Entrepreneurial behavior in the beekeeping sector as determinant of sustainable development

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Abstract
The role of entrepreneurship in the development of a more sustainable society has been recently sustained and debated. Using factor analysis, the present research emphasizes three categories of beekeepers from the North West Region of Romania that are inclined towards an entrepreneurial behavior. The current study proposes certain actions that each category should undertake in order to achieve sustainable development. Entrepreneurship fosters sustainability as the bees are essential to biodiversity. Moreover, through entrepreneurship, beekeepers can increase their revenues and enrich their social capital. The innovative entrepreneurial behaviour determines improved production conditions in order to maximize the production, together with the reduction of costs. Entrepreneurship influences sustainable development as it entails a better access to certain markets and opportunity recognition. The entrepreneurial behaviour influences sustainable development through the maximization of the rural beekeepers' income and by reducing poverty, maintaining the biological systems through pollination. Entrepreneurship as a strategy for the improvement of sustainability combines the interests of beekeepers and of the environment. Therefore, entrepreneurship in the beekeeping sector is considered to be a factor that influences sustainable development.

Key words: entrepreneurship, sustainable development, opportunity, innovation, biodiversity

Introduction

Entrepreneurship is considered to be a major conduit for sustainable products and processes (Hall *et al.*, 2010). Entrepreneurship fosters sustainable development (Brugmann and Prahalad, 2007) and can be a solution for many social and environmental concerns. Authors like Brown (2006) emphasize the role of entrepreneurship in the transition to a more sustainable society. Entrepreneurship is defined as the discovery and evaluation of opportunities (Shane, 2004; Shane and Venkataraman, 2000) as well as the creation of new opportunities and possibilities (Sarasvathy and Venkataraman, 2009).

Sustainable development represents a development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland, 1987). Sustainable development is a concept that describes the social goal of improving and maintaining human wellbeing over a long-term time horizon within the critical limits of life-sustaining ecosystems (UN Conference on the Human Environment, 1972).

Researchers that analyse sustainable development from an entrepreneurial orientation start from Schumpeter's (1942) concept of “creative destruction” arguing that new sustainability pressures create various types of market failure, opening up opportunities for new entrants (Cohen and Winn, 2007; Hall and Vredenburg, 2003). In the works of these authors, entrepreneurship is a means by which economic, environmental and social disruptions can be improved.

A current environmental disruption is the collapse of the number of bees that implies the drastic drop of crops being able to grow and harvest. Of the approximately 300 commercial crops (Richards, 1993) about 84% are insect pollinated (Williams, 1996). Modern commercial crop production is increasingly dependent on managed pollinators (e.g. the introduction of honeybee colonies into orchards or fields to improve crop production), and less on wild insects living on the periphery of crop fields (Richards, 2001). In this context, bees are considered to be essential to biodiversity, a main indicator of the health of an ecosystem (Schacker and McKibben, 2008). Bees all over the word are affected by mites, pesticides as well as the colony collapse disorder (CCD) that was first officially reported in 2006 in the US. The cause of this disease is unknown, although specialists sustain the fact that it is due to a combination of factors such as mites, pesticides and viruses, environmental stress, pathogens, genetically modified crops, and even cell phone radiation (Schacker and McKibben, 2008). In the present, honey bees are considered to be protectors of humanity and guardians of the planet (Rudolph, 2010), considering the words of Albert Einstein according to whom “If the bee disappeared off the surface of the globe, then man would only have four years of life left. No more bees, no more pollination, no more plants, no more animals, no more man”. Habitat destruction has reduced pollination in croplands and natural areas due to pesticides and insecticides that kill pollinators. Moreover, honeybee diseases threaten to change the availability of pollination (Kevan, 1991). Honeybees are extremely important pollinators because they are available throughout the growing season, because they pollinate such a wide variety of crops and because they can be concentrated in large numbers whenever and wherever needed (Morse and Calderone, 2000). According to Mogni *et al.* (2010), studies that look at beekeeping as a pollinating activity deal with the analysis concerning the environment and biodiversity.

Rogers *et al.* (2008) indicate that poverty causes a continuous resource depletion and degradation. By the necessity of survival, the poor pollute the environment and erode the land, both of which, in turn, further entrench poverty; this vicious loop is called the “pollution of poverty.” In this context, entrepreneurship has important contributions for the economic growth, job creation, increased productivity, technological innovation and

structural realignments (Gibb, 1996). Regarding the social dimension of the sustainable development, entrepreneurship facilitates the development of social networks mobilizing other industries in the region (Marsden 2005).

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 comprised items for measuring the dimensions of the entrepreneurial behaviour of beekeepers and characteristics of the beekeeping exploitations. The sample is non-probabilistic as the beekeepers are a homogenous group and therefore the work tool, the questionnaire, was distributed during beekeepers' meetings organized by the Romanian Beekeepers' Association and by post. The questionnaire was composed of a number of 29 questions following a Likert-type scale. The survey was conducted between November 2010 and February 2011 in the North-West Region of Romania, comprising the counties of Bihor, Bistrita-Nasaud, Cluj, Maramures, Satu-Mare and Salaj. The general purpose of the present study is to determine the ways in which beekeepers who intend to become entrepreneurs can contribute to sustainable development. The current study, as the majority of studies analyzing the relationship between sustainable development and entrepreneurship (Hall *et al.*, 2010), is rather prescriptive than descriptive. Using factor analysis developed in SPSS 19 statistical program, the present study selects, form a number of 8 factors, 3 factors that are representative both for entrepreneurship and for sustainable development: potential entrepreneurs, innovative beekeepers and opportunity driven beekeepers. The study proposes certain measures for each of the three categories.

Results and discussion

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 years old.

Table 1

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	Individual	54.0
	Sole proprietorship	34.5
	Individual enterprise	6.7
	Family enterprise	4.5
	Limited Liability Company	0.2

An exploratory factor analysis using the principal factors method with varimax rotation was used to identify certain categories of beekeepers. Factor analysis has the ability to produce descriptive summaries of data matrices, which engender the detection of meaningful patterns among a given set of variables. There were 8 main factors analysed that resume 50.33% of the information contained in the 30 variables introduced in the model. The results of the factor analysis (Tab.2) group the initial variables into factors and show the impact of each variable within the factors through the loading. Factor 1 groups the following variables: Measure 141, The business plan, The National Beekeeping Plan, Other measures meant to help beekeepers, Beekeeping management courses. The 8 factors are: (1) beekeepers interested in accessing funds, (2) potential entrepreneurs, (3) consecrated beekeepers, (4) niche beekeepers, (5) beekeepers who are against the Romanian legislation, (6) beekeepers motivated by necessity, (7) innovative beekeepers, (8) beekeepers motivated by opportunity.

Table 2

Results of the factor analysis

Variable	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8
Measure 141	0.786							
The business plan	0.618							
National beekeeping Plan	0.617							
Other measures meant to help beekeepers	0.554							
Beekeeping management courses	0.389							
Measure 112		0.860						
Intention to start a business		0.538						
Collaboration		0.435						
Interest for beekeeping courses			0.689					
Experience in beekeeping			0.611					
Romanian Beekeepers' Association			0.501					
Other beekeeper' association				0.850				
A group of producers				0.841				
Degree of access to funds				0.439				
Lack of state support					0.830			
High taxes					0.726			
Reduced income						0.810		
Excessive bureaucracy						0.617		
Creation of new products							0.762	
Modernization							0.563	
Specialization on a single product							0.428	
Improvement of products and processes								0.857
Export of products								0.635
Percentage of variance explained (%)	11.36	20.01	26.50	32.10	37.13	41.84	46.16	50.33

Source: Own calculations in SPSS

Out of these 8 factors, the current study in interested in only 3 (potential entrepreneurs, innovative beekeepers and opportunity driven beekeepers) because these types of beekeepers can contribute to the sustainable development of the beekeeping sector. For each of the 3 factors, the current study proposes practical measures that influence sustainable development.

Proposed measures for potential entrepreneurs

Potential entrepreneurs, represented by beekeepers interested in starting a new business, cam implement measures that determine sustainable development. Studies that examine the entrepreneurial contributions to sustainable development assume that entrepreneurs are by definition driven by self-interested profit-seeking motives (Parrish, 2010). Therefore, from entrepreneurs' perspective, contributing to sustainable development is valued primarily as a means of earning profits (Cohen and Winn, 2007). In this way, researchers try to find how entrepreneurs can be motivated to contribute to sustainable development by making it profitable to do so (Parrish, 2010). York and Venkatatraman (2010) sustain that entrepreneurs find solutions to environmental degradation. According to these authors "the more uncertain and intractable the environmental problem, the greater likelihood that entrepreneurs can make a contribution to resolving it", emphasizing the role of determination towards resolving environmental problems.

Beekeepers who are potential entrepreneurs realize that it is profitable to be "green", that is to protect the environmental quality (consumption of energy and sweet water for production), maintenance of essential ecological processes and life support systems, the preservation of genetic diversity of the bee and the capitalization and protection of pollination. Entrepreneurs understand that a viable and sustainable enterprise can generate profit. In Romania, pollination is done for free. This type of pollination is called spillover pollination, meaning that beekeepers collect no fees (Morse and Calderone, 2000). However, if pollination was paid and fees were collected, Romanian beekeepers could develop and expand their beekeeping exploitations. Entrepreneurs should focus on the importance of pollination and strive that pollination is paid in our country. Insect pollination is an ecosystem service with high economic value that is mainly provided by bees (Ványi *et al.*, 2010).

Beekeepers who are potential entrepreneurs and are focused upon sustainability require more than the right set of values and motives to protect the nature, they also need to implement practical actions in the management of their beekeeping exploitations. Therefore, they should increase the value of their enterprise by implementing the principles of

sustainability in the production, use, and disposal of the container of the bee products.

Proposed measures for innovative beekeepers

Innovation in the beekeeping sector is related to the creation of new products and services and the associated development of new markets. York and Venkataraman (2010) propose a model that illustrates how entrepreneurs address environmental uncertainty, provide innovation and engage in resource allocation to address environmental degradation. According to these authors, entrepreneurs can contribute to solving environmental problems by creating new, more environmentally sustainable products and services. In their model, innovation includes not only technological advancements that reduce the environmental degradation, but also innovations in the formation of new markets and the distribution of information to consumers (Dean and McMullen, 2007). In this way, beekeepers have to improve the practice of labeling the products by providing the exact geographical origin of the product that will give the consumer confidence in the product. Apart from attracting customers to the product, the label provides useful information such as the type of honey, the country and district where it was produced, name and address of the beekeeper, the weight of honey in the container, the date of packing. Innovative beekeepers should consider the importance of specialized food networks in shaping sustainable development as locally and regionally-based networks have the capacity to contribute to more sustainable rural development (Marsden, 2003). Therefore, innovative beekeepers can build local and regional networks to gain knowledge and create a collective willingness to innovate and to achieve mutually beneficial goals (Marsden, 2005). Through established networks, beekeepers can achieve international registration concerning “fair trading”. Within the network, beekeepers are able to create collection centers where beekeepers can bring their products and reach a market. If important volumes of good quality honey and beeswax are collected, traders will be interested to travel to remote areas, being certain of the volume and quality they will be able to collect (Bradbear, 2009). In order to achieve a sustainable network of beekeepers who collaborate for the common purpose of wealth creation, innovations in the processes of production and distribution have to be implemented by producers and processors.

Proposed measures for opportunity driven beekeepers

Hall *et al.* (2010) consider that entrepreneurship for sustainable development may be driven by a need for social improvement or simply by opportunity recognition. Opportunity driven beekeepers should take into

consideration the fact that markets and consumers' preferences create different opportunities. This type of beekeepers identify the appropriate technological and market opportunities that generate improvements towards sustainability. Opportunity driven beekeepers have as a main purpose the improvement of products and processes by exploiting opportunities related to certain needs within the society and the export of bee products. The "technological gap" (Mogni *et al.*, 2010) between the more professional producers and the small (less than 50 hives) is present among Romanian beekeepers and should be addressed by beekeepers who are focused mainly on opportunities that exist on the market. If beekeepers own modern technology, they can achieve environmental sustainability through the production of superior goods and services because they can then stat to divert income to purposes such as air quality, avoiding ecosystem degradation and global climate change. In order to meet the criteria for sustainability and to make rational choices based on predicted impacts, Rogers *et al.* (2008) propose the use of indicators. One of these indicators of the sustainable development, from an economic point of view, is the food chain performance and competitiveness of bee products in the context of the increasing demand of consumers for high quality food.

Concerning the export of bee products, as the European Union honey market is rather difficult to enter, entrepreneurs who want to be exporters have to comply with the legislative norms concerning the export of honey. The EU honey market requires imported honey to be certified that it is free from chemical, antibiotic and other residues. Regarding the importance of food safety, entrepreneurs should avoid mixing Romanian high quality honey with honey of lower quality, assuming the social responsibility for the heath of consumers and for the prestige of the Romanian high quality honey. The authenticity of honey implies both its content and also its geographical and botanical origin as both aspects are required for honey to be authentic. Romanian honeybees generally forage in environments that are unpolluted, and therefore the honey is of excellent quality and so entrepreneurs in the beekeeping sector can achieve good prices on western markets, provided that they are able to gain access. In the European Union, there is a strong demand for organic honey and there is a premium price available to beekeepers who can supply organic certified honey (Bradbear, 2009). In order to influence the sustainable development of the rural areas, this type of beekeepers should implement fundamental changes in their apiaries such as the conversion towards organic beekeeping as well as the branding of the products.

Conclusions

Entrepreneurship in the beekeeping sector represents a fundamental issue for sustainable development and, therefore, a large number of initiatives have to be implemented. Beekeepers can take specific measures that determine sustainable development. Potential entrepreneurs can influence the wellbeing of the environment by implementing the principles of sustainability in the production, use and disposal of the bee products. In this way, they can differentiate their products and gain better access to certain markets. Entrepreneurs oriented towards innovation should balance activities that benefit themselves, other people, and nature by creating new, more environmental sustainable products, improve the practice of labeling and build local and regional networks. Opportunity driven beekeepers should discover opportunities that generate profit such as the conversion towards organic beekeeping and branding of products. Therefore, it is profitable for beekeepers to build enterprises that directly contribute to sustainable development by improving the quality of the products and by increasing their attractiveness to consumers. Entrepreneurial behavior within the beekeeping exploitations is a main component of sustainable development.

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