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SOME DIFFERENCES OF INNOVATION POTENTIAL IN AGRICULTURAL FARMS IN SOUTH GREAT PLAIN REGION IN HUNGARY

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ABSTRACT – SOME DIFFERENCES OF INNOVATION POTENTIAL IN AGRICULTURAL FARMS IN SOUTH GREAT PLAIN REGION IN HUNGARY

Agriculture as a special branch of economy may have different attitudes against the developments, innovations and 129 million Euros from which almost 80% is the loss of South Great Plain, North Great Plain, and South Transdanubia changes. According to a study of Central Statistical Office in 2008, the value of the cancelled investments approaches Due to the developments cancelled, the technical level of agricultural property did not improve significantly contributing to the decrease of economic significance of the sector. Moreover, the usage of outdated machines and equipment reduces the competitiveness of agriculture. The article attempts to carry out an investigation of the development factors expected by agricultural ventures producers. The investigation based on 265 questionnaires collected in 2009 the sum of the total area the questionnaires covered was more than 131 thousand hectares. This paper shows some data of the technical stages, and some pre-requisites of development possibilities. The work financed by NKTH by the support of BAROSS DA_ELEM_07_ MGK_INNO tender.

Keywords: innovation activity, agriculture, development factors, pre-requisites, Welch-test

INTRODUCTION

Innovation as the request of the continuous economic development needs special attention in agriculture (MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT, 2008). Agriculture as a special branch of economy may have different attitudes against the developments, innovations, and changes. The question we are asking are seeking an answer to is what the size dependent differences are in agricultural firms. According to HESZKY's (2008) opinion it is clear that the challenges with we face in the 21st century are greater than whose we faced in last century. As Udovecz and his co-authors' (2009) point out there are just few enterprises owned by Hungarians which could expand its activity especially because of lack of capital, application of outmoded technologies and a remarkably low level of innovation. Therefore, besides other important aspects, innovation is necessary for gaining the capability of adaptation. According to BODNAR AND KIS' investigation several enterprises provide the possibility for employees of getting knowledge in logistics in different ways. One part of small and medium enterprisec fight for survive so application develop logistics at these firms would be too much requirement in this situation (BODNAR AND KIS, 2004). This work uses and utilizes only a little part of a big database so some general but narrow conclusion could be drawn.

MATERIALS AND METHODS

The work is based on primary data coming from 265 detailed questionnaires. All questionnaires include approximately 240 data inputs, so the raw data amount means about 60 thousand primary data.

The base result did not need difficult methods. Therefore, mainly MS Excel or OpenOffice were used in order to examine simple relationships between data. Somewhere the questionnaire was partly filled, or contained missing, or false data. In

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that cases data were revised or uniformed. Questions were open or scale types "If...then", "Yes/No", and "scale" questions, so the average of the values were between 0 and 1.

In this study, we compared the companies' capacities and factors below the 200 Million HUF/year net sales and over. Moreover the differences were compared in time, what was the situation in the past, the present and what is the own forecast of the firms to the future. The whole database was divided into two parts, and d-test (Welch -test) were used to compare the groups.

Welch-test (d-test):

$$t = \frac{\bar{x} - \bar{y}}{\sqrt{\frac{s_x^2}{n} + \frac{s_y^2}{m}}}$$

where

- $\bar{x}$ the average of the either variable in the sample,
- $\bar{y}$ the average of the other variable in the sample,
- s_x the estimated variance of the either variable,
- s_y the estimated variance of the other variable,
- n number of element of the either data
- m number of elements of the other data

The "n" value (number of answers) was more than 120 in every line of questions, so regarding to the Student-table, the significance level for 5 % is 2,358 and for 1 % is 2,617. Over those values significant differences were found between the groups (see Tables). We marked the presence of significant differences with "+', and the lack of it by "-" sign. The tables contain 14 lines with different questions, in reference of the financial, business, production aspect of activities of the firm.

RESULTS

Firms independently their sizes statistically and equally agree in lot of questions. Statistically there is no difference of the presence or lack of the first question the "Middle term business plan".

Table: 1: **Differences in different capacity and activity of firms (present)**

Present	Below 200 M HUF/year net sales		Over 200 M HUF/year net sales				
	Average	S.D.	Average	S.D.	Welch value	Sign (5%)	Sign (1%)
1. Middle term business plan	0.517	0.502	0.538	0.503	0.2570	-	-
2. Investment plan or project plan	**0.545**	**0.500**	**0.765**	**0.428**	**2.8609**	+	+
3. Short term bank loan	**0.444**	**0.499**	**0.635**	**0.486**	**2.3276**	+	+
4. Investment credit	**0.513**	**0.502**	**0.706**	**0.460**	**2.4108**	+	+
5. Own Web-page	0.193	0.396	0.294	0.460	1.3599	-	-
6. Internet access	**0.829**	**0.378**	**0.980**	**0.140**	**3.7760**	+	+
7. Patent or know-how	0.035	0.186	0.020	0.143	0.5581	-	-
8. Innovation	0.106	0.309	0.100	0.303	0.1196	-	-
9. Own new varieties, species	**0.035**	**0.185**	**0.000**	**0.000**	**2.0271**	+	-
10. Commercial or trade unit, shop	**0.043**	**0.205**	**0.137**	**0.348**	**1.7938**	+	-

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Present	Below 200 M HUF/year net sales		Over 200 M HUF/year net sales				
11. Depot or store capacity	**0.733**	**0.444**	**0.922**	**0.272**	**3.3869**	**+**	**+**
12. Transport capacity	**0.622**	**0.487**	**0.843**	**0.367**	**3.2493**	**+**	**+**
13. Sales contracts	**0.807**	**0.397**	**1.000**	**0.000**	**5.3170**	**+**	**+**
14. Complete machinery	**0.628**	**0.485**	**0.796**	**0.407**	**2.2663**	**+**	**-**

Approximately a bit more than 50 % of the firms has this very important document. The craggy difference occurs in the other type of plan (Question 2), the "Investment, or Project plan". If bigger companies have a project plan, it should sign a stronger investment purpose. Generally, there are significant differences in the presence of investment plans, bank loans, investment credits, the financial possibilities. This means the advantages of the bigger companies.

Table 1 shows that significant differences occur mainly in the 2-6, and 9-13 questions. Bigger companies - over 200 million HUF/year net sales - are stronger in planning, financial, and informatics background, depot stores, and machinery. These features could be observed in Table 2 and Table 3 as well (past and future).There is only one question (13. Sales contract) in connection of which the biggest companies gave "yes" answers in 100 % in the past, present and future. Smaller firms have no sales contract in 100%. The ratio is high but reaches only the 80.2 % in the present, and were 85.2 % in the past. The high value signs that companies try to increase the market safety.

Table 2: **Differences in different capacity and activity of firms (past)**

Past	Below 200 M HUF/year net sales		Over 200 M HUF/year net sales				
	Average	S.D.	Average	S.D.	Welch-test	Sign (5%)	Sign (1%)
1. Middle term business plan	**0.585**	**0.495**	**0.735**	**0.446**	**1.8763**	**+**	**-**
2. Investment plan or project plan	**0.575**	**0.497**	**0.750**	**0.438**	**2.1961**	**+**	**-**
3. Short term bank loan	**0.589**	**0.494**	**0.813**	**0.394**	**3.0096**	**+**	**+**
4. Investment credit	**0.574**	**0.497**	**0.878**	**0.331**	**4.5120**	**+**	**+**
5. Own Web-page	0.124	0.331	0.188	0.394	0.9730	-	-
6. Internet access	**0.543**	**0.501**	**0.796**	**0.407**	**3.3314**	**+**	**+**
7. Patent or know-how	0.029	0.168	0.021	0.146	0.2812	-	-
8. Innovation	0.124	0.331	0.149	0.360	0.4077	-	-
9. Own new varieties, species	**0.048**	**0.214**	**0.000**	**0.000**	**2.2804**	**+**	**-**
10. Commercial or trade unit, shop	**0.086**	**0.281**	**0.327**	**0.474**	**3.2970**	**+**	**+**
11. Depot or store capacity	**0.716**	**0.453**	**0.920**	**0.274**	**3.5125**	**+**	**+**
12. Transport capacity	**0.654**	**0.478**	**0.857**	**0.354**	**2.9648**	**+**	**+**
13. Sales contracts	**0.852**	**0.357**	**1.000**	**0.000**	**4.3138**	**+**	**+**
14. Complete machinery	0.610	0.490	0.729	0.449	1.4851	-	-

Although there are no significant differences in questions 6, 7 and 8, some increasing tendency could be observed in the question 7, which is the presence of patents and know-how. In the past the value was 0.029 and 0.021 (2.9 % and 2.1 % of firms had some patents or know-how), in the present this value increased to 0.035, and 0.02 (3.5% and 2 %), and in the future these values are expected to be 0.057, and 0.043 (5.7 % ad 4.3 %). In both periods, smaller firms showed higher values in this "innovation marker"

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activity and all data show a weak or moderate increase of innovation activity in both sectors.

Table 3: **Differences in different capacity of firms (Future)**

Future in plan	Below 200 M HUF/year net sales		Over 200 M HUF/year net sales				
	Average	S.D.	Average	S.D.	Welch-test	Sign (5%)	Sign (1%)
1. Middle term business plan	**0.578**	**0.496**	**0.735**	**0.446**	**1.9714**	**+**	**-**
2. Investment plan or project plan	**0.636**	**0.484**	**0.792**	**0.410**	**2.0693**	**+**	**-**
3. Short term bank loan	**0.443**	**0.499**	**0.735**	**0.446**	**3.6380**	**+**	**+**
4. Investment credit	**0.542**	**0.501**	**0.809**	**0.398**	**3.5270**	**+**	**+**
5. Own Web-page	0.370	0.485	0.457	0.504	0.9822	-	-
6. Internet access	**0.858**	**0.350**	**0.957**	**0.204**	**2.1895**	**+**	**-**
7. Patent or know-how	0.057	0.233	0.043	0.206	0.3598	-	-
8. Innovation	0.131	0.339	0.222	0.420	1.2922	-	-
9. Own new varieties, species	0.056	0.231	0.022	0.147	1.1014	-	-
10. Commercial or trade unit, shop	0.128	0.336	0.174	0.383	0.6992	-	-
11. Depot or store capacity	**0.809**	**0.395**	**0.939**	**0.242**	**2.5363**	**+**	**+**
12. Transport capacity	**0.679**	**0.469**	**0.851**	**0.360**	**2.4917**	**+**	**+**
13. Sales contracts	**0.850**	**0.358**	**1.000**	**0.000**	**4.3171**	**+**	**+**
14. Complete machinery	0.724	0.449	0.778	0.420	0.7056	-	-

We got almost the same result, if we compare question 8 in the target groups. Although there is no significant difference between the sizes of the firms, but we can also observe an increasing trend in time, concerning the bigger companies mainly.

Table 4: **Changes of absolute average values in time (decrease, or increase)**

	From past to present		From present to future	
	Under 200 Million HUF/Year	Over 200 Million HUF/Year	Under 200 Million HUF/Year	Over 200 Million HUF/Year
1. Middle term business plan	-6.80%	-19.60%	6.10%	19.62%
2. Investment plan or project plan	-3.00%	1.47%	9.01%	2.70%
3. Short term bank loan	-14.43%	-17.79%	-0.10%	10.01%
4. Investment credit	-6.08%	-17.17%	2.88%	10.26%
5. Own Web-page	**6.92%**	**10.66%**	**17.74%**	**16.24%**
6. Internet access	**28.62%**	**18.45%**	2.94%	-2.29%
7. Patent or know-how	0.66%	-0.09%	2.17%	2.31%
8. Innovation	-1.76%	-4.89%	2.46%	**12.22%**
9. Own new varieties, species	-1.25%	0.00%	2.10%	2.17%
10. Commercial or trade unit, shop	-4.22%	**-18.93%**	8.50%	3.67%
11. Depot or store capacity	1.77%	0.16%	7.58%	1.72%
12. Transport capacity	-3.24%	-1.40%	5.71%	0.79%
13. Sales contracts	-4.51%	0.00%	4.37%	0.00%
14. Complete machinery	1.88%	6.68%	9.55%	-1.81%

We collected the changes of different questions in time in Table 4. Generally, there were no big differences if we compare the past, present and the planned future capacities in the same questions. Strong changes could be measured in certain cases. BODNAR ET AL 2005 found in their investigation that those farmers who planned to develop and expand their enterprise, regardless of the type of the enterprise, had knowledge about financial resources, application-systems and application possibilities at approximately the same rate.

For example the development of internet access were done in the past, and the increase of innovation activity is planned in the bigger companies, and bigger companies gave up the trade units in the past, but now the own trade unit ratio increasing again (Table 4).

CONCLUSION

Differences depending on the size of agricultural firms could be examined in various aspects. Mainly the business planning and financial background is the handicap for the smaller firms. Bigger companies have more developed production, financial and trade background (machinery, plans, transport, depots), but the dynamics of internet access was developed in the smaller farms in the past.

Comparing agricultural companies by net sales showed significant differences in some cases but the differences were not univocal in the innovation type questions. Only some weak correlations were found in this point of view but there is no determined relationship between the size and the innovation.

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