profession, and the majority did not have any formal training in agriculture. It was stated that attracting new entrants to agriculture for non-economic reasons may bring societal benefits such as maintaining rural landscapes, preserving heritage and natural resources conservation. The Wait and see

Figure 2. Model adjusted to data of study.
A strategic group in the present study can be seen in this context and is something that could be further explored. The results of this study also show that a Wait and see strategy has a negative influence on performance. This is in line with the findings of Verhees et al. (2011), who showed that pro-activeness, as an element of entrepreneurship, was the decisive factor in the performance of farmers.

A proportion of farmers showed an interest in cooperation but overall interest in cooperation was low particularly in Lithuania and Poland, most probably because of the unpopular role of cooperatives in communist times, and lack of trust between farmers (Milczarek-Andrzejewska et al. 2008; Pohar and Klopčić 2013).

**Internal and external environment**

Farmer goals, resources and O&T were quite similar across the seven strategic groups and, to a lesser degree, across the three countries. Land and labour availability appeared to be the most limiting factors for the farm development. Part of the farmers in this study from all three countries participated in a 3-day strategy development training. The 106 farmers that followed the Interactive Strategic Management (ISM) sessions discussed in detail the critical success factors associated with their future plans (Beldman et al. 2013, p. 74–76). They listed three critical success factors per future strategy: the farmer himself (health, family, competencies) 16%; the farm performance (economic and technical results, farm structure) 26%; and the economic environment (price of milk and production factors, availability of finance) 58%. Market prices and availability of finance were the most important in realising certain goals, which corresponds with the outcome of a study by Huirne et al. (1997) in Michigan, USA and the Netherlands.

O&T are perceived differently in the CEE countries than in Western Europe. In 2013, a sample of the Netherlands’ farmers was asked the same questions as were asked in this study. The Netherlands’ farmers were more positive towards the market and the abolition of the milk quota than the farmers from the CEE countries (Kuipers et al. 2013). It was postulated that farmers in the dairy intensive Western EU countries may have more self-confidence than farmers in the new EU countries.

**Impact**

The variation in attitude towards cooperation and non-agricultural activities should be of great interest to the countries involved in this study and to EU policy makers in guiding the dairy sector. The more pessimistic outlook of the CEE countries on market opportunities and a quota-free milk production environment shows that there are large differences in future perspectives across the different countries in the EU. Politicians and farmers’ organisations shall be aware of this and recognise especially the Wait and see and the Independent diversifier groups that are more concerned about certain issues. These segments need to be further analysed to better understand the background to their concerns.

Strategic decision-making is expected to improve farm performance. However, our results provide little evidence that farmers in CEE countries (yet) choose their strategies by matching external O&T with internal weaknesses to achieve their goals. It would be helpful to check this outcome in other small scale farming regions in a similar stage of development. Moreover, it is desirable to repeat this analysis with recent data to cover the changing situation in the dairy sector. Therefore, part of the farmers in the three countries and an added group of farmers in the Netherlands were asked the same questions as in this study in years 2013 and 2016. The data will be analysed and results reported in year to come.

**Conclusions**

A large dataset on the opinions of dairy farmers was compiled and analysed to study strategic decision making in three CEE countries – Poland, Lithuania and Slovenia. These conclusions address the following four questions which were posed in the study.

1. **Which strategies do dairy farmers in these countries choose to develop their farm?** The results revealed seven farmer groups each indicating a certain strategic development path: Wait and see, Movers, Specialisers (cooperating and independent), Chain integrators and Diversifiers (cooperating and independent). All strategic groups were represented in each country, but in different proportions. The main strategy was specialising in dairy production. Polish farmers had the highest interest in specialising, Slovenian farmers had the greatest interest in diversifying and Lithuanian farmers had the least interest in cooperation and chain integration.

2. **Which goals do farmers have, how do they think about the availability of resources and which opportunities and threats do they see?** Perceived farming goals, resources and O&T ranked rather similar for
the various strategic groups and countries. However, Wait and see farmers and Cooperating diversifiers scored lower on several components than the other strategic groups. Differences among countries in farming goals, resources and O&T were more common than differences amongst strategic groups. Polish farmers scored lower on maximising profit, sustainability and dairy tradition, while Slovenian farmers scored lower on the work environment. Land and labour are the biggest constraints to farm development in all three countries. Polish farmers were more positive about the availability of land, capital and know-how, while Slovenian farmers saw fewer problems in sourcing labour. Lithuanian farmers were more optimistic in seeing opportunities like the perspectives of the EU, milk market and local services, while Polish farmers were more positive about their local situation, and Slovenian farmers were more client oriented.

3. **Do farmers’ goals and the farm’s internal and external environment influence farmers’ strategic choices?** The various components of dairy farmers’ goals, resources, and O&T did not substantially differ in ranking between the seven strategic groups. Farmers’ goals, resources, and O&T were not significantly associated with strategy formation.

4. **Do strategic choices of dairy farmers affect their performance?** Strategy appeared not to be a mediating variable amongst farming goals, resources, O&T on the one side and future prospects (performance) on the other. Moreover, the results do not support the idea that strategies are chosen based on goals, available resources and perceived O&T. Instead, all factors affected the perceived farm performance directly. Consequently, there is little evidence that strategic decision-making is (yet) practised by dairy farmers in Central and Eastern Europe.

**Ethical approval**

Research reported in the article has been conducted in an ethical and responsible manner, in full compliance with all relevant codes of experimentation and legislation.

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