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A Complex Model of Factors that Influence Entrepreneurship in the Beekeeping Sector

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Abstract. Research meant to promote and extend beekeeping is undertaken in many countries of the world. As part of the research that tries to find the factors that determine a revival of the beekeeping sector, the present study analyses the factors that influence the probability of becoming an entrepreneur in the beekeeping sector. The method used is the logistic regression, model that predicts the probability of an event occurring for a given person. According to the results of the logistic regression model, the following factors determine beekeepers' intention to start an enterprise: the modernization of the beekeeping exploitation, collaboration with other enterprises from the beekeeping sector, belonging to a beekeeping association (different from Romanian Beekeepers' Association), the strategy to export beekeeping products and to create alliances with other enterprises, the commercialization of bee products by distribution to a few stores and the age of beekeepers. The present study emphasizes the role of beekeepers' social capital and their ability to acquire modern technology as two of the most important sources of opportunities that influence the emergence of new and profitable beekeeping enterprises.

Key words: beekeeping, entrepreneurship, logistic regression, influencing factors

INTRODUCTION

The entrepreneurship phenomenon is defined in many ways by different researchers either as the creation of a new enterprise (Low and MacMillan, 1988), or as a purposeful activity meant to initiate, maintain and aggrandize a profit-oriented business (Cole, 1949). Entrepreneurship is also considered to be the process of creating something different with value, by devoting the necessary time and effort, assuming the accompanying financial, psychological, and social risks and receiving the resulting rewards of monetary and personal satisfaction (Hisrisch and Peters, 1989). More precisely, the field of entrepreneurship is defined as the scholarly examination of how, by whom, and with what effects opportunities to create future goods and services are discovered, evaluated, and exploited (Venkataraman, 1997). Consequently, the field involves the study of sources of opportunities; the processes of discovery, evaluation, and exploitation of opportunities; and the set of individuals who discover, evaluate, and exploit them (Shane and Venkataraman, 2000). One of the most popular theoretical perspectives in the debate about entrepreneurship and small business formation is "the network approach to entrepreneurship" (Aldrich and Zimmer, 1986). This literature assumes that network resources, networking activities and network support are heavily used to establish new firms (network founding hypothesis) (Brüderl and Preisendörfer, 1998) as entrepreneurs benefit from social networks in the start-up period of their businesses. Burt (1992) sustains the fact that social networks stimulate entrepreneurship. Moreover, network contacts can provide access to customers and suppliers which determines the success of a new business (Brüderl and Preisendörfer, 1998). Collaboration with other

enterprises is expressed by social relations and social contacts that represent important channels for gaining access to information. Collaboration gives entrepreneurs the possibility to gather reliable information on market conditions and opportunities. According to a study conducted by the National Council for Private Small and Medium Enterprises from Romania (on a sample of 1485 enterprises), in the North-West Region of Romania entrepreneurs have indicated the following business opportunities.

Tab. 1

Business opportunities for Small and Medium Sized Private Enterprises in the North-West Region of Romania (2009)

No.	Business opportunities in 2009	Percent (%)
1.	Increase domestic sales	78.91%
2.	Increase exports	3.91%
3.	Use modern technologies	26.56%
4.	Penetration on new markets	57.81%
5.	Assimilation of new products	63.28%
6.	Forming business partnerships	12.50%
7.	Obtaining a grant	9.38%

Source: White Paper on Small and Medium Sized Private Enterprises 2010, CNIPMMR

Beekeepers who intend to export their products are also interested in starting a business because they want to penetrate the EU honey markets with highly processed and branded products as an export price increase is not possible with a bulk product (Nyárs, 2003).

Tab. 2

Romanian exports and imports of honey during 2000 – 2009

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Import	137	506	739	232	52	21	63	315	777	515.5
Export	7,501	6,862	5,784	9,633	8,757	6,632	9,606	6,255	7,087	10,654.1

Source: National Institute of Statistics

The export of beekeeping products can only be successful if enterprises sell branded products with quality assurance certifications and consumer-friendly packages (Nyárs, 2003). Moreover, the government should support and promote the Romanian honey as a high quality natural product, as this quality is frequently underestimated if honey is sold wholesale. Moreover, bureaucracy that sometimes hinders Romanian beekeepers from selling their products abroad should be reduced.

Over the past years there has been a remarkable growth in strategic alliances across all business sectors (Chen and Chen, 2003). Strategic alliances have developed in significance as a means of doing business across nations (Kauser and Shaw, 2004). A strategic alliance is defined as a business relationship, partnership or coalition between organizations meant to minimize organizational costs, share risks, integrate business functions and improve competitive strengths (Chand and Katou, 2011). Alliances are considered to be critically important to entrepreneurial firms (Alvarez and Barney, 2001; Ireland et al., 2006). Entrepreneurial firms initiate alliances to manage challenges associated with technology and to expand to international markets (Leiblein and Reuer, 2004).

Empirical evidence shows that younger individuals are more likely to start a new firm than older ones (Levesque and Minniti, 2003). According to Reynolds et al. (2003), the probability of becoming an entrepreneur is most likely between 25 and 35 years. These theoretical findings are supported by Blanchflower (2004) who sustains the fact that the likelihood of being a nascent entrepreneur is maximized among young individuals.

MATERIALS AND METHODS

The data within the present study was collected through a survey administered to a sample composed of 420 beekeepers from the North-West Region of Romania. The survey was conducted between November 2010 and February 2011. The North-West Region (Northern Transylvania) was set-up on the grounds of the Law 151/1998, modified by Law 315/2004, through the volunteer association of the local public administrations from the counties of Bihor, Bistrita-Nasaud, Cluj, Maramures, Satu-Mare and Salaj. The work tool used was the questionnaire, distributed during beekeepers' meetings, by post and on the internet.

The statistical method used for the analysis of the data is the logistic regression as the purpose of the present study represents the identification of the factors that influence the intention to start an enterprise. Logistic regression is multiple regression, but with an outcome variable that is a categorical variable and predictor variables that are continuous or categorical (Field, 2009). Therefore, it can be predicted which of two categories a person is likely to belong. The category analysed within the present study is the beekeeper as an entrepreneur who intends to start a beekeeping enterprise. In opposition to this category, there is the beekeeper as a non-entrepreneur who does not intend to start a beekeeping enterprise. In order to determine the factors that influence the probability for a beekeeper to start a beekeeping enterprise, the present study analyses a set of variables. The discrimination power of the variables was tested using the ROC (Receiver Operating Characteristic) curves and the AUROC statistics (Under Area ROC).

RESULTS AND DISCUSSION

The beekeeping sector plays a major role in the socio-economic development and environmental conservation as it is a source of food, raw material for various industries, medicine and income for the people. The development of entrepreneurship in the beekeeping sector is an important component of integrated rural development programs and an important source of employment creation for the rural people as unemployment is one of the major economic problems in Romania (National Romanian Agency for Employment). Therefore, research is needed concerning the factors that determine entrepreneurship in the beekeeping sector. Moreover, the beekeeping sector has an economic impact through direct effects (the gross value of production), indirect effects (demand stimulated in linked sectors) and crop pollination effects (Moniruzzaman and Rahman, 2009). The total number of beekeeping enterprises that were registered during 2007-2010 in the North-West Region of Romania is presented in Table 3.

Tab. 3

The total number of registrations of beekeeping enterprises during 2007 – 2010 in the North-West Region of Romania

County	Family enterprise	Individual enterprise	Sole proprietorship	Limited Liability Company	Total
Bihor	2	16	173	10	201
Bistrița-Năsăud	9	9	278	7	303
Cluj	1	14	162	15	192
Maramureş	7	73	189	3	272
Satu-Mare	0	6	165	1	172
Sălaj	1	22	282	8	313

Source: Own calculations after data from the National Trade Register Office

Regarding the socio-demographic profile of the respondents, it can be noted that the age groups between 25 and 64 years old are found in approximately equal proportions. The majority of beekeepers are between 35 and 44 years old (24,5%). The median age of the sample is 45.

Tab. 4

Profile of beekeepers from the sample

Variable	Category	Percent (%)
Beekeepers' Age	18-24	6.0
	25-34	19.5
	35-44	24.5
	45-54	19.3
	55-64	22.6
	over 64 years	8.1
Education	Maximum 8 classes	3.8
	Vocational school	15.5
	High school	27.6
	Post high school	14.8
	University degree	38.3
The income per household member (the last month)	maximum 60 €	14.0
	61-100 €	19.5
	101-200 €	19.0
	201-250 €	16.2
	over 250 €	28.6
Apiary size (number of colonies of bees)	maximum 50 colonies of bees	47.1
	51-100 colonies of bees	31.4
	101-150 colonies of bees	10.7
	over 150 colonies of bees	10.7
Type of beekeeping exploitation	Amateur beekeeper	54.0
	Sole proprietorship	34.5
	Individual enterprise	6.7
	Family enterprise	4.5
	Limited Liability Company	0.2

The logistic regression model was estimated in SPSS statistical program using the variables that have discrimination power. Within this model, the explanatory variables are the influencing factors of starting an enterprise. The statistically significant variables at a threshold of 5% are represented in the following table:

Tab. 5

Explanatory variables used in the construction of the models

Notation	Description	Values
MODERNIZ	Intention to modernize the beekeeping exploitation	1=Yes, 2=No
COLAB	Collaboration with other enterprises from the beekeeping sector	1=I do not collaborate, 2=Very rarely, 3=Rarely, 4=Often, 5=Very often
OTHER_ASSOC	Belonging to another beekeeping association (different from Romanian Beekeepers' Association)	1=Yes, 2 = No, but I intend to subscribe, 3 = No and I do not intend to subscribe
STRAT_EXP	The strategy to export bee products	1=Yes, 2=No
STRAT_ALLIANCES	The strategy to initiate alliances with other enterprises	1=Yes, 2=No

Notation	Description	Values
DISTRIB_STORES	Commercialize bee products by distribution to a few stores	1=Yes, 2=No
AGE_GR	Beekeepers' age by groups	1=18-24, 2=25-34, 3=35-44, 4=45-54, 5=55-64, 6=over 64 years

The results of the logistic estimation are presented in Table 6.

The probability for a beekeeper to start an enterprise is taken as the dependent variable in identifying the factors that influence the entrepreneurial behaviour in the beekeeping sector.

Tab. 6

The results of the logistic regression on the estimation sample regarding the intention to start a business in the beekeeping sector

The dependant variable: the probability for a beekeeper to start an enterprise

Explanatory variable	Coefficient	Standard error	Wald Statistics	p value
CONST	10.002	1.861	28.877	0.000
MODERNIZ	-2.231	1.070	4.343	0.037
COLAB	0.356	0.099	12.869	0.000
OTHER_ASSOC	-0.799	0.258	9.584	0.002
STRAT_EXPORT	-0.663	0.279	5.638	0.018
STRAT_ALLAINCES	-0.904	0.299	9.166	0.002
DISTRIB_STORES	-1.428	0.527	7.454	0.006
AGE_GR	-0.487	0.099	23.944	0.000
Number of observations: 416 Cox & Snell R^2= 0.276 Nagelkerke R^2=0.379 Hosmer and Lemeshow test Chi ^{2}(8)=2,582, p=0.958				

Source: Own calculations in SPSS

The logistic function has the following form:

$$\ln\left[\frac{P_i}{1-P_i}\right] = 10.002 - 2.231\ MODERNIZ_i + 0.356\ COLAB_i - 0.799\ OTHER\_ASOC_i - 0.663\ STRAT\_EXPORT_i - 0.904\ STRAT\_ALLIANCES_i - 1.428\ DISTRIB\_SHOPS_i - 0.487\ AGE\_GROUP_i + \varepsilon_i$$

i = the code of the respondent

Cox & Snell R^2 values, Nagelkerke R^2 and the result of the Hosmer and Lemeshow test obtained for the estimation sample indicate that the current model respects the exigencies of good econometrical standards. The Hosmer and Lemeshow test shows the fact that the significance threshold is 0,958, that is over the threshold of 5%, fact that confirms the null hypothesis according to which the model is significant, the estimated values are close to the real ones. The estimation sample is composed of 416 persons, as the persons that did not answer to the questions analysed in the model were excluded. The coefficients were tested using the Wald test. The Wald statistic is usually used to ascertain whether a variable is a significant predictor of the outcome. If the coefficient is significantly different from zero, then it can be assumed that the explanatory variable has a significant contribution in the prediction of the outcome (Field, 2009). The coefficients are statistically significant at a significance threshold of 0,05. As for the variables, the significance level is below 0,05 and therefore the null hypothesis, according to which the independent variable does not contribute to the

explanation of the dependent variable, is rejected. The explanatory variables from the model have the signs in accordance to the economic theory. Beekeepers who intend to modernize their beekeeping exploitations, who collaborate with other beekeeping enterprises, who are members of a separate beekeeping association (different from Romanian Beekeepers' Association), whose business strategies are the export of beekeeping products and the creation of alliances with other enterprises, who commercialize their products by distribution to a few stores and who are young start a beekeeping enterprise with a greater probability.

The modernization of the beekeeping exploitation is the first step that has to be taken before the decision to engage in entrepreneurial behaviour. The modernization of the apiary will engender increased financial performance and competitiveness. The Romania beekeeping industry requires coordinated collaboration among all beekeeping enterprises that should increase communication between beekeepers and provide guidance and support in the process of establishing new businesses. All associations of beekeepers are meant to advice and assist beekeepers who want to become entrepreneurs and facilitate their access to markets. In addition, starting a business would facilitate the export of bee products to the European Union as Romanian beekeepers do not have experience in accessing international markets and this can be a constraint on their profitability. This is the reason why they want to start their own enterprise and therefore engage in strategic alliances. Beekeeping firms use strategic alliances to explore new markets and gain access to resources such as financial capital. By working together, beekeepers can achieve mutual objectives and benefits. Entrepreneurs in the beekeeping sector initiate inter-firm links that involve exchange, sharing or co-development as the enterprise development effort is dependent on the functioning of the respective industry value chain. Moreover, in this way, beekeeping firms combine their resources and capabilities in order to create a competitive advantage.

Beekeepers who distribute their products to a few stores usually want to start their own enterprise as this type of dependence creates a high level of risk in case those stores stop receiving beekeeping products. On the other hand, this type of stores usually maintain more than one product brand and this can result in conflict of interest between products. By selling their products through their own retail stores, beekeepers can improve the efficiency by eliminating the selling expenses that usually occur between the producer and the retailers. Moreover, if beekeepers sell their products in their own stores, they detain maximum control over the products sold to the market. Beekeepers' age is also a factor that influences the decision to start a business, this process being undertaken mainly by young people. The younger the beekeepers are, the more likely it is for them to start a business. Consequently, the probability of becoming an entrepreneur in the beekeeping sector decreases with age.

Entrepreneurship in the beekeeping sector is sustained by modernization of the technology used and the development of beekeepers' management skills. The development of entrepreneurship in the beekeeping sector is based on opportunity identification (developing the ability to perceive opportunities) and opportunity exploitation (clear identification of suitable markets and market niches for specific beekeeping products).

CONCLUSIONS

Entrepreneurship is focused on the transformation of small scale beekeeping exploitations into viable market oriented enterprises able to commercialize a wide range of apiary products in order to generate substantial revenues. Entrepreneurship represents a strategy for generating supplemental income for rural beekeepers and, therefore, the analysis of the factors that determine entrepreneurship in the beekeeping sector is of extreme

importance. In this way, the most important factors maintained in the logistic regression model are: the modernization of the beekeeping exploitation, collaboration with other enterprises from the beekeeping sector, belonging to another beekeeping association (different from Romanian Beekeepers' Association), the strategy to export beekeeping products and to create alliances with other enterprises, the commercialization of beekeeping products by distribution to a few stores and the age of beekeepers. Using logistic regression, the present study demonstrates the fact that all of these variables predict the intention to start a business in the beekeeping sector.

The lack of technical know-how concerning modern hive management practices, processing and packaging techniques is a major constraint that hinders entrepreneurship in the beekeeping sector. This constrain can be abolished through the modernization of the apiaries, collaboration and strategic alliances with other enterprises. As a conclusion, it can be stated that nascent entrepreneurs in the beekeeping sector should invest in the modernization of their apiaries and establish partnerships with a wide range of national and foreign enterprises. Moreover, entrepreneurs should identify opportunities to add value to products (branding, certification) and improve their marketing strategies in order to meet consumers' requirements and identify the most profitable markets. These entrepreneurial strategies represent a solution for the development of the beekeeping sector, generating the increase of the sector competitiveness and strong value chain linkages through collaboration and strategic alliances.

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