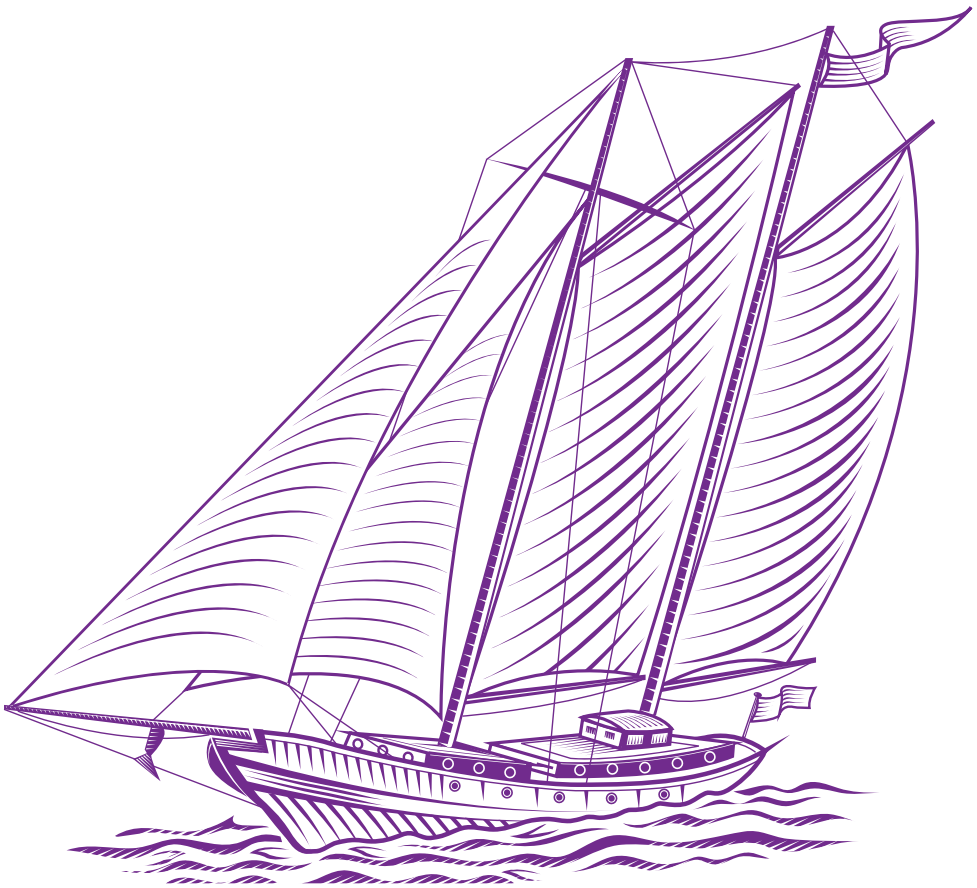
STUDIA UNIVERSITATIS
BABEŞ-BOLYAI



NEGOTIA

4/2013

STUDIA
UNIVERSITATIS BABEŞ-BOLYAI

NEGOTIA

4 / 2013
October - December

EDITORIAL BOARD

STUDIA UNIVERSITATIS BABEŞ-BOLYAI

NEGOTIA

YEAR **Volume 58 (LVIII) 2013**
MONTH **DECEMBER**
ISSUE **4**

S T U D I A

UNIVERSITATIS BABEŞ–BOLYAI

NEGOTIA

4

Desktop Editing Office: 51st B.P. Hasdeu, Cluj-Napoca, Romania, Phone: +40-264-405352

CUPRINS – CONTENT – SOMMAIRE – INHALT

STUDIA UBB NEGOTIA, LVIII, 4, 2013, pp. 5 - 21
(RECOMMENDED CITATION)

TOURISTS' INTENTIONS TO SUPPORT ENVIRONMENTAL INITIATIVES IN MOUNTAIN DESTINATIONS: THE CASE OF POIANA BRASOV, ROMANIA

ANA ISPAS[1], CRISTINEL CONSTANTIN[2], ADINA NICOLETA CANDREA[3]

ABSTRACT. Considering the fact that international consumers are being increasingly ecologically conscious, the present study aims to capture tourists' intentions to support environmental initiatives in a Romanian mountain destination, namely Poiana Brasov. Using a quantitative research method, a total of 331 tourists have been interviewed in their accommodation location. The main variables of the research refer to the following issues: tourists' interest in supporting environmental initiatives in the visited destination, the type of environmental initiatives they would participate in, the profile of the environmentally friendly tourists in Poiana Brasov and tourists' interest in donating funds for conservation projects. The results of this study outline the necessity for a responsible management of both the destination and tourism services providers in Poiana Brasov, in order to meet tourists' interest to participate in environmental initiatives.

Key words: *environmental initiatives, mountain destination, environmentally-friendly tourists, profile*

JEL Classification: Q59; L83

[1] Professor Dr., Faculty of Economic Sciences and Business Administration, Transilvania University of Brasov, ispasana@unitbv.ro
[2] Associated professor Dr., Faculty of Economic Sciences and Business Administration, Transilvania University of Brasov, cristinel.constantin@unitbv.ro
[3] Lecturer Dr., Faculty of Economic Sciences and Business Administration, Transilvania University of Brasov, adina.candrea@unitbv.ro

1. Introduction

Increasingly aware of the serionusness of environmental problems, customers are becoming more ecologically conscious and are seeking to purchase eco-friendly products and services, preferring firms that favour environmental practices (Laroche et al., 2001; Roberts, 1996). Environmental concern was defined by Dunlap and Jones (2002, p. 485) as 'the degree to which people are aware of problems regarding the environment and support efforts to solve them and/or indicate a willingness to contribute personally to their solution'. Other authors have defined environmental concern as an attitude towards a general or specific environmental issue (e.g. Fransson and Gärling, 1999). Several studies have examined the relationship between environmental concern and environmentally related behaviour (Hedlund, 2011).

Given the current trend in nature-based tourism and the popularity of mountain destinations for nature tourism, it is reasonable to assume that many mountain regions will experience a significant growth in both international and domestic tourism (Nepal, 2002). However, exposure from tourism can leave mountain communities vulnerable to severe environmental consequences, as has happened in many mountain destinations around the world. Thus, it is essential that mountain tourism be based on the principles of sustainability, which emphasize sound environmental practices, equity and long-term benefits for all stakeholders (Nepal, 2002).

As Kohler and Byers (1999) state, tourism affects mountains in many ways. Economically, tourist resorts in mountains directly depend on their customers. There are direct and indirect benefits to many sectors and communities inside and outside the resort areas. However, a considerable share of tourism revenue spreads to areas outside the mountains. In addition, tourist activities have biophysical impacts. For example, paths and ski runs may modify sensitive Alpine areas, tourists have known impacts along mountain trails, and wildlife may be disturbed (Schorner, 2011).

For true progress to be made towards more sustainable tourism in mountain destinations, tourists should themselves reflect sustainability concerns in their travel choice and behaviour. The tourism industry is much more likely to respond to an approach that is market driven. Tourists' environmental concern can motivate tourism industry members

in an attempt to make their operations more sustainable as there is an increasing competition in the tourism market and the consumer decision making process is influenced by a multitude of factors, including tourists' environmental orientation.

European stakeholders from different mountain destinations have initiated several activities in order to promote a sustainable tourism development for the conservation of the natural resources and the biodiversity in mountain areas (e.g. Davos, Nendaz – Switzerland, Cairngorm Mountain, Nevis Range – UK, Alta Badia – Italy, Les Aillons, Alpes d'Huez – France) while certain researchers have studied tourists' environmental attitudes and intentions in mountain resorts (Holden, 2000; Hudson and Ritchie, 2001; Brymer et al., 2009).

Romanian mountain destinations are characterized by the absence of an integrated destination management, the limited implication of destination management organizations (DMO) in environmentally responsible tourism development, mainly lacking interest in the study of tourist behaviour.

The present study aims to capture tourists' expressed intentions to support environmental initiatives, focusing on one of the most famous Romanian mountain destinations - Poiana Brasov. Poiana Brasov is Romania's most complex winter sports resort as well as an important international tourist centre; it boasts 12 ski runs of various difficulty degrees (an Olympic run, three downhill and giant slalom runs, one special slalom run, two jumps, etc.), sports grounds (for tennis, mini-golf, handball, basketball), a lake, ropeway, rope chair, ski lift, indoor pools, saunas, medical gyms, discos, bars and restaurants etc. The accommodation offer is quite rich, in Poiana Brasov there are over 40 hotels, villas, and boarding houses. Tourists can go skiing, snowboarding, skating, ATV riding in winter and during summer they can ride, fly a motor glider, go bungee jumping or paragliding, climbing. There are also archery, shooting and paintball facilities. This resort is visited both by Romanian and foreign tourists (more than 15% of tourists are foreigners) especially for winter sports, leisure and business events (Brasov County Institute of Statistics, 2013).

Considering the role of tourists' environmental concern in the development of sustainable tourism in mountain destinations, our research aims to answer following issues:

Q1: Are tourists interested in environmental initiatives during their stay in Poiana Brasov?

Q2: To what type of environmental initiatives would tourists participate in?

Q3: What is the profile of the environmentally friendly tourists?

Q4: Are tourists interested in donating funds for conservation projects?

2. Review of literature

The study of behaviour with environmental consequences has a long tradition among social scientists. Besides the theoretical value of environmental studies, they are of significant practical value because they identify for organizations and policy makers which actions to take to increase the level of pro-environmental behaviour and consequently protect natural resources (Dolnicar and Grün, 2009). Moreover, the ecological sustainability of tourism has been researched extensively. The central aim of sustainable tourism research has been to identify how an economically viable tourism industry can be developed and maintained at a destination while minimizing adverse environmental impacts (the 'ecological footprint') and in so doing, preserve the destination's natural and cultural resources for both residents and future generations of tourists (Dolnicar et al., 2008).

Businesses wishing to adopt a more strategic approach to green business model innovation can begin this process by asking themselves the question, "What is the strategic goal of our business in relation to environmental sustainability?" (Wolcott and Lippitz, 2010). Other key questions they can address to enable quick progress on sustainable innovation, include (Wolcott and Lippitz, 2010):

– Which of our existing customers are looking for greener solutions?

– How does this green concept affect the way we interact with customers in any context, e.g. buying, delivery, support or service?

– Will we need to educate existing or new customers and develop new markets and customers in order to succeed?

One of the most important barriers to the development of sustainable tourism includes the lack of awareness and information of

tourists and the tourism industry of the harmful environmental impacts of tourism and tourism-related activities. This challenge is reflected in one of major gaps in current policies to promote sustainable tourism, which is that the demand/consumption side of tourism is not widely addressed in existing tourism policy (BIO Intelligence Service, 2012). In tourism research, it has been shown that tourists with a positive environmental attitude and an environmental awareness are more likely to engage in pro-environmental behaviours than tourists who are not pro-environmentally concerned (Luzar et al., 1998; Weaver and Lawton, 2002; Lee and Moscardo, 2005). Although it is possible to behave in a pro-environmental manner without being environmentally concerned, the above studies show that the link between values, attitudes, and behaviour exists in some sense, both in a general and in a tourism context (Hedlund, 2011).

Roberts (1996) indicated that consumer attitudes are significant predictors of ecologically conscious consumer behaviours. His findings revealed that environmentally conscious people are likely to engage in eco-friendly consumer behaviours, and individuals who believe their specific ecological activities can cause positive change are more likely to display green consumer behaviours. He also suggested that individual perception regarding the environmental resource problems can encourage more ecologically friendly consumer behaviours (Han et al., 2011).

Increasing numbers of customers who consider various environmental issues are starting to seek and buy eco-friendly products over alternatives, sometimes even paying more for such products (Laroche et al., 2001). Increasing numbers of tourists, being aware of the environmental hazards (e.g., emissions released into the air, water, and soil) and the wasting/harming of environmental resources caused by hotels (e.g., excessive consumption of non-durable goods, energy, and water), now look for accommodation that follows eco-friendly practices (APAT, 2002; Manaktola and Jauhari, 2007; Han et al., 2010). Green customers are willing to change their buying behaviours in a more ecologically favourable way (e.g., avoidance of disposable products) and behave in an environmentally friendly manner, thus sacrificing convenience, accepting lower levels of performance in eco-friendly products, and even paying extra for the products (Kalafatis et al., 1999; Laroche et al., 2001; Manaktola and Jauhari, 2007).

Producers, governments and consumers share the responsibility for solving environmental problems. The Flash Eurobarometer *"Europeans' attitudes towards the issue of sustainable consumption and production"* (European Commission, 2009) was conducted in order to examine EU citizens' knowledge and levels of concern about sustainable consumption and production. European citizens' opinions concerning environmental impacts of consumption and the possible solutions for a sustainable development are quite varied in different countries of the EU. When asked which actions have the greatest impact on solving environmental problems, the largest proportion of EU citizens (30%) selected minimizing waste and recycling. Approximately a fifth (21%) of interviewees mentioned buying products produced by eco-friendly methods and a similar proportion (19%) selected buying energy-efficient home appliances as actions that could have the most impact. Only 15% of interviewees answered that adopting sustainable modes of transport and travelling less frequently are the most important actions to solve environmental problems and 11% mentioned making efforts to use less water as the action with the greatest impact. In that sense, similar studies are needed in different locations and for different types of consumers, and this study reports the findings/results of a survey conducted among mountain tourists in Romania.

3. Material and method

In order to find responses to the above mentioned questions we have conducted a survey in Poiana Brasov. The questionnaire used for data collection contains more than 60 variables concerning various behaviours, attitudes and intentions of tourists who visited this destination. From these ones, several variables were used for the assessment of tourists' intentions to support some environmental initiatives in Poiana Brasov. As we did not find similar studies in the literature, the variables used in our questionnaire are based mainly on the nominal scale aiming at finding responses to the research questions mentioned above. These variables were put in relationship with the population's demographics in order to find a profile of the environmentally-friendly tourists.

Tourists were approached in their accommodation location based on a random selection and asked to fill the questionnaire. Thus, a

number of ten accommodation units were selected from the list of legally recorded companies. From each of these accommodation units tourists have been selected using the systematic sampling method with a sampling interval of 5 persons. The main weakness of our sample consists in the impossibility to assure a veritable sample framework, which is a common issue in tourism research. Our efforts have focused on covering a quite large period of time and different seasons in order to obtain a good representativeness of the sample in spite of the mentioned weak point.

The final sample size obtained after data collection and questionnaire validation was of 331 tourists. Data was analysed using the Statistical Package for the Social Sciences (SPSS) Version 16.0 and several statistical methods have been used: descriptive analysis, cross tabs, Homogeneity Analysis (HOMALS). Firstly, the analyses have been focused on the assessment of tourists' expressed intentions to support some environmental initiatives in Poiana Brasov. Secondly, we have identified the main categories of environmental initiatives in which tourists would get involved in. Further, a profile of the tourists interested in environmental initiatives has been computed taking into account the visit purpose and tourist's gender and age. The same characteristics have been used to obtain a profile of tourists who expressed the intention to donate money for conservation projects in the visited destination.

4. Results and discussions

Tourists' interest to participate in environmental initiatives

The analysed sample counted 331 tourists with the following demographic and travel characteristics: females (42.3%) and males (57,7%). The distribution according to the respondents' age is: 16 to 24 years old (13.9%), 25 to 34 years old (38.1%), 35 to 44 years old (31.7%), 45 to 54 years old (13.3%), over 54 years (3%). Most of them are married (47,7%) or single (25.4%), living in partnership (22.4%) and others (4.5%). From the total number of respondents, 15.7% were foreign tourists while the rest were Romanians. The main purpose of visit was leisure (80.1%), followed by business (14.8%) and visit friends or relatives (5.1%).

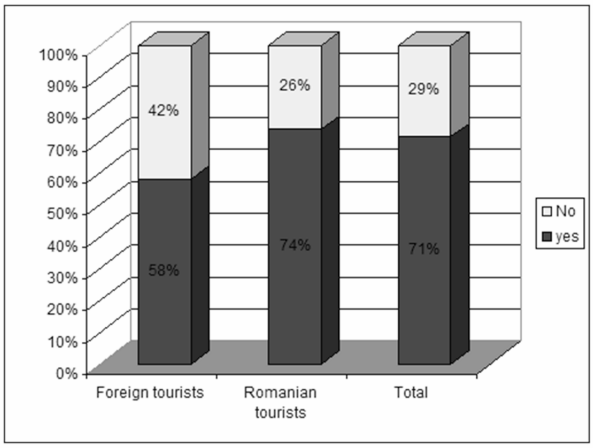


Figure 1. Tourists' interest to participate in environmental initiatives during their stay in Poiana Brasov

According to the research results, a high percentage of the respondents were interested to participate in environmental initiatives **(Q1)** during their stay in Poiana Brasov (71%). Comparing the nationality of the respondents (see Figure 1) it is found that the percentage of Romanian tourists interested to participate in various environmentally friendly projects (74%) is significantly higher than the percentage of foreign tourists (58%).

Individuals differ in their concern for the environment. To explain this variation, the earliest research focused on such personal socio-economic characteristics as age, education, income and residential location (Wong & Wan, 2011). Empirical studies have generally found that those who are female, younger, better educated, have a higher income and live in a city tend to be more concerned about the quality of the environment than others (Hunter *et al.*, 2004).

Tourists' choice of environmental initiatives they would participate in

The results presented in Figure 2 reveal that a high percentage of tourists willing to participate in environmental initiatives (65%) are interested in selective waste collection **(Q2)**. These responses confirms the results of The Flash Eurobarometer (European Commission, 2009), as citizens in almost all EU Member States were most likely to mention "Minimizing waste and recycling" as the actions having the greatest impact

on solving environmental problems (EU 27 – 30%, Romania – 33%). The Germans were shown to be particularly aware of saving water and energy, recycling waste and using biodegradable cleaning products (Robinot and Giannelloni, 2007).

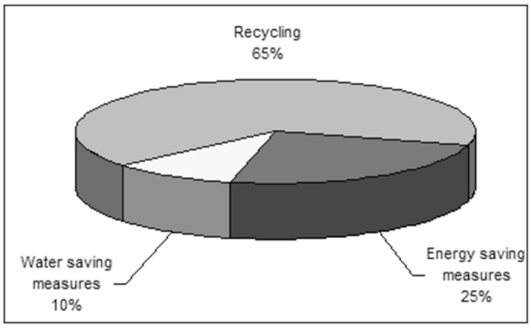


Figure 2. Tourists' choice of environmental initiatives they would participate in

However, a low percentage of tourists are interested in water (10%) and energy (25%) saving measures **(Q2).** This result is also in line with The Flash Eurobarometer (European Commission, 2009) as respondents in almost all of the countries surveyed were the least likely to select "making efforts to use less water" as having the greatest impact on solving environmental problems. (EU-11%, Romania – 5%).

The above information is important for both hotel managers and the destination management organisation in Poiana Brasov.

The profile of the environmentally friendly tourists

Further on, we have computed cross tabulations between the intention to participate in environmental initiatives and the respondents' demographic and travel characteristics. A profile of the environmentally friendly tourists **(Q3)** is computed in Table1: most of them are females (74%), Romanians (74%), visiting friends or relatives (88%) and young, with an age between 16 and 24 years (89%) and they have a high level of education.

These results are in line with previous studies related to demographic characteristics which showed that customers' buying behaviours and expressed intentions varied as a function of those demographic characteristics (i.e., gender, age, education, and income) and suggested that environmentally conscious customers are more

likely to be female, younger, more educated, and earn more money than average (Han et al., 2011).

In a hotel context, Han et al. (2009) identified that gender has a significant moderating role in customer's eco-friendly decision-making processes. Women tend to be more environmentally conscious and more frequently form environmentally friendly consumption intentions (Banerjee and McKeage, 1994; McIntyre et al., 1993). Certain researchers (Evanschitzky and Wunderlich, 2006; Gilly and Zeithaml, 1985) have also indicated that ecological customers who frequently make green purchasing decisions are more likely to be younger. Younger people with better information processing capacities tend to search for new and alternative information.

Table 1.

The characteristics of respondents who intend to participate in environmental initiatives

Characteristics	***Intention to participate in environmental initiatives***	
	Yes	*No*
Gender		
Male	70%	30%
Female	74%	26%
Age		
16-24 years	89%	11%
25-34 years	66%	34%
35-44 years	73%	27%
45-54 years	65%	35%
55-64 years	75%	25%
Education		
Below high school	56%	44%
High school	70%	30%
College/Degree	75%	25%
Postgraduate and beyond	77%	23%
The main purpose of the visit		
Leisure	71%	29%
Business	69%	31%
Visit friends-relatives	88%	12%
Country of residence		
Romanian tourists	74%	26%
Foreign tourists	58%	42%

Tourists' expressed intentions to donate money for conservation projects

There appears to be a slight incoherence between government perceptions of consumer demand as a driver for green innovation in tourism, and the industry perception, that customers are generally reluctant to pay a premium for more environmentally friendly products or services (OECD, 2012).

The analysis of collected data has provided us with information concerning respondents' expressed intentions to donate money for credible conservation projects in the visited destination **(Q4)**. According to the data presented in Table 2, 51.1% of the respondents have expressed their interest in donating money, 22.8% are not disposed for such donations and 26.1% are undecided. Further on we have investigated the relationship between tourists' environmental awareness and their expressed support for environmental projects in the studied tourism destination (Table 2).

Table 2.

Crosstabulation between tourists' environmental awareness and their expressed intention to donate money for credible conservation projects

(% within the tourists' interest concerning the tourism impact on the environment)

		Tourists' intention to donate money for credible conservation projects			Total
		Yes	No	I don't know	
Tourists' interest concerning the impact of tourism activities on the environment	1-Very low		83,3%	16,7%	100,0%
	2,00	28,2%	48,7%	23,1%	100,0%
	3,00	44,4%	18,5%	37,0%	100,0%
	4,00	64,0%	14,0%	21,9%	100,0%
	5-Very high	57,8%	18,1%	24,1%	100,0%
Total		51,1%	22,8%	26,1%	100,0%

The majority of tourists with the lowest interest concerning the impact of tourism activities on the environment (83.3%) would not donate money for conservation purposes. More than half of the respondents with a neutral and high interest in environmental issues would donate money for credible conservation projects in the visited destination.

This result confirms previous studies which highlighted the positive relationship between environmental concern in tourism

choices and willingness to accept economic sacrifices to protect the environment (Hedlund, 2011) as well as the positive relationship between environmental concern and pro-environmental buying behaviour (Schlegelmilch et al., 1996; Kim and Choi, 2005; Hedlund, 2011).

Aiming to find some characteristics of the people that want to donate money for credible conservation projects in Poiana Brasov, we have used a multivariate research method: the Homogeneity Analysis or HOMALS.

Using the homogeneity analysis between the main tourists' characteristics we have found interesting conclusions concerning the profile of the environmentally friendly tourists visiting Poiana Brasov.

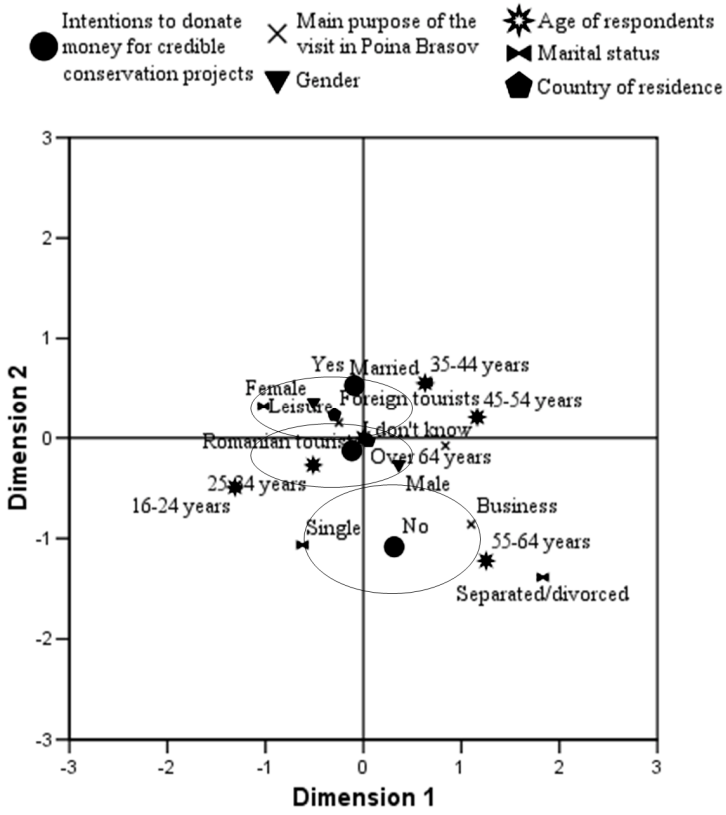


Figure 3. Homogeneity analysis between respondents' expressed intentions to donate money for conservation projects and tourists' characteristics

Tourists interested to donate money for conservation purposes are mainly females, persons aged between 35 and 44 years, foreign

tourists, travelling for leisure purposes. Undecided tourists are mainly Romanian tourists, males, aged between 25 and 34, travelling for leisure purposes or to visit friends or relatives. Tourists who are not interested in donating money for conservation purposes are businessmen, aged between 55 and 64 years.

5. Conclusions

The fact that 71% of the interviewed subjects are interested to participate in environmental initiatives during their stay in Poiana Brasov should motivate hotel managers in Poiana Brasov to start such initiatives which can make their activity more efficient, minimize expenses (energy and water saving measures, recycling) and attract new clients or keep the existing ones. The local DMO could also prepare an eco-guide aimed at providing detailed information concerning energy-saving measures and different environmental tools to accommodation managers, while promoting these environmental initiatives among tourists especially using brochures, leaflets and information panels.

As almost half of interviewees have shown their interest to donate money for conservation purposes in the visited destination, the local DMO should identify credible projects in partnership with ecological NGOs, but also facilitate and monitor the use of these financial contributions, while promoting the results. The implementation of environmental initiatives should be promoted by both the local DMO and tourism providers as a key competitive advantage and benchmarking tool for a better positioning of Poiana Brasov on the national and international market.

The results of the present study can be useful to both the local DMO in Poiana Brasov and tourism service providers in their attempt to implement environmental initiatives for a sustainable tourism development. However, our research does not include an evaluation of this type of initiatives and it has not captured tourists' actual participation. Thus, future studies should be initiated in order to identify the practical implications of tourists' expressed intentions to participate in environmental initiatives in Poiana Brasov.

At the same time, tourists' expressed intentions cannot guarantee their actual participation in environmentally-friendly initiatives. Despite optimistic views generated by studies of tourist preferences, previous researches indicate that while 70–80% of tourists state their high

concerns for eco-social components of holidays, only about 10% convert this concern to purchasing decisions (Chafe, 2005; Budeanu, 2007) and, in reality, the majority are reluctant to change their own behavior in support of sustainability goals (Budeanu, 2007; Grankvist, 2002; Yan et al., 2006).

One reason for the differences between stated environmental attitudes and actual behaviour may be the social desirability bias (Leggett et al., 2003), which entice people to answer positively to questions related to concerns about sensitive subjects such as environmental protection (Chung and Monroe, 2003). Furthermore, asking tourists about their behaviour in hypothetical situations may trigger positive answers that give a good impression but are less truthful (Trudgill, 1990; Dickinson and Dickinson, 2006), which reduces the reliability of results.

Although this study provides interesting information for both destination managers and tourism service providers in Poiana Brasov, it has a series of limitations. First, tourists' environmental concern and expressed ecological intentions do not necessarily transpose in tourists' behaviour. Although responses are anonymous there is also the possibility that subjects formulate social desirable answers instead of their own opinions. Secondly, this study does not take into consideration tourists' pro-environmental behaviour at home, which can influence their behaviour during their holiday. Despite these limits, our study can be a useful tool for both accommodation managers as well as destination management organizations.

As the type of environmental initiatives mentioned by the respondents are in line with the results of the Flash Eurobarometer, future studies should be focused on tourists' environmentally-friendly behaviour in mountain destinations and their choice of tourism providers which have implemented recycling, water and energy saving measures.

REFERENCES

APAT (2002), *Tourists accommodation EU eco-label award scheme – Final report,* Italian National Agency for the Protection of the Environment and for Technical Services, Rome.

Banerjee, B. and McKeage, K. (1994), "How green is my value: exploring the relationship between environmentalism and materialism", in Allen, C.T. and John, D.R. (Eds.), *Advances in Consumer Research 22*, Association for Consumer Research, Provo, UT, pp. 147–152.

BIO Intelligence Service (2012), Policies to encourage sustainable consumption, Final report prepared for European Commission (DG ENV).

Brasov County Institute of Statistics, http://www.brasov.insse.ro (accessed on September 18th, 2013).

Brymer, E., Downey, G. and Gray, T. (2009), "Extreme Sports as a Precursor to Environmental Sustainability", *Journal of Sport & Tourism,* Vol. 14 No. 2, pp. 193-204.

Budeanu, A. (2007), "Sustainable tourist behaviour – *a discussion of opportunities* for change", *International Journal of* Chafe, Z. (2005), „Consumer Demand and Operator Support for Socially and Environmentally Responsible Tourism", available at: http://www.rainforest-*Consumer Studies,* Vol. 31, pp. 499-508.

alliance.org/branding/documents/consumer_demand.pdf (accessed on September 20th, 2013).

Chung, J. and Monroe, G.S. (2003), "Exploring social desirability bias", *Journal of Business Ethics*, Vol. 44, pp. 291- 312.

Dickinson, J.E. and Dickinson, J.A. (2006), "Local transport social representations. Challenging the assumptions for sustainable tourism", *Journal of Sustainable Tourism*, Vol. 14, pp. 192–208.

Dolnicar, S. and Grün, B. (2009), "Environmentally Friendly Behavior — Can Heterogeneity Among Individuals and Contexts/Environments be Harvested for Improved Sustainable Management?", *Environment & Behavior*, Vol. 41, pp. 693- 714.

Dolnicar, S., Crouch, G.I. and Long, P. (2008), "Environment-friendly Tourists: What Do We Really Know About Them?", *Journal of Sustainable Tourism*, Vol. 16 No. 2, pp. 197-210.

Dunlap, R.E. and Jones, R.E. (2002), "Environmental concern: conceptual and measurement issues", in Dunlap, R.E. and Michelson, W. (eds.), *Handbook of Environmental Sociology*, Greenwood, Westport, CT, pp. 482–524.

Evanschitzky, H. and Wunderlich, M. (2006), "An examination of moderator effects: the four stage loyalty model", *Journal of Service Research*, Vol. 8 No. 4, pp. 330–345.

European Commission (2009), *Europeans' attitudes towards the issues of sustainable consumption and production*. Flash Eurobarometer 256, available at: http://ec.europa.eu (accessed on December 10th, 2012).

Fransson, N. and Gärling, T. (1999), "Environmental concern: Conceptual definitions, measurement methods, and research findings", *Journal of Environmental Psychology,* Vol. 19, pp. 369–382.

Gilly, M.C. and Zeithaml, V.A. (1985), "The elderly consumer and adoption of technologies", *Journal of Consumer Research,* Vol. 12, pp. 353–357.

Grankvist, G. (2002), *Determinants of choice of Eco-labeled Products*. Department of Psychology, Göteborg University, Göteborg.

Han, H., Hsu, L. and Lee, J. (2009), "Empirical investigation of the roles of attitudes toward green behaviors, overall image, gender, and age in hotel customers' eco-friendly decision-making process", *International Journal of Hospitality Management*, Vol. 28 No. 4, pp. 519–528.

Han, H., Hsu, L.T. and Sheu, C. (2010), "Application of the theory of Planned Behavior to green hotel choice: Testing the effect of environmental friendly activities", *Tourism Management,* Vol. 31, pp. 325-334.

Han, H., Hsu, L.J., Lee, J. and Sheu, C. (2011), "Are lodging customers ready to go green? An examination of attitudes, demographics, and eco-friendly intentions", *International Journal of Hospitality Management,* Vol. 30, pp. 345–355.

Hedlund, T. (2011), "The impact of values, environmental concern, and willingness to accept economic sacrifices to protect the environment on tourists' intentions to buy ecologically sustainable tourism alternatives", *Tourism and Hospitality Research,* Vol. 11 No. 4, pp. 278–288.

Holden, A. (2000), "Winter tourism and the environment in conflict: the case of Cairngorm, Scotland", *International Journal of Tourism Research,* Vol. 2 No. 4, pp. 247-260.

Hudson, S. and Ritchie, J.R.B. (2001), "Cross-cultural tourist behaviour: An analysis of tourist attitudes towards the environment", *Journal of Travel & Tourism Marketing,* Vol. 10 No. 2, pp. 1-22.

Hunter, L.M., Hatch, A. and Johnson, A. (2004), "Cross-national gender variation in environmental behaviors", *Social Science Quarterly,* Vol. 85, pp. 677–694.

Kalafatis, S.P., Pollard, M., East, E. and Tsogas, M.H. (1999), "Green marketing and Ajzen's theory of planned behavior: A cross-market examination", *Journal of Consumer Marketing,* Vol. 16 No. 5, pp. 441–460.

Kim, Y. and Choi, S.M. (2005), "Antecedents of green purchase behavior: An examination of collectivism, environmental concern, and PCE", *Advances in Consumer Research,* Vol. 32, pp. 592–599.

Kohler, T. and Byers, E. (1999), *Mountain of the world: Tourism and sustainable mountain development – Mountain Agenda*, Institute of Geography, University of Berne, Switzerland.

Laroche, M., Bergeron, J. and Barbaro-Forleo, G. (2001), "Targeting consumers who are willing to pay more for environmentally friendly products", *Journal of Consumer Marketing,* Vol. 18 No. 6, pp. 503–520.

Lee, W.H. and Moscardo, G. (2005), "Understanding the impact of ecotourism resort experiences on tourists' environmental attitudes and behavioural intentions", *Journal of Sustainable Tourism,* Vol. 13 No. 6, pp. 346-565.

Leggett, C.G., Kleckner, N.S. et al. (2003), "Social desirability bias in contingent valuation surveys administered through in-person interviews", *Land Economics*, Vol. 79, pp. 561–575.

Luzar, E.J., Diagne, A., Gan, C.E.C. and Henning, B.R. (1998), "Profiling the nature-based tourist: A multinomial logit approach", *Journal of Travel Research*, Vol. 37, pp. 48–55.

McIntyre, R.P., Meloche, M.S. and Lewis, S.L. (1993), "National culture as a macro tool for environmental sensitivity segmentation", in Cravens, D.W. and Dickson, P.R. (Eds.), *AMA Summer Educators' Conference Proceedings* 4, American Marketing Association, Chicago, pp. 153–159.

Manaktola, K. and Jauhari, V. (2007), "Exploring consumer attitude and behavior towards green practices in the lodging industry in India", *International Journal of Contemporary Hospitality Management*, Vol. 19 No. 5, pp. 364–377.

Nepal, S.K. (2002), "Tourism as a Key to Sustainable Mountain Development: the Nepalese Himalayas in Retrospect", *Unasylva,* Vol. 53 No. 208, pp. 38-45.

Organisation for Economic Co-operation and Development - OECD (2012), OECD Tourism papers „Green Innovation in tourism services", OECD, Paris.

Roberts, J.A. (1996), "Green consumers in the 1990s: profile and implications for advertising", *Journal of Business Research,* Vol. 36, pp. 217–231.

Robinot, E. and Giannelloni, J.L. (2007), "Diversité des attentes en matière de prise en compte de l'environnement dans une prestation de service hôtelier. Une approche interculturelle", *Proceedings of the 3rd Rencontres internationales de la diversité,* IAE de Corte, October 4-6, CD-ROM.

Schlegelmilch, B.B., Bohlen, G.M. and Diamantopoulos, A. (1996), "The link between green purchasing decisions and measures of environmental consciousness", *European Journal of Marketing,* Vol. 30 No. 5, pp. 35–55.

Schorner, B. (2011), "Sustainable Mountain Tourism Development Illustrated in the Case of Switzerland", *SPNHA Review*, Vol. 6 No. 1, pp. 88-108.

Trudgill, S. (1990), *Barriers to a Better Environment: What Stops Us Solving Environmental Problems?,* Belhaven Press, London.

Weaver, D.B. and Lawton, L.J. (2002), "Overnight ecotourist market segmentation in the Gold Coast Hinterland of Australia", *Journal of Travel Research,* Vol. 40, pp. 270–280.

Wolcott, R.C. and Lippitz, M.J. (2010), *Grow From Within – Mastering Corporate Entrepreneurship and Innovation*, Mc Graw Hill, USA.

Wong, T.K.Y. and Wan, P.S. (2011), "Perceptions and determinants of environmental concern: The case of Hong Kong and its implications for sustainable development", *Sustainable Development,* Vol. 19 No. 4, pp. 235-249.

Yan, J., Barkmann, J. et al. (2006), "Sustainable Production and Consumption in the Domestic Chinese Tourism Market: The Sceptics' Challenge for Sustainable Tourism in the Southwestern China Biodiversity Hotspot", in *Sustainable Consumption and Production: Opportunities and Challenges Conference (SCORE),* SCORE, Wuppertal, pp.193-200.

STUDIA UBB NEGOTIA, LVIII, 4, 2013, pp. 23 - 51
(RECOMMENDED CITATION)

VALUE CO-CREATION AS PRECONDITION FOR THE DEVELOPMENT OF A SERVICE BUSINESS MODEL CANVAS

BIRGIT DAXBÖCK[1]

ABSTRACT. Environmental changes such as increasing competitive pressure and rising customer power force companies to rethink their way of doing business and to implement a service-oriented business logic. As a result, companies more and more aim at offering solutions instead of selling products in order to meet customer demands more effectively. This transition from a goods-oriented to a service-oriented logic depicts a fundamental change in the mental model underlying the business. Therefore, a redesign of a company's business model is necessary. This paper analyzes the influence of a product-service transition on the business model canvas against the background of service-dominant logic. The paper analyzes how a service-dominant business logic affects the design of the nine building blocks of the business model canvas. Special emphasis is given to the aspect of value co-creation and the need to integrate customers as key partners in value creation processes. The result of this conceptual paper is a set of propositions that may serve as a basis for future empirical research.

Keywords: *business model canvas, service-dominant logic, value co-creation, customer integration*

JEL Classification: L29, L89

1. Introduction

Companies recently face the challenge to cope with a business environment that is in a constant flux; global competition is increasing,

[1] B.Sc., M.Sc., Research Assistant, Otto von Guericke University Magdeburg, Department of Economics and Management, Chair in Business Administration, esp. International Management, birgit.daxboeck@ovgu.de

product life cycles are becoming shorter and customer needs are changing frequently (Teece, 2010; Gummesson, 2007). Especially the rise of new information and communication technology (ICT) puts further pressure on companies to adapt their strategies to the changing business environment. On the one hand, ICT has a major impact on manufacturing processes and product innovation (Osterwalder and Pigneur, 2004). On the other hand, ICT also strongly influence customer behaviour (Prahalad and Ramaswamy, 2004). Nowadays, suppliers as well as customers benefit from a widespread access to information and enhanced communication abilities. However, ICT developments especially support a shift of power from suppliers to customers as they contribute to making product and service offerings more transparent and comparable (Teece, 2010; Kucuk and Krishnamurthy, 2007). Customers more and more claim voice related to product- and especially service-design (Chesbrough and Spohrer, 2006). Furthermore, they do not hesitate to share and discuss their experiences with products and services with others within widespread customer communities. Therefore, markets increasingly develop into forums where customers actively participate in value creation processes (Prahalad and Ramaswamy, 2004; 2002).

Offering standardized goods on the mass market is no longer a suitable option for many suppliers as customers increasingly seek customized solutions (Jaakkola and Hakanen, 2013; Moeller, 2008). As a consequence, even traditional manufacturing companies more and more follow recommendations of management literature to move downstream toward the customer (Wise and Baumgartner, 1999). In order to escape the menace of commoditization and to meet customer demand more effectively, they extend their product portfolios by adding services to their core product offerings (Neu and Brown, 2006; Gebauer et al., 2005; Oliva and Kallenberg, 2003). In doing so, companies are forced to adjust their basic business logic as not only the tangible product itself, but to a growing extent also unbundled service offerings that are tailored to customer needs considerably contribute to revenues and following profitability of a company (Osterwalder and Pigneur, 2010). Hence, a company has to develop a more customer-centric mindset to be able to deliver solutions to its customers (Kowalkowski, 2010; Galbraith, 2002; Ramirez, 1999). In this context, Vargo and Lusch (2008a; 2004) argue that companies need to overcome the old, mainly goods-dominant business logic (GDL) (Mill, 1929; Say, 1821) and to replace it by a service-dominant

logic (SDL) (see also Vargo and Morgan, 2005). According to SDL, value is no longer created solely by the supplier. In contrast, an integration of the customer into the value creation process and thus a joint creation of value is a necessary precondition that enables companies to meet customer demands (Grönroos, 2011; Vargo and Lusch, 2008a; 2004).

In addition to redefining value propositions and value delivery processes, a company moving towards a service-oriented business logic has to think about how to capture value from their new offerings (Teece, 2010). Otherwise, companies risk being trapped in the so called service paradox (Gebauer et al., 2005). The service paradox is characterized by an increase of costs companies have to spend for additional service offerings that is not accompanied by corresponding higher revenues. As a consequence, a company's whole value creation network has to be analyzed (Ng et al., 2012). This means that companies changing their business logic need to consider not only value creation during production processes within their own value chain, but also the value that is realized during the consumption process of the customer (Grönroos, 2008; Vargo and Lusch, 2004). To consider internal as well as external value creation processes, the business model is a suitable unit of analysis. Business models not only explain internal activities of the focal company, but also mirror activities performed by suppliers and customers (Zott et al., 2011). Following, companies need to adjust their business models to new market conditions and to the transformed business logic to be able to exploit the potential of services successfully. Nevertheless, it is difficult for companies do deal with this need for change as business models are quite fuzzy constructs and literature does up to now not provide a common understanding of business models and its basic elements (Zott et al., 2011).

The purpose of this paper is to employ a SDL perspective on the transition process from a goods-focused to a service-focused business model. To date researchers very often only describe specific service-focused business models (e.g. Johnson et al., 2008; Wise and Baumgartner, 1999). However, only a few studies explicitly discuss the transition to a service business model with a particular focus on value co-creation and customer integration (e.g. Frankenberger et al., 2013; Storbacka et al., 2013; Kindström, 2010, Nenonen and Storbacka, 2010). In addition, these studies rather focus on specific aspects of service business models, but do not integrate business model concepts and SDL in a systematic way. Furthermore, it is necessary to address the influence of

a product-service transition on particular elements of a business model. Understanding the elements that are relevant for a specific business logic and analyzing their relationships is essential for companies to identify the right measures to implement the new business model (Osterwalder and Pigneur, 2004). Therefore, this paper aims at analyzing the necessary changes related to the transition from a product-oriented to a service-oriented business model. The basic research questions are: *Which elements of traditional holistic goods-dominant business models have to be changed in which way to upgrade these business models to service business models? How should a service-oriented business model be designed to facilitate customer integration and value co-creation?*

This paper contributes to business model literature and SDL literature by integrating the core elements of SDL into the business model canvas originally developed by Osterwalder and Pigneur (2010). In doing so, the paper provides a framework for the analysis of the effects of a growing service orientation on the way how companies do business. Furthermore, the paper gives first insights how to redesign business model building blocks to match the requirements of a service-oriented business logic.

2. Theoretical Background

Before discussing the need to integrate service aspects into business models in detail, a clarification of basic concepts and a brief explanation of the conceptual framework of this paper are necessary. Therefore, this chapter provides insights into SDL and gives information on the basic understanding of business models employed in this paper.

Service-dominant Logic

More and more manufacturing companies follow the suggestion given by management literature to shift the focus from producing goods towards providing solutions by integrating services in their offerings (Gebauer, 2008; Oliva and Kallenberg, 2003, Wise and Baumgartner, 1999). One benefit for companies refocusing on service activities is rooted in the fact that it is highly difficult to imitate intangible aspects of services. Furthermore, adding services to core products can be seen as a differentiation strategy which aims at attracting new customers and enhancing retention of the existing customer base (Matthysen and

Vandenbempt, 2008; Bruhn and Georgi, 2006). Additionally, the recent progress in ICT allows for an increasing customer participation in value creation processes as customization of products becomes faster and cheaper (Prahalad and Ramaswamy, 2002). As a consequence, the traditional distinction between tangible goods and intangible services becomes more and more blurred (Gummesson, 2007; Grönroos, 2006; Lovelock and Gummesson, 2004). Consequentially, companies need to develop new ways of value creation by continuously redesigning their relationships with customers and other business partners (Normann and Ramirez, 1993).

In this paper, the concept of SDL introduced by Vargo and Lusch (2004) is employed to overcome the somewhat outdated differentiation between products and services. Furthermore, SDL allows for looking at the transition of companies from being a producer to becoming a service provider from a new perspective. In contrast to the old GDL, SDL does not differentiate between tangible and intangible outputs, but defines service (singular) as *'…the application of specialized competences […] through deeds, processes, and performances for the benefit of another entity or the entity itself.'* (Vargo and Lusch, 2004: 2). This definition reflects the necessity to employ a completely new way of doing business to be able to successfully implement service-oriented strategies (Vargo and Lusch, 2008b). While GDL focuses on the production output, SDL regards service as the fundamental base of exchange with goods merely being a distribution mechanism for service provision (Vargo and Lusch, 2008a; 2004)

Basically, the concept of SDL rests on ten foundational premises (Vargo and Lusch, 2008a; 2006), which can be consolidated into three core elements that enhance the general understanding of service explained above. First of all, the concept of *value-in-context* replaces the old GDL concept of value-in-exchange (Vargo et al., 2010; Vargo, 2009). This means that companies cannot deliver value, but only offer value propositions which are evaluated exclusively by the beneficiary (the customer). Hence, companies need to understand the value of the customers' experience in using an offering instead of evaluating value according to the production process (Prahalad and Ramaswamy, 2004; Vargo and Lusch, 2004). In this context, SDL emphasizes the importance of collaborative processes resulting in a joint creation of value. The customer is no longer an exogenous variable, but integrated in a company's value creation process (Vargo and Lusch, 2008b). In turn, the company also

interacts with the customer's value creation system. Therefore, companies' and customers' service systems form a network by multilaterally contributing to the value creation process resulting in at least temporal cooperation (Grönroos, 2011; Lusch et al., 2010; Maglio et al., 2009). As a consequence, value is always co-created and bound to the context of the network in which it arises.

This *network perspective* is the second core element of SDL and supersedes the old GDL-related concept of the value chain. Against this background, a value network is defined as *'…a spontaneously sensing and responding spatial and temporal structure of largely loosely coupled value proposing social and economic actors interacting through institutions and technology, to: (1) co-produce service offerings, (2) exchange service offerings, and (3) co-create value…'* (Lusch et al., 2010: 20). Again, this sense and respond logic highlights the need to integrate the customer base and its resources into the value creation process (Lusch and Webster, 2011). On the one hand, a deep understanding of customer needs is required from a company in order to develop adequate value propositions (Payne et al., 2008). On the other hand, integrating a customer's own network base can also extend the addressable knowledge base of accompany considerably (Prahalad and Ramaswamy, 2000).

The last main element is the specific *resource perspective* adopted by SDL. In this context, two types of resources have to be distinguished: operand (mainly tangible) resources and operant resources, meaning resources which produce an effect upon other resources. Operant resources are considered primary and superior to operand resources as they are usually dynamic and infinite (Vargo and Lusch, 2004; Constantin and Lusch, 1994). Therefore, they are more adaptive and less imitable than operand resources. Especially in dynamic environments adaptability, agility and constant learning are essential for companies to meet complex customer needs (Lusch et al., 2010). In this context, empowered customers are participating actively in value creation processes and thus become a new source of operant resources. Companies can benefit from the contribution of their customers if they are able to embrace the knowledge and skills customers possess and support customers' willingness to share experiences and to learn from the company (Prahalad and Ramaswamy, 2000).

To date, SDL only provides some insights into how the customer's service system should be integrated so that companies can

benefit from this new network configuration. Lusch et al. (2010) argue that the different members of value networks are linked by three major elements: (1) their competences, which are used to provide service for the other actors; (2) their collaborative relationships, which are based on rather non-coercive, informal governance mechanisms; and (3) information shared through common standards and protocols. However, the literature on SDL does not provide satisfying information on how the co-creation process exactly works. The development of value propositions is explained as a learning process based on market-related sources of information such as financial metrics (Lusch et al., 2010; Lusch et al., 2008). This market-based learning mechanism does not consider the need to integrate the customers' network into the value network to jointly create value. Further research is needed in order to deepen the understanding on activities and structures which enable value co-creation processes. Moreover, since the concept of SDL is not entirely theoretically founded and has not reached the state of a paradigm yet, a deeper analysis of the core elements is essential. Additionally, the concept is criticized because of its limited managerial implications (Achrol and Kotler, 2006; Ballantyne and Varey, 2006). Therefore, a more practice-oriented perspective on the process of value co-creation has to be taken into account. Nevertheless, research on service business model development can be strengthened by SDL's particular definition of service and its insights on value creation networks. Vice versa, illustrating the customer integration aspect within the business model can also support the development of SDL by clarifying the co-creation mechanisms.

Basics of Business Models

Since the mid-1990s, practitioners as well as researchers increasingly place emphasis on the concept of business models. Especially in times of increasing competition and severe pressure on profit margins, innovating the business model becomes a less time-consuming and less expensive alternative to product or process innovations (Amit and Zott, 2012; Chesbrough, 2010; Teece, 2010; Margretta, 2002). The product-service transition can be seen as a trigger of business model innovation. For example, Wise and Baumgartner (1999) identify four basic business model types that describe how companies integrate service offerings in their product portfolios.

However, they do not explain the underlying processes of business model innovations in general, nor do they draw on the business model as a unit of analysis in particular.

Despite of the growing attention on business models in scientific research in the past 20 years, there is still a lack of definitional clarity (Zott et al., 2011). In general, business models can be understood as a blueprint of economic actions of companies (Osterwalder et al., 2005). They describe mechanisms to create, deliver and capture value (e.g. Osterwalder and Pigneur, 2010; Teece, 2010; Chesbrough, 2007; Afuah and Tucci, 2001). However, recent research increasingly emphasizes the value creation aspect of business models. Moreover, network relations and collaborative value creation processes are considered in particular, even though the traditional perspective of value creation through the focal company does still prevail (Zott et al., 2011). In the context of this paper, business models are defined according to Osterwalder (2004: 15) as *'...a conceptual tool that contains a set of elements and their relationships and allows expressing the business logic of a specific firm. It is a description of the value a company offers to one or several segments of customers and of the architecture of the firm and its network of partners for creating, marketing, and delivering this value and relationship capital, to generate profitable and sustainable revenue streams.'*

Similar to other researchers (e.g. Teece, 2010; Amit and Zott, 2001; Chesbrough and Rosenbaum, 2000; Timmers, 1998), Osterwalder (2004) conceptualizes a meta-model that includes specific business model elements (see also Osterwalder and Pigneur, 2010; 2004). However, the advantage of Osterwalder's (2004) understanding of the business model concept is that its definition already applies a network perspective on value creation. The main elements of Osterwalder's (2004) conceptualization – the so called four main pillars – are (1) product (or product innovation), (2) customer interface, (3) infrastructure management and (4) financials. Thus, these pillars describe a company's offerings, its target group, the way how the business operates and the profit a company aims to achieve. In order to make the business model work, the four pillars need to be aligned with external forces such as competition, environmental change or customer demand (Osterwalder and Pigneur, 2004). Another point in favor of this model is that the four pillars of the business model are further decomposed into nine business model building blocks: value proposition, customer relationships, customer segments, channels, key

partners, key activities, key resources as well as cost and revenue structure (for a detailed description see table 1).

Table1.

Business model building blocks

Business model pillar	Business model building block	Description
Product	Value proposition	Describes the bundle of products and services that create value for a specific customer segment
Customer interface	Customer relationships	Describes the types of relationships a company establishes with specific customer segments
	Customer segments	Defines the different groups of people or organizations an enterprise aims to reach and serve
	Channels	Describes how a company communicates with and reaches its customer segments to deliver value propositions
Infrastructure management	Key partners	Describes the network of suppliers and partners that make the business model work
	Key activities	Describes the most important things a company must do to make a business model work
	Key resources	Describes the most important assets required to make a business model work
Financial aspects	Cost structure	Describes all costs incurred to operate a business model
	Revenue structure	Represents the cash a company generates from each customer segment

Source: Own illustration adapted from Osterwalder and Pigneur, 2010; Osterwalder et al., 2005.

This detailed fragmentation of the meta-model allows for an in-depth description of a company's business model. This, in turn, helps managers to generate a common understanding of the model and to identify the most important drivers of their business model (Osterwalder and Pigneur, 2004). Most important, the single building blocks are not independent. They are interconnected and dependent on each other (see figure 1) (Osterwalder and Pigneur, 2004; Osterwalder, 2004). Changing one element leads inevitably to the necessity of adjusting other elements. Furthermore, By illustrating and mapping all building blocks and their interrelations, changes in the business model can be easily illustrated which makes the evolution of new strategic alternatives apparent (Osterwalder and Pigneur, 2010; 2004).

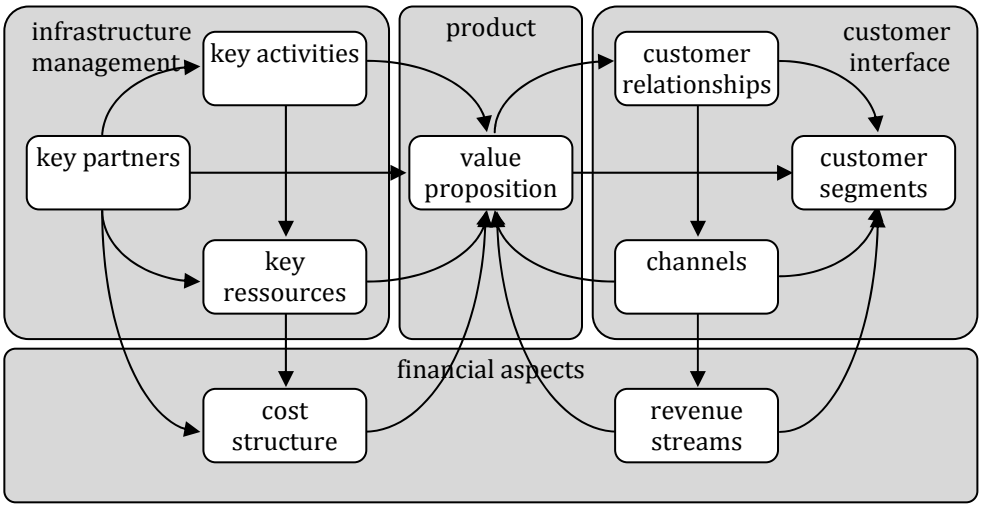


Figure 1. Business model building blocks and their interrelationships
Source: Own illustration based on Osterwalder and Pigneur, 2010; 2004.

The original meta-model (Osterwalder, 2004; Osterwalder and Pigneur, 2004) was developed with a particular focus on e-businesses. However, Osterwalder and Pigneur (2010) updated the model later on in cooperation with over 400 practitioners. The goal was to create a meta-model – the so called business model canvas – that allows managers to *'think through the business model'* (Osterwalder and Pigneur, 2010: 15). Furthermore, the business model canvas was applied and tested in a multitude of different companies and various industries. Thus, another main advantage of the business model canvas is that it can generally be adapted to match diverse business settings (Osterwalder and Pigneur, 2010).

The need to improve a business model is on the one hand a coercive reaction to changes in a company's business environment. On the other hand, managers can use a structured approach to proactively redesign specific business model building blocks. In this context, the reinvention of specific business model elements to deliver value in a new way (Lindgardt et al., 2009), or more general, the transition from an old business model to a new one (Osterwalder et al., 2005), is referred to as business model innovation. By analyzing the necessity to change the above mentioned business model building blocks according to SDL, such a structured approach to business model innovation can be pursued. To implement SDL these building blocks need to be aligned with the

core elements of SDL. In doing so, necessary changes in the business model triggered by an increasing service-orientation of a company can be identified and analyzed in detail.

Although the meta-model by Osterwalder and Pigneur (2010; 2004) has various advantages compared to alternative business model concepts, its development was mainly influenced by a rather goods-dominant thinking disregarding the need to co-create value with customers. Taking a closer look at the description of the single components, it has to be mentioned that not only the wording (e.g. deliver value to customers instead of creating value with customers) but also the basic understanding of exchange mechanisms (e.g. the role of partnerships in value chains instead of the integration of various service systems to one value network) is highly related to GDL. At first glance, some concepts within the customer relationship block of the more recently developed business model canvas (Osterwalder and Pigneur, 2010) could be related to SDL. For example they discuss co-creation or the utilization of customer communities as an element within the customer relationship block. However, a closer examination shows that co-creation is rather described as a type of customer-company interaction or a part of customer relationship management, which suggests that the general underlying logic does not fully match SDL thinking.

Role of Value Co-creation in Business Models

The transition from a product-oriented to a service-oriented business logic requires a holistic change in the mental model underlying the whole business. As a consequence, even meta-models of the business model concept need to be adapted to adhere to the basic tenets of SDL. Against this background, it is necessary to examine adjustments that have to be made to the meta-model before analyzing the influence of SDL – and especially the aspect of value co-creation – on the business model building blocks and their interrelations.

Integrating Service-dominant Logic into the Business Model Canvas

A shift in the dominant logic of a company (Prahalad and Bettis, 1995) goes along with a need for considerable changes within the whole company (Grönroos, 2006). Especially the transition from a

product- to a service-oriented business logic causes considerable managerial challenges (Oliva and Kallenberg, 2003). First of all, service business models tend to be more complex compared to mainly goods-focused business models as the traditional product focus is developed into a process focus of value co-creation (Lusch et al., 2010). In this context, companies actively need to facilitate the joint creation of value (Grönroos, 2011) by establishing an infrastructure which allows for customer integration in value creation processes (Vargo et al., 2008). Second, companies need to develop specific competences to adjust the customer interface adequately in order to recognize and fulfil changing customer needs (Karpen et al., 2012; Lusch et al., 2007). Third, customer relationships have to be redefined to live up to the network perspective of SDL. Summing up, managing the value creation network is vital to organizational survival of service-oriented companies. Even from a GDL perspective, the integration of the customer as an external factor into the service process has always been an essential prerequisite of service provision (Bruhn and Georgi, 2006). SDL intensifies the importance of the customer relationship as it forces a company to jointly create value with its customers. Therefore, transaction relationships need to be replaced by newly developed value creation partnerships (Lusch et al., 2010). This paradigm shift of the business logic results in the need to change the company's activity system – the business model – fundamentally (Ng et al., 2012).

Many business model conceptualizations already indicate an interplay between company-internal structures and processes with external network partners and customers (e.g. Osterwalder and Pigneur, 2010; 2004; Morris, et al., 2005; Chesbrough and Rosenblohm, 2002). Furthermore, researchers often emphasize a customer-centric perspective on business models or even address value co-creation (Frankenberger et al., 2013). Additionally, open business models focus on external resources in order to facilitate value creation processes (e.g. Chesbrough, 2007; 2006). However, when speaking about customer centricity scholars usually refer to strategies such as customer orientation or relationship management which were developed based on GDL (Vargo and Lusch, 2008b). Open business models on the other hand usually focus on opening research and development or intellectual property management to external contributors and do not include long-term partnerships in any other ways (Frankenberger et al., 2013). Hence, instead of a one-sided

perspective (supplier focus or customer focus), a balanced centricity including all members of the value network has to be considered in the business model conceptualization (Gummesson, 2008).

As discussed before, the business model canvas (Osterwalder and Pigneur, 2010) does not explicitly illustrate value co-creation processes according to SDL. One way to further emphasize the co-creation aspect within the business model would be to change the product related block of value proposition to a process related aspect of value co-creation. However, altering the meta-models building blocks is not helpful. First, changing one building block would result in changes of all other building blocks. Nevertheless, the customer interface would still be inadequate in regard to the core elements of SDL, as customer segments would still be regarded as 'targets' instead of partners for value co-creation. In order to fulfill SDL related requirements, a more explicit integration of customers is strongly needed. Second, from a company's perspective the focus on value propositions is still important. Even though companies are – according to SDL – not able to create value by themselves, they need to make value propositions in order to initiate value co-creation processes with their customers.

Following, these value propositions are exclusively evaluated by the customer (Vargo and Lusch 2008a, 2004). As a consequence value is jointly created by all actors within the value networks through exchange of resources and knowledge. These networks are viewed as open systems which allow for constant learning and adaption to a changing environment (Lusch et al., 2010). Osterwalder and Pigneur's (2004) meta-model does not account for such close relationships between the focal company and the customer, nor does the business model canvas (Osterwalder and Pigneur, 2010) do so. To date, feedback from the customer base to the company is only indicated by the link between the revenue flows and the value proposition block. In general, this consideration is in line with the learning mechanism via financial metrics proposed by Lusch et al. (2008). However, as stated before, a more direct transfer of information and knowledge is necessary to successfully implement a service-dominant business logic. To facilitate resource transfers from customers to the focal company, it is necessary to perceive customers not only as 'targets', but as key partners. According to Osterwalder and Pigneur (2010; 2004), key partners can be used to acquire particular resources. By linking the customer segments to the

key partners building block and thus creating an indirect feedback loop from the value proposition block back to the infrastructure management pillar, it is possible to include the co-creation aspect into the model while still focusing on the company perspective of value proposition (see figure 2).

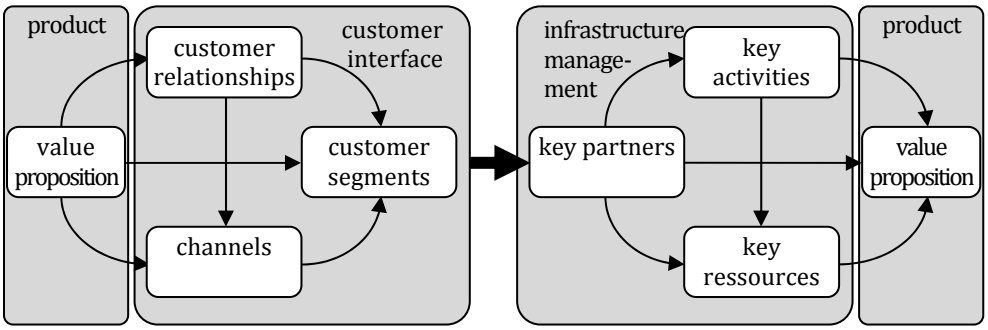


Figure 2. Interrelationship between customer interface and infrastructure management
Source: Own illustration.

3. Development of Research Propositions

Proactively changing a business model requires a structured approach. Mapping and linking the underlying processes and elements by using a meta-model and changing each one of them is a suitable course of action (Scott-Kemmis, 2012; Osterwalder, 2004). Taking a look at the meta-model, the transition from a goods-oriented to a service-oriented focus might influence each single business model building block and companies changing their business models toward service-oriented solutions need to make changes in multiple dimensions as various business model elements are interrelated and interdependent (Storbacka et al., 2013).

Value proposition. A value proposition includes quantitative (e.g. price) as well as qualitative elements (e.g. customer experience) (Osterwalder and Pigneur, 2010). The definition of a particular value proposition of service-oriented company as well as transition paths from a goods orientation to a service orientation will vary depending on the company's context-specific strategy (Storbacka et al., 2013). However, to implement SDL accordingly, companies need to understand that value propositions based on SDL are rather value-supporting processes. Not only the exchange of goods and service is of importance, but also the

exchange of information and other operant resources (Lusch et al., 2010). Furthermore, customer-company interactions are necessary to enable customers to create value-in-context in their everyday practice (Grönroos, 2008). Additionally, companies need to be aware of the fact that they serve as performance providers or problem solvers and therefore have to develop a deep understanding of a customer's needs (Storbacka et al., 2013). This is not only true in B2B aspects, where intense relationships between supplier and customer can be observed frequently (Ballantyne, 2004). A stronger focus on customers' experiences with products and services during the usage process is also increasingly relevant in B2C aspects (Prahalad and Ramaswamy, 2004).

Proposition 1a: Implementing SDL enhances the service focus and reduces the product focus of the value proposition.

Proposition 1b: Companies implementing SDL are more interested in the value created by customers during the usage process of an offering than companies that remain in a goods-dominant business logic.

Key activities. Similar to the value propositions block, the key activities a company performs not only depend on the service focus, but also on general factors such as market strategy or industry focus. However, companies focusing on service-oriented solutions will rather follow the 'value shop' concept to organize their value creation activities (Osterwalder and Pigneur, 2004). This means that they will focus on detecting and fulfilling customers' needs and thus on problem discovery and problem solving activities (Osterwalder and Pigneur, 2010; 2004). The main business focus shifts from being a producer to being a provider (Storbacka et al., 2013). To implement SDL, companies need to support the value creation processes of their customer and thus, serve as value facilitators. As a consequence, they need to create opportunities to develop interactions with customers (Grönroos, 2008) in order to engage in an active dialog (Prahalad and Ramaswamy, 2000).

Proposition 2a: Implementing SDL changes the role of a company from being a producer of offerings to being a provider of offerings.

Proposition 2b: Implementing SDL enhances the need for interaction with customers.

Key resources. The definition of service according to SDL refers to the process of using one's resources for the benefit of another entity. In this context, all economic actors are resource integrators (Vargo and Lusch, 2008a; 2004). The concept of value-in-context implies that customers not only integrate resources supplied by the company in their value creation process, but also consider resources at their own disposal or sourced from other partners (Lusch and Webster, 2011). The whole value network aims at co-creating valuable solutions to mutually improve all network partners' well-being (Vargo and Lusch, 2011). In this context, a special emphasis has to be placed on operant resources such as knowledge and skills. Moreover, special capabilities are necessary to develop adequate value propositions (Osterwalder and Pigneur, 2004) as well as to actively manage the value co-creation process (Karpen et al., 2012). To develop and use such operant resources effectively, learning mechanisms and knowledge transfer from customers to the company (and vice-versa) are of importance (Madhavaram and Hunt, 2008). Companies need to relate knowledge management activities to value co-creation processes instead of relying on information technology-enabled processes (Payne et al., 2008). Therefore, the ability to learn directly from the customer base and from other network partners becomes more important (Lusch et al., 2010). Furthermore, as the product-service transition is a rather stepwise approach (Storbacka et al., 2013) companies utilize experimentation trial-and-error learning to change elements of their business models (Chesbrough, 2010; Sosna et al., 2010).

Proposition 3a: Companies implementing SDL develop specific interaction capabilities facilitating the co-creation of value.

Proposition 3b: Designing value propositions is related to a feedback learning mechanism based on operant resources provided by the customer base.

Customer segments. Implementing SDL also has an influence on considerations regarding customer segmentation. However, traditional criteria for customer segmentation such as requirements regarding different distribution channels, prices, offerings, types of relationships as well as the varying profitability of different customers (Osterwalder and Pigneur, 2010) are still relevant. Furthermore, a company's decision whether to serve, for example, the mass market or to follow a niche

market strategy might not be influenced by the product-service transition at all. SDL is not only applicable to niche market strategies or B2B settings, in which close relationships are established with a manageable amount of customers. In contrast, SDL argues that strategies from B2B settings can be translated to B2C settings (Vargo and Lusch, 2011; 2008b). Customers are an essential source of operant resources – in all different settings (e.g. Lusch et al., 2010; Prahalad and Ramaswamy, 2000). Of course, different customers have a different willingness to participate in co-creation processes (Yi and Gong, 2013; Rosenbaum and Massiah, 2007) as well as different skills, which also determine the perceived value for a customer (Prahalad and Ramaswamy, 2000). As a consequence, for service-oriented companies the type of relationship will be the most important segmentation criteria. On the one hand, companies need to manage customer diversity and facilitate value co-creation for customers with a different degree of sophistication (Prahalad and Ramaswamy, 2000). On the other hand, the integration of specific customers in order to gain access to operant resources is regarded as a strategic choice (Lusch and Webster, 2011). Hence, companies should focus on integrating key customers, who value a company's service propositions and are willing to provide operant resources in return.

Proposition 4: Companies implementing SDL segment key customers based on their willingness and ability to share information.

Key partners. Osterwalder and Pigneur's (2004) meta-model directly links the building blocks 'key resources' and 'key partnerships'. Besides the optimization of operations and processes and the reduction of risk, the acquisition of specific resources is one major reason for companies to engage in partnerships. Against this background, Osterwalder and Pigneur (2010) distinguish between four types of relationships: strategic alliances, coopetition, joint ventures and buyer-supplier relationships to assure reliable supplies. By employing SDL, companies have to further consider the importance of operant resources provided by the customer such as market-related knowledge (Madhavaram and Hunt, 2008). Furthermore, to facilitate experiential learning and thus the constant improvement of value propositions, feedback loops with all stakeholders are necessary to acquire knowledge about customers' needs and to learn how to meet them. To

do so, a two-way information flow with customers as well as with all other stakeholders has to be established (Lusch and Webster, 2011). Hence, customers' service systems represent valuable key partners and need to be integrated with a company's existing partner network. Moreover, it can be assumed that value network partners are linked more closely and become more dependent upon each other (Frankenberger et al., 2013; Storbacka et al., 2013).

Proposition 5a: Companies implementing SDL integrate customers as well as other network partners to gain access to specific service capabilities.

Proposition 5b: Companies implementing SDL have closer relationships with their value network partners.

Customer relationships. As customers are integrated in a company's partner network, customer relationships play a major role in SDL business models. Value is (co-)created when customers interact with the resources and capabilities provided by a relationship with a supplier as well as by other actors within the value network (Vargo and Lusch, 2010; 2004; Lusch and Webster, 2011). While Osterwalder and Pigneur (2010) relate this building block to different types of relationships (e.g. direct, personal assistance vs. indirect relationships such as self service), in this paper the nature of the relationship is emphasized. According to SDL, relationships should be beneficial for all involved parties to be in line with the specific definition of service. Hence, companies need to establish a dialog of equals with their customers (Prahalad and Ramaswamy, 2000) and they need to ensure that the acquisition of resources through customer relations does not lead to a one-sided exploitation of the customer's knowledge base. Negative examples would be specific open innovation projects, where customers surrender their property rights without receiving value in return (Kozinets et al., 2008; Prahalad and Ramaswamy, 2004). Hence, customer-supplier relationships require multi-directional linkages, while each actor influences the value creation of the other (Grönroos, 2008). Instead of a rather hierarchical value chain perspective with companies 'targeting' customers in the market, SDL-based customer relationships become more heterarchic (Hedlund, 1986; 1993) resulting in collaborative relationships of all partners within the value network and in symmetrical exchange of information and other operant resources (Kowalkowski, 2010).

Proposition 6: Companies implementing SDL facilitate multi-directional value creation activities that enable customers to interact with other network partners on eye level.

Channels. Channels connect the value propositions of a company with the customer segment and reflect all possible interaction points between suppliers and customers (Osterwalder and Pigneur, 2004). Originally, the building block 'channels' is rather related to distribution channels and focuses on the delivery of value to customers. However, this paper goes further and interprets channels as interaction mechanisms, which not only allow for distributing goods and services to customers, but which facilitate the joint creation of value. To employ SDL successfully, companies need to establish such interaction channels actively and thus encourage the reciprocal exchange of information and other resources (Grönroos and Ravald, 2011).

Of course, this consideration is strongly linked to the customer relationship aspect of the model. Even though an integration of customers is a prerequisite of value co-creation, customer relationships do not necessarily need to be direct. To be able to manage the complex relationships within service business models, companies already heavily rely on ICT. This provides a virtual platform for a close integration of customers and suppliers into value creation networks (Tuunanen et al., 2010) which seems to be crucial for the success of the adjusted or newly developed business model. Moreover, technology is an enabler to liquefy information resources, meaning the separation of information from its physical form. Therefore, information can flow more easily from one entity to another. By using ICT-based channels the knowledge transfer from customers to the company can be facilitated. In turn, the company is able to constantly reconfigure its resources and thus to improve its ability to offer more adequate value proposition (Lusch et al., 2010).

Proposition 7a: ICT-based channels enhance the exchange of information and facilitate the co-creation of value.

Service delivery is also more and more supported by ICT (Belvedere et al., 2013). With advancements of ICT in the mass market, customer acceptance of digitized services increases even in the B2C market (Tuunanen et al., 2010). While technology-generated self-

service has usually decreased the personal interaction, today's ICT enables interpersonal exchanges similar to face-to-face contact (Breidbach et al., 2013) and allows for a more personalized communication at reasonable costs (Osterwalder and Pigneur, 2004). Therefore, developments in ICT change the characteristics of customer relationships and exchange mechanisms as it facilitates the coordination of diverse partners within the value network (Davis et al., 2011; Osterwalder and Pigneur, 2004). On the one hand, ICT changes the balance of market power in favor of customers due to enhanced information access, increased transparency and the ability to exchange information within large online-customer communities. Today, customers are even able to create value for themselves (e.g. C2C markets). Hence, empowered customers try to capitalize on their improved position by gaining a stronger influence on market exchange processes (Kucuc and Krishnamurthy, 2007; Prahalad and Ramaswamy, 2004; Steward and Pavlou, 2002). On the other hand, companies can stimulate the customers' willingness to participate in the value creation process and use the customer's contribution to their own benefit. By treating customers at an eye's level and rewarding them for their involvement, specific tasks can be transferred to the customer base. However, companies need to provide customers with specific tools or establish common standards to facilitate knowledge transfer and value co-creation (Briscoe et al., 2012; Lusch et al., 2010).

Proposition 7b: Empowered customers are willing to participate in ICT-based value creation as long as their participation enhances their own value-in-context.

Proposition 7c: To benefit from the use of ICT-based channels, companies establish common standards and instruct customers in using them.

Cost structure and revenue stream. The transition from a product- to a service-oriented business logic influences financial streams as offering services can provide a more stable source of revenues as extensive investments in tangible goods are usually more dependent on economic cycles (Oliva and Kallenberg, 2003; Wise and Baumgartner, 1999). For example, Rolls Royce changed its airline business from a goods-dominant logic to the provision of service when offering leasing contracts instead of selling engines (Ng et al., 2012). However, the

product-service transition does not necessarily result in service-dominant thinking (Kowalkowski, 2010). Not only lack of organizational arrangements supporting the transition but also cognitive limitations of managers increase the risk of being caught by the service paradox (Gebauer et al., 2005). As long as the customer remains an exogenous variable in the value creation process, companies still apply GDL even when offering intangible goods (Vargo and Lusch, 2008b; Lusch et al., 2007). Nevertheless, in the example of Rolls Royce the transition not only addresses more continuous revenue streams and a solution-oriented activity focus, but also the improvement of customer utility (offering leasing contracts to ensure the long-term efficiency of airplanes). The value proposition needs to fit the customer's capabilities and resources in order to achieve a high value-in-context (Ng et al., 2012). To achieve high revenues, companies need to change their mental model.

Proposition 8a: Companies implementing SDL are affected by an increase of costs.

Proposition 8b: Companies implementing SDL are able to realize an increase of revenues that is higher than the increase of costs.

4. Conclusion, Limitations and Outlook

This paper examines how a growing service-orientation affects the business model design in manufacturing companies. In this context, the business model canvas of Osterwalder and Pigneur (2010; 2004) serves as overall theoretical framework for this paper. Insights on how business models need to be redesigned can be derived from the concept of service-dominant logic (Vargo and Lusch, 2008a; 2004). By discussing three major aspects of SDL, value-in-context as well as SDL's specific network and resource perspectives, evidence is provided that the implementation of a service-oriented business logic substantially affects all nine business model building blocks of Osterwalder and Pigneur's (2010; 2004) business model conceptualization , regardless what kind of service offerings are involved in particular.

What clearly distinguishes SDL from GDL is that a reciprocal provision of service supersedes the provision of – either tangible or intangible – goods (Vargo and Lusch, 2008b) while the focus is shifted from exchange to interactions (Grönroos, 2006). Integrating and

supporting customers to facilitate their resource integration and value co-creation processes within the network is the main challenge for a truly service-dominant business model (Lusch and Webster, 2008). Especially the integration of the customer base in the value creation process plays a central role to effectively accomplish the transition towards a service-oriented business logic. As a consequence, adaptations of the meta-model by Osterwalder and Pigneur (2010; 2004) are necessary in order to display the role of the customer as a provider of operant resources in the business model. A direct link from the customer segments building block to the key partners block illustrates this interrelationship. Following, the propositions can be understood as an attempt to portray the influence of SDL on each single business model building block. Most notably, the propositions indicate that all nine business model building blocks are affected by an implementation of a service-oriented business logic. Of course an integration of customers in value creation processes is the most fundamental aspect of the new business model. Nevertheless, due to the interdependencies of building blocks changes in the customer interface pillar result in the need to adjust other building blocks as well.

This research provides only a first attempt to describe the development of service-oriented business models. However, due to its conceptual nature this paper may lack explanatory power. Especially the intensity of modifications in each single business model building block cannot be explained within this paper. It can be assumed that the design of a specific business model is also dependent on particular context-related circumstances. This aspect was not considered in this research. Moreover, this paper does not explain precisely how companies can establish service-oriented business models in practice. Hence, detailed research on specific means to configure business models especially in order to apply the new perspective on customer relations is still necessary. Nevertheless, newness and complexity of the research question gave reason for following a more exploratory research approach.

Several interesting and important implications for future research can be highlighted. Especially the need for further empirical research has to be pointed out. First of all, a more detailed analysis of specific influences of SDL on the business model elements in business practice is necessary. This could be achieved by qualitative research – for example in-depth interviews with managers that already

implemented service-dominant business models. Second, the question arises which service related capabilities need to be developed by companies which increase their service focus. Again, this can be answered by qualitative research. Nevertheless, besides focusing on a company perspective of service capabilities it could also be of interest to gain insights into the customers' point of view. Which expectations do customers have related to value propositions? Or, in other words, which service-related capabilities are demanded by customers? Furthermore, the customers' opinion may also be of relevance related to the co-creation aspect of SDL. Customer surveys could analyze the willingness of customers to participate in the co-creation of value. It might also be interesting to further examine customers' perspectives on value creation. What benefits can customers gain from value propositions? Is there a gap between the value-in-context intended by the service provider and the value-in context perceived by the customers? Either qualitative or quantitative research could be useful to answer these questions. The addressed topics for future research are only a few issues that emerge from our research. Both, SDL as well as research related to the concept of business models can be strengthened by an integrative approach. Hence, future research focusing the research topic addressed in this paper is highly appreciated.

REFERENCES

Achrol, R. S. and Kotler, P. (2006), "A service-dominant logic for marketing: a critique", Vargo, S. L. and Lusch, R. F. (Eds.), *The service-dominant logic of marketing: dialog, debate, and directions*, M E Sharp, Boston/MA, pp. 320-334.

Afuah, A. and Tucci, C. L. (2001), *Internet business models and strategies: text and cases,* McGraw-Hill, New York.

Amit, R. and Zott, C. (2012), "Creating value through business model innovation", *MIT Sloan Management Review,* Vol. 53 No. 3, pp. 41-49.

Amit, R. and Zott, C. (2001), "Value creation in e-business", *Strategic Management Journal,* Vol. 22 No 6-7, pp. 493-520.

Ballantyne, D. (2004), Dialogue and its role in the development of relationship specific knowledge", *Journal of Business & Industrial Marketing,* Vol. 19, No. 2, pp. 114-123.

Ballantyne, D. and Varey, R. J. (2006), "Introducing a dialogical orientation to the service-dominant logic of marketing", Vargo, S. L. and Lusch, R. F. (Eds.), *The service-dominant logic of marketing: dialog, debate, and directions,* M E Sharp, Boston/MA, pp. 224-235.

Belvedere, V., Grando, A. and Bielli, P. (2013), "A quantitative investigation of the role of information and communication technologies in the implementation of a product-service system", *International Journal of Production Research,* Vol. 51 No. 2, pp. 410-426.

Breidbach, C. F., Kolb, D. G. and Srinivasan, A. (2013), "Connectivity in service systems: does technology-enablement impact the ability of a service system to co-create value?" *Journal of Service Research*, Vol. 16 No. 3, pp. 428-441.

Briscoe, G., Keränen, K. and Parry, G. (2012), "Understanding complex service systems through different lenses: an overview", *European Management Journal,* Vol. 30 No. 5, pp. 418-426.

Bruhn, M. and Georgi, D. (2006), *Services marketing. Managing the service value chain*, Prentice Hall, Harlow.

Chesbrough, H. (2010), "Business model innovation: opportunities and barriers", *Long Range Planning,* Vol. 43 No. 2-3, pp. 354-363.

Chesbrough, H. (2007), "Why companies should have open business models", MIT Sloan Management Review, Vol. 48 No. 2, pp. 22-28.

Chesbrough, H. (2006), *How to thrive in the new innovation landscape*, Harvard Business School Press, Boston/MA.

Chesbrough, H. and Rosenbloom, R. S. (2002), "The role of the business model in capturing value from innovation: evidence from Xerox Corporation's technology spin-off companies", Industrial and Corporate Change, Vol. 11 No. 3, pp. 529-555.

Chesbrough, H. and Spohrer, J. (2006), "A research manifesto for service science", *Communications of the ACM*, Vol. 49 No.7, pp. 35-40.

Constantin, J. A. and Lusch, R. F. (1994). *Understanding resource management: how to deploy your people, products, and processes for maximum productivity*, The Planning Forum, Oxford, OH.

Davis, M. M., Spohrer, J. C. and Maglio, P.P. (2011), "Guest editorial: how technology is changing the design and delivery of services", *Operations Management Research,* Vol. 4 No. 1-2, pp. 1-5.

Frankenberger, K., Weiblen, T. and Gassmann, O. (2013), "Network configuration, customer centricity, and performance of open business models: a solution provider perspective", *Industrial Marketing Management,* Vol. 42 No. 5, pp. 671-682.

Galbraith, J. R. (2002), "Organizing to deliver solutions", *Organizational Dynamics,* Vol. 31 No. (2), pp.194-207.

Gebauer, H. (2008), "Identifying service strategies in product manufacturing companies by exploring environment-strategy configurations", *Industrial Marketing Management,* Vol. 37 No. 3, pp. 278-291.

Gebauer, H., Fleisch and E., Friedli, T. (2005), "Overcoming the service paradox in manufacturing companies", *European Management Journal*, Vol. 23 No. 1, pp. 14-26.

Grönroos, C. (2006), "Adopting a service logic for marketing", *Marketing Theory*, Vol. 6 No. 3, pp. 317-333.

Grönroos, C. (2008), "Service logic revisited: who creates value? And who co-creates?", *European Business Review,* Vol. 20 No. 4, pp. 298-314.

Grönroos, C. (2011), "Value co-creation in service logic: a critical analysis", *Marketing Theory*, Vol. 11 No. 3, pp. 279-301.

Grönroos, C. and Ravald, A. (2011), "Service as business logic: implications for value creation and marketing", *Journal of Service Management,* Vol. 22 No. 1, pp. 5-22.

Gummesson, E. (2008), "Extending the service-dominant logic: from customer centricity to balanced centricity", *Journal of the Academy of Marketing Science,* Vol. 36 No. 1, pp. 15-17.

Gummesson, E. (2007), "Exit services marketing – enter service marketing", *The Journal of Customer Behaviour,* Vol. 6 No. 2, pp. 113-141.

Hedlund, G. (1986), "The hypermodern MNC – a heterarchy?" *Human Resource Management,* Vol. 25 No. 1, pp. 9-35.

Heldund, G. (1993), *Organization of transnational corporations,* Routledge, London/New York.

Jaakkola, E. and Hakanen, T. (2013), "Value co-creation in solution networks", *Industrial Marketing Management,* Vol. 42 No. 2, pp. 47-58.

Johnson, M. W., Christensen, C. C., and Kagermann, H. (2008), "Reinventing your business model", *Harvard Business Review,* Vol. 86 No. 12, pp. 50-59.

Karpen, I. O., Bove, L. L. and Lukas, B. A. (2012), "Linking service-dominant logic and strategic business practice: a conceptual model of service-dominant orientation", *Journal of Service Research*, Vol. 15 No. 1, pp. 21-38.

Kindström, D. (2010), "Towards a service-based business model – key aspects for future competitive advantage", *European Management Journal,* Vol. 28 No. 6, 479-490.

Kowalkowski, C. (2010), "What does a service-dominant logic really mean for manufacturing firms?", *CIRP Journal of Manufacturing Science and Technology,* Vol. 3 No. 4, pp. 285-292.

Kozinets, R. V., Hemetsberger, A. and Schau, H. J. (2008), "The wisdom of consumer crowds: collective innovation in the age of networked marketing", *Journal of Macromarketing*, Vol. 28 No. 4, pp. 339-354.

Kucuk, S. U. and Krishnamurthy, S. (2007), "An analysis of consumer power on the internet", *Technovation*, Vol. 27 No. 1-2, pp. 47-59.

Lindgardt, Z., Reeves, M., Stalk, G. and Deimler, S. (2009), "Business Model Innovation. When the game gets tough, change the game", Boston Consulting Group report, available at: http://www.bcg.com/documents/file36456.pdf (accessed on the 12th of December 2013).

Lovelock, C. and Gummesson, E. (2004), "Whither services marketing?: in search of a new paradigm and fresh perspectives", *Journal of Service Research,* Vol. 7 No. 1, pp. 20-41.

Lusch, R. F., Vargo, S. L. and Tanniru, M. (2010), "Service, value networks and learning", *Journal of the Academy of Marketing Science*, Vol. 38 No. 1, pp. 19-31.

Lusch, R. F., Vargo, S. L. and Wessels, G. (2008), "Toward a conceptual foundation for service science: contributions from service-dominant logic", *IBM Systems Journal*, Vol. 47 No. 1, pp. 5-14.

Lusch, R. F., Vargo, S. L. and O'Brien, M. (2007), "Competing through service: insights from service-dominant logic", *Journal of Retailing*, Vol. 83 No. 1, pp. 5-18.

Lusch, R. F. and Webster, F. E. (2011), "A stakeholder-unifying, co-creation philosophy for marketing", *Journal of Macromarketing*, Vol. 31 No. 2, pp. 129-134.

Madhavaram, S. and Hunt, S. D. (2008), "The service-dominant logic and a hierarchy of operant resources: developing masterful operant resources and implications for marketing strategy", *Journal of the Academy of Marketing Science*, Vol. 26 No. 1, pp. 67-82.

Maglio, P. P., Vargo, S. L., Caswell, N. and Spohrer, J. (2009), "The service system is the basic abstraction of service science", *Information Systems & e-Business Management*, Vol. 7 No. 4, pp. 395-406.

Margretta, J. (2002), "Why business models matter", *Harvard Business Review,* Vol. 80 No. 5, pp. 86-92.

Matthyssens, P. and Vandenbempt, K. (2008), "Moving from basic offerings to value-added solutions: strategies, barriers and alignment", *Industrial Marketing Management,* Vol. 37 No. 3, pp. 316-328.

Mill, J. S. P. o. t. P. E. 1929. *Principles of the political economy.* Longmans, London.

Moeller, S. (2008), "Customer integration – a key to an implementation perspective of service provision", *Journal of Service Research,* Vol. 11 No. 2, pp. 197-210.

Morris, M., Schindehutte and M., Allen, J. (2005), "The entrepreneur's business model: toward a unified perspective", *Journal of Business Research,* Vol. 58 No. 6, pp. 726-735.

Nenonen, S. and Storbacka, K. (2010), "Business model design: conceptualizing networked value co-creation", *International Journal of Quality and Service Sciences*, Vol. 2 No. 1, pp. 43-59.

Neu, W. A. and Brown, S. W. (2005), "Forming successful business-to-business services in goods-dominant firms", *Journal of Service Research*, Vol. 8 No. 1, pp. 3-17.

Ng, I., Parry, G., Smith, L., Maull, R. and Briscoe, G. (2012), "Transitioning from a goods-dominant to a service-dominant logic: visualizing the value proposition of Rolls-Royce", *Journal of Service Management,* Vol. 23 No. 3, pp. 416-439.

Normann, R. and Ramirez, R. (1993), "From value chain to value constellation: designing interactive strategy", *Harvard Business Review*, Vol. 71 No. 4, pp. 65-77.

Oliva, R. and Kallenberg, R. (2003), "Managing the transformation from products to services", *International Journal of Service Industry Management*, Vol. 14 No. 2, pp. 160-72.

Osterwalder, A. (2004), *The business model ontology: a proposition in the design science approach*, Dissertation, University of Lausanne.

Osterwalder A. and Pigneur, Y. (2010), *Business model generation: a handbook for visionaries, game changers, and challengers,* John Wiley & Sons, Hoboken/NJ.

Osterwalder, A. and Pigneur, Y. (2004), "An ontology for e-business models", Currie, W. (Ed.), *Value creation from e-business models,* Elsevier Butterworth-Heinemann, Burlington/MA, pp. 65-97.

Osterwalder, A., Pigneur, Y. and Tucci, C.L. (2005), "Clarifying business models: origins, present and future of the concept", *Communications of the Association for Information Science (CAIS),* Vol. 16, pp. 1-25.

Payne, A. F., Storbacka, K. and Frow, P. (2008), "Managing the co-creation of value", *Journal of the Academy of Marketing Science*, Vol. 36 No. 1, pp. 83-96.

Prahalad C. K. and Bettis, R. (1995), "The dominant logic: retrospective and extension", *Strategic Management Journal*, Vol. 16 No. 1, pp. 5-14.

Prahalad, C. K. and Ramaswamy, V. (2004), "Co-creating experiences: the next practice in value creation", *Jounal of Interactive Marketing,* Vol. 18 No. 3, pp. 5-14.

Prahalad, C. K. and Ramaswamy, V. (2002), "The co-creation connection", *Strategy+Business,* Vol. 2 No. 27, pp. 1-12.

Prahalad, C. K. and Ramaswamy, V. (2000), "Co-opting customer competence", *Harvard Business Review*, Vol. 78 No. 1, pp. 79-87.

Ramirez, R. (1999), "Value co-production: intellectual origins and implications for practice and research", *Strategic Management Journal,* Vol. 20 No. 1, pp. 49-65.

Rosenbaum, M. S. and Massiah, C. A. (2007), "When customers recieve support from other customers: exploring the influence of intercustomer social support on customer voluntary performance", *Journal of Service Research,* Vol. 9 No. 3, pp. 257-270.

Say, J. (1821), *A treatise on the political economy,* Wells & Lilly, Boston/MA.

Scott-Kemmis, D. (2012), *Responding to change and pursuing growth: exploring the potential of business model innovation in Australia,* Australian Business Foundation, Sydney.

Sosna, M., Trevinyo-Rodríguez, R. N. and Velamuri, S. R. (2010), "Business model innovation through trial-and-error learning: the Naturhouse case", *Long Range Planning,* Vol. 43 No. 2-3, pp. 383-407.

Steward, D. W. and Pavlou, P. A. (2002), "From consumer response to active consumer: measuring the effectiveness of interactive media" *Journal of the Academy of Marketing Science*, Vol. 30 No. 4, pp. 376-396.

Storbacka, K., Windahl, C., Nenonen, S. and Salonen, A. (2013), "Solution business models: transformation along four continua", *Industrial Marketing Management,* Vol. 42 No. 5, pp. 705-716.

Teece, D. J. (2010), "Business models, business strategy and innovation", *Long Range Planning,* Vol. 43 No. 2-3, pp. 172-194.

Timmers, P. (1998), "Business models for electronic markets", *Electronic Markets,* Vol. 8 No. 2, pp. 3-8.

Tuunanen, T., Myers, M. S. and Cassab, H. (2010), "A conceptual framework for consumer information systems development" *Pacific Asia Journal of the Association for Information Systems*, Vol. 2 No. 1, pp. 47-66.

Vargo, S. L. (2009), "Toward a transcending conceptualization of relationship: a service-dominant logic perspective", *Journal of Business & Industrial Marketing,* Vol. 24 No. 5-6, pp. 373-379.

Vargo, S. L. and Lusch, R. F. (2011), "It's all B2B…and beyond: toward a systems perspective of the market", *Industrial Marketing Management*, Vol. 40 No. 2, pp. 181-187.

Vargo, S. L. and Lusch, R. F. (2008a), "Service-dominant logic: continuing the evolution", *Journal of the Academy of Marketing Science*, Vol. 36 No. 1, pp. 1-10.

Vargo, S. L. and Lusch, R. F. (2008b), "From goods to service(s): divergences and convergences of logics", *Industrial Marketing Management,* Vol. 37 No. 3, pp. 254-259.

Vargo, S. L. and Lusch, R. F. (2006), "Service-dominant logic: what it is, what it is not, what it might be", Vargo, S. L. and Lusch, R. F. (Eds.), *The service-dominant logic of marketing: dialog, debate, and directions,* M E Sharp, Boston/MA, pp. 43-56.

Vargo, S. L. and Lusch, R. F. (2004), "Evolving to a new dominant logic for marketing" *Journal of Marketing*, Vol. 68 No. 1, pp. 1-17.

Vargo, S. L., Lusch, R. F., Akaka, M. A. and He, Y. (2010), "Service-dominant logic: a review and assessment", N. K. Malhotra (Ed.), *Review of Marketing Research,* Emerald Group Publishing: pp. 125-167.

Vargo, S. L., Maglio, P. P. and Akaka, M. A. (2008), "On value and value co-creation: a service systems and service logic perspective", *European Management Journal*, Vol. 26 No. 3, pp. 145-152.

Vargo, S. L. and Morgan, F. W. (2005), "Services in society and academic though: an historical analysis", *Journal of Macromarketing,* Vol. 25 No. 1, pp. 42-53

Wise, R. and Baumgartner, P. (1999), "Go downstream: the new profit imperative in manufacturing", *Harvard Business Review,* Vol. 77 No. 5, pp. 133-141.

Yi, Y. and Gong, T. (2013), "Customer value co-creation behavior; scale development and validation", *Jounal of Business Research,* Vol. 66 No. 9, pp. 1279-1284.

Zott, C., Amit, R. and Massa, L. (2011), "The business model: recent developments and future research", *Journal of Management,* Vol. 37 No. 4, pp. 1019-1042.

STUDIA UBB NEGOTIA, LVIII, 4, 2013, pp. 53 - 67
(RECOMMENDED CITATION)

THE PROCESS OF ATTRACTING EU FUNDS BY SMES: LESSONS FROM THE PAST

NICOLAE MARINESCU[1]

Abstract. The European Union (EU) supports small and medium-sized enterprises (SMEs) through various programmes of financing. This paper starts by reviewing the recent literature related to the topic of EU funds accessed by SMEs. By means of a broad classification, the second section tries to shed a light in the maze of national and EU funding opportunities currently available to Romanian SMEs in particular. With EU-integration, Romania gained access to EU funding for 2007-2013. Inside this period, the main programme of EU funds oriented towards SMEs was the Operational Programme called "Increase of Economic Competitiveness" (CCE). As Romanian SMEs lag behind their European counterparts in several indicators, such as productivity, value-added, or density, the matter of attracting EU funds in the SME sector has become of paramount importance. The third section of the paper analyzes how Romanian SMEs fared in absorbing the funds available through the CCE programme. Although the absorption rate for private firms was higher compared to public institutions, overall it turned out extremely disappointing judging by the necessary funding and the lost opportunities. The causes for the low absorption rate are investigated further. These can be separated in two categories: internal causes, such as lack of co-financing, insufficient managerial skills, no usage of consulting companies; and external causes, e.g. massive bureaucracy in the initial phase, high guarantees required by banks, delays in evaluating applications. The fourth section of the paper analyses by means of two case studies of SMEs in the Centre Region the main features of the project management related to writing applications for non-refundable financing. The concluding section of the paper comprises some conclusions and lessons to be learnt to avoid the difficulties encountered by Romanian SMEs in the process of submitting applications for EU funding especially for the financial perspective 2014-2020.

[1] Nicolae Marinescu, Assoc. Prof. at the MTSAI Department, Faculty of Economic Sciences and Business Administration, Transilvania University of Brasov, marinescu@unitbv.ro

Key words: *SMEs, European Union, EU funds, projects*

JEL Classification: F15, D2, M2

1. Literature review

There has been much debate over the years about the efficiency of absorbing European Union (EU) funds by member states as well as measuring the impact of implementing EU funding. Various methodologies to assess the efficiency of EU structural funds have been proposed, based on several indicators, with an empirical application in various regions of the EU (see for example Marchante & Ortega, 2010; Ekins & Medhurst, 2006; Munday & Williams, 2009). As Senior-Nello (2005) notes, the difficulty to assess the effectiveness of structural measures stems from different counts, such as the long run of many projects, the need to isolate the effects of regional policies from other factors, and the tendency of recipients to overestimate the impact of regional measures.

The impact of EU funds destined for the support of SMEs represents a special issue, as SMEs form the backbone of all the economies included in the EU and as such, of the EU economy itself. The European Commission did its best to tailor specific programmes for the needs of SMEs, but several important obstacles still remain in place that hinder an effective absorption of funds.

Christian de Fouloy, director of research at the European Enterprise Institute, a Brussels based think-tank, performs a clear classification of the EU funding opportunities for SMEs but warns that funds are not destined for everyone. SMEs should identify a real need and think seriously about what the application will entail, as weak and unfocused applications rarely succeed. He also notes that a detailed business plan is the cornerstone of any grant application (de Fouloy, n.a.).

Ignatescu (2010) investigates the main sources of financing available to SMEs in the euro area, with a focus on credit institutions, including the likes of the European Investment Bank. Using data from a Flash Eurobarometer performed in 2009 on more than 9,000 SMEs, it turns out that the most popular providers of loans are the banks. They are also the preferred source for stimulating future growth for SMEs.

However, despite the emerging recovery after the crisis, access to finance is still a main problem for SMEs across Europe. Drawing data from a survey with more than 15,000 respondents, 15% reported access to finance to be a "significant problem" for their businesses and 29% of SMEs applying for loan facilities either had their applications rejected or did not receive the full amount asked for (Croucher, 2013).

The European Commission recognized the difficulty of SMEs in gaining access to finance, due to the unfavourable position of banks and financial intermediaries after the crisis. The new COSME Programme (Competitiveness of Enterprises and SMEs) launched by the EU for the next programming period 2014-2020 with a budget of EUR 2.3 bn. is aimed especially at SMEs and present & future entrepreneurs. Its key actions (European Commission, 2013a) are targeted towards: (1) Access to finance for SMEs through dedicated financial instruments; (2) Enterprise Europe Network: a "one stop-shop" for the business needs of SMEs; (3) Support for initiatives to foster entrepreneurship; (4) Access to markets through support for the internationalization of SMEs.

The COSME Programme is also intended as an instrument to enlarge loan guarantees to SMEs so as to improve access to finance for entrepreneurs.

Turning to the case of Romania, this country's experience with absorbing EU structural funds in general has been widely covered by the media at various stages in time. The most recent contribution in literature for the framework 2007-2013 is a study by Jaliu & Radulescu (2013). The authors cite poor management due to low institutional capacity as one of the main factors that led to Romania's faulty absorption of structural funds.

When considering SMEs in particular, probably the most complex and up-to-date contribution to the topic that can be found in the Romanian literature comes from Silivestru (2013), whose PhD Thesis focuses entirely on the financing of Romanian SMEs within the European context. The thesis analyzes empirically the impact of different financing sources to which Romanian SMEs have had access during 2007-2011. Subsequently, by means of a sample of more than 1,000 SMEs, Silivestru (2013) is able to rank the various sources of financing arrangements on the value added generated by SMEs.

In another empirical study on Romanian SMEs, Popa (2013) finds out that the main benefits of accessing EU funds for beneficiaries lie in the increased performance of the respective firms in terms of: development of production capacity and turnover and acquiring new

equipments, less for promoting new products and services, whereas indicators referring to the number of jobs created or maintained during and after project implementation, were considered less important by SME managers.

This paper contributes to the recent literature in the field of absorbing EU funds by SMEs. It provides first an "under-one-roof" classification of funding opportunities for Romanian SMEs (section 2), followed by an in-depth analysis of the causes that led to poor absorption of EU funds by SMEs (section 3) and an empirical investigation into the process or writing and submitting a project proposal in order to obtain EU funds by means of two different SMEs treated as a case study (section 4). The concluding section comprises some conclusions and recommendations.

The research method combines theoretical and empirical approaches. It draws data from a literature review of recent contributions in the field of accessing EU funds by SMEs. Several types of information have been investigated, from public sources such as official EU documents and reports from Romanian authorities to industry studies and private sources in the case of the two firms. This information is confronted and completed with insights developed by the author from participating in SME-themed conferences and with information gathered from survey results on Romanian SMEs performed by various authors in different regions and by the author himself.

2. An overview of EU-funded programmes available to Romanian SMEs

The 2013 EU budget reflects the main goal of competitiveness for economic growth and employment with EUR 16.1 bn. set aside for this category and another EUR 54.5 bn. for cohesion for economic growth and employment through structural & cohesion funds, meaning 46.8% of the EU budget (European Commission, 2013b).

Through a recent decision of the European Council (June 2013), the sums which are not used within the structural funds may be used by member states to consolidate employment among young people and offer support to SMEs.

The European Union (EU) supports small and medium-sized enterprises (SMEs) through various programmes of funding. This section

tries to shed a light in the maze of local and foreign funding opportunities currently available to Romanian SMEs by means of a broad classification.

First, there are several governmental programmes of non-refundable financing available to SMEs initiated on the basis of Law no. 346/2001 with its subsequent additions. They are largely administered by the Agency for Implementing Programmes and Projects for SMEs (AIPIMM).

These multi-annual programmes of support are:

- Developing entrepreneurial skills of young people and access to finance (START);
- Stimulating the initiation and development of microenterprises by young people;
- Financing of SMEs ("Mihail Kogalniceanu");
- Initiating and developing technology and business incubators;
- Developing and modernizing marketing activities for products and services;
- Supporting craftsmanship and artisans;
- Developing an entrepreneurship culture among women managers.

In 2013, a new scheme of financing with 100% support by the Government has been launched aimed to stimulate investments and the creation of jobs by SMEs with a ceiling of maximum EUR 200,000 per firm. The total budget for this financing scheme amounts to approx. EUR 100 million and applicants will be selected on a first-come first-served basis. Although this initiative is well-intended, considering that there will be only around 1,000 beneficiary SMEs, this may seem like a drop in the ocean (BTL Design Conference, 2013).

Second, there is EU non-refundable financing available for SMEs through the structural funds. With EU-integration, Romania gained access to the EU funding period for 2007-2013. As Romanian SMEs lag behind their European counterparts in several indicators, such as productivity, value-added, or density (see table 1), the matter of attracting EU funds in the SME sector has become of paramount importance.

Romanian SMEs display very similar characteristics to EU-SMEs concerning their share in the total number of active firms and their share in employment. The differences become evident, however, when looking at their number per capita (three times less compared to the EU-average), or performance indicators such as their share in value-added (50.2% compared to 58.4% for the EU) and their productivity (four times smaller

compared to the EU-average). These indicators underline the obvious weakness of Romanian SMEs when compared to the EU-average.

Table 1.

Several indicators for Romanian vs. EU-SMEs, 2010

	Romania	EU-27
No. of active SMEs	468,552	20,796,192
Share of SMEs in total no. of firms	99.7%	99.8%
Share of SMEs in total no. of employees	65.9%	66.9%
Share of SMEs in total value-added	50.2%	58.4%
Density of SMEs (no. / 1,000 inhabitants)	21	63
Productivity (EUR 1,000 / employee)	9.9	39.9

Source: Adapted from FPP, 2012; CNIPMMR, 2012; EUROSTAT, 2011.

EU-funding programmes destined exclusively for SMEs include the Operational Programme called "Increase of Economic Competitiveness" (CCE), first, second and third axis, and the Regional Operational Programme (POR), fourth and fifth axis, both amounting for a cumulated total of EUR 1.1 bn. SMEs are also entitled alongside other eligible entities for the other three axes of the CCE programme, as well as various measures within the Development of Human Resources Operational Programme (POSDRU) and the Rural Development Programme (PNDR).

Third, there are specific programmes of the EU (former Community initiatives) co-financed from structural funds and destined for SMEs. These are managed by the Education, Audiovisual & Culture Executive Agency and include programmes such as Erasmus for Young Entrepreneurs, Media and Culture. Furthermore, projects submitted by SMEs European-wide in the environmental field and nature preservation area may be financed inside the LIFE programme as long as they comply with the guidelines of the environmental policy of the EU.

Besides these, there are financial instruments indirectly available to SMEs via intermediaries such as banks or investment funds. Both the Joint European Resource for Micro and Medium Enterprises (JEREMIE) and the Joint Action to Support Micro-finance Institutions in Europe (JASMINE) aim to improve access to finance for SMEs.

3. The state of attracting EU-funds by Romanian SMEs

The third section of the paper analyzes how Romanian SMEs fared in absorbing the funds available through the CCE programme, the

main programme of EU funds oriented towards SMEs. Although the absorption rate for private firms was higher compared to public institutions, overall it turned out extremely low judging by lost opportunities and necessary funding. In June 2013, the rate of absorption amounted to a ridiculous 6.77% for the whole period 2007-2013 (see table 2 for details).

Table 2.

The state of absorption for funds in the CCE Programme, June 2013

Submitted projects (no.)	15,562	78,540 (RON million)
Approved projects (no.)	4,147	10,817 (RON million)
Signed contracts (no.)	2,711	8,415 (RON million)
Internal payments to beneficiaries	25.58%	3,356 (RON million)
Expenditure statements to EU	14.45%	369.17 (EUR million)
Intermediary payment from EU	6.77%	172.91 (EUR million)

Source: Romanian Ministry of European Funds, 2013

Romania displays thus one of the worst records in absorbing funds among member states. It is true however, that internal payments to beneficiaries reached 25.58% already and a lot of contracts are under way, with projects being implemented during this period.

A partial explanation for the low absorption rate of EU funds lies in the striking difference between the number of submitted projects and the approved ones. Almost three-fourths of submitted applications have been rejected. The causes for the rejection of projects can be separated into two categories: internal causes, such as lack of co-financing, insufficient managerial skills, no usage of consulting companies; and external causes, e.g. massive bureaucracy in the initial phase, high guarantees required by banks, delays in evaluating applications.

According to a research conducted on 1,716 Romanian SMEs (CNIPMMR, 2012), some of the most important difficulties encountered by SMEs in the recent years include: decreasing demand (60.55%), bureaucracy (52.86%), excessive taxation (51.69%), inflation (49.59%), corruption (41.14%), excessive control (40.56%), hiring, training and maintaining personnel (24.94%), import competition (22.90%), difficult access to credit (20.22%), high cost of credit (19.17%), etc.

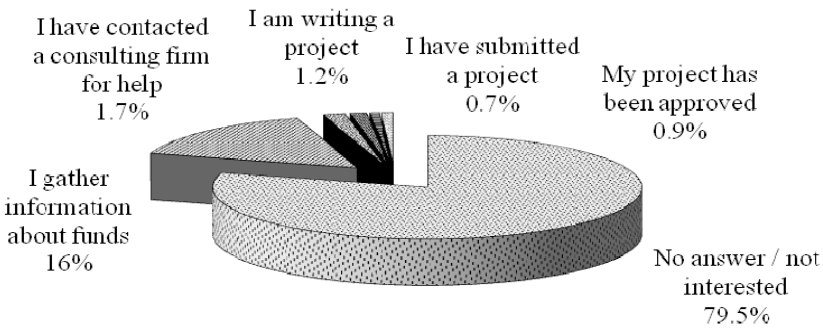


Figure 1. The state of accessing structural funds by SMEs
Source: CNIPMMR, 2012

In a general perspective, managers of SMEs don't seem too interested in the subject of attracting EU-funding. A survey on 1,716 owner-managers of SMEs shows that almost 80% of them don't have an opinion or are not interested in the subject of structural funds, while other 16% are just gathering information about the possibilities of accessing EU funds (see figure 1). This leaves under 5% of them directly involved in the process of attracting non-refundable EU financing.

Only 1.7% of owner-managers contacted a consulting firm for help in the matter of writing and submitting an application, a fact that shows the lack of trust in consulting agencies, the conviction that the application can be written successfully by the firm itself as well as the unwillingness of owner-managers to give up some part of the attracted funding or a commission fee in favour of technical assistance.

Besides the sparse usage of consulting firms, another explanation for the limited success of SMEs in attracting EU-financing is the lack of managerial skills. A hidden barrier for the low enthusiasm of SMEs to attract EU-funds may also originate in the insufficient economic training of owner-managers. In a research conducted by the author on more than 110 SMEs in the city of Brasov (see Marinescu, 2007), the largest part of the surveyed managers indicated that their training was provided by daily operation itself (71 per cent), to which they added some specialized or professional courses. Only about one third of managers graduated business or economics higher education of some kind. This surely has an impact on the way SMEs approach their financing behaviour.

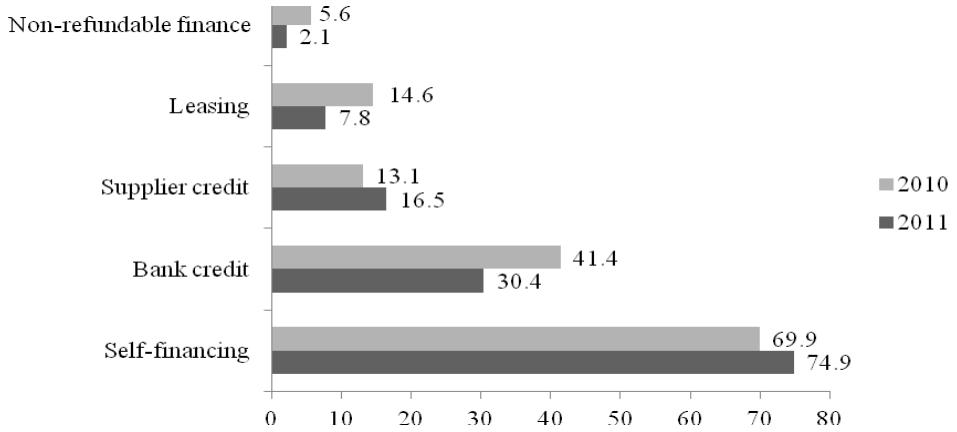


Figure 2. Types of financing used by SMEs
Source: CNIPMMR, 2012

Obviously, another major difficulty faced by SMEs when trying to attract EU-funding is the lack of co-financing. As observed by Marinescu & Tanase (2010), for any type of funding requested, applicants stumble on the same problem. For them, the largest cost is brought by the difference between the money they receive from EU funding and the co-financing they need to provide.

According to the White Charter of SMEs in Romania, more than 60% of SMEs went bankrupt or reduced their volume of activity during 2008-2011. The decrease in turnover for the whole SME sector reached 32% (2009), 18% (2010) and 8% (2011), respectively (CNIPMMR, 2012). More than 70% of SMEs used self-financing for survival during the year 2011 (see figure 2) but this is a significant characteristic of Romanian SMEs over a longer period of time.

The use of bank credits also went down to just 30% in 2011 (from 41% during 2010), while non-refundable financing as a source of money was indicated by a mere 2% of SMEs in 2011 (significantly down from 5.6% in 2010).

4. Comparative case study analysis of two Romanian SMEs

When an SME wants to access EU funds it should elaborate and submit a project proposal, which can be challenging sometimes. The difficulties of owner-managers of SMEs concerning the writing of an

application for non-refundable financing are illustrated next by means of a comparative case study. Two funding applications of SMEs located in the Centre Region will be analysed in detail to show the possible pitfalls and loopholes that are frequently overlooked by SMEs when drawing up and submitting an application. Both SMEs, called in an abbreviated form "ER" and "VF" for confidentiality reasons, have applied for funding inside the same CCE Operational Programme, the same Priority Axis: "An innovative and eco-efficient production system", the same Intervention Area 1.1.: "Productive investments and the preparation of enterprises, especially SMEs, for the competition on the market" (SC ER SRL, 2012 and SC VF SRL, 2011).

One of the two applications (VF, title of the project: "Increased competitiveness of VF SRL by means of participating in fairs and organizing seminars") was successful, the other one (ER, title of the project: "Romanian performance for the European market of ER SRL") was not.

The total value of the project was much higher for ER (24,615,400 RON) compared to VF (95,353 RON), in accordance with the aim of the application. In the case of ER, a spare parts maker for trucks, buses, tractors and cars of Italian origin, the funding was requested to support industrial investments for an increased productivity and competitiveness, namely the acquisition of production equipment with a ten year depreciation rate so as to stimulate the medium and long-term development of the firm.

In the case of VF, an electronics producer, the funding was intended to support the internationalization of the firm by providing the necessary means for a promotional campaign intended for the external market so as to increase the visibility of Romanian products abroad, especially a new brand launched by the firm in the high-tech sector.

Subsequently the non-refundable grant requested in the project is also of a different amount: 8,833,907 RON for ER (50% of the eligible sum, for a period of two years) and just 53,264 RON (70% of the eligible sum, for a period of one year) for VF.

When analyzing the funding applications in detail, several interesting points emerge. In the case of ER, a structural error of writing the application is that directly after formulating the general objective appears a table with the classification of costs in the main categories. The same table is repeated in the sub-chapter related to the budget of the project, where it actually belongs. No such redundancies can be identified in the case of VF's application. Also, in ER's application the

specific objectives have not been written in a concise form (increase of productivity and turnover, identifying new customers) and they are mixed up with some of the expected results, generating confusion between the two categories.

In the case of VF, objectives and results are nicely separated. The specific objectives are precisely indicated at the beginning of the application, namely gaining new contacts by participating in fairs and exhibitions, an increase of the national market share by 2%, the creation of new jobs, an increase in the number of visitors on the website and the penetration of new market segments. The results comprise an increase of the turnover by minimum 10% for VF, an increase in exports so that they should make up at least 10% of turnover and the creation of two new jobs, while maintaining the thirty old ones.

Another structural mishap in ER's application is about reversing the order of the imposed elements. First appear the planned activities and the expected results and only then the potential beneficiaries of the project, while it should have been the other way round. In VF's application, the elements follow strictly the order suggested in the blank form of the grant application.

In ER's case, the sub-chapter dedicated to activities and results does not appear in the form of a table, as required. This table should have also comprised indicators for evaluation and the necessary resources. No details are provided concerning the way results will be measured neither how many material, financial and human resources will be employed for achieving the expected results of the project.

In VF's application, the necessary resources are separated into three categories: material, financial and human, with a quantitative and qualitative indication for the amount envisaged.

The activities listed in ER's application are strictly related to the building of the production site, the acquisition of new equipment, and the arrangement of the production line. Activities related to technical assistance for the management of the project, the promotion and information activities, the finding of partners, the supervision of works, as well as the evaluation activity have been omitted from the list. The results also do not perfectly match the proposed activities.

In the case of VF, the table comprising the suggested activities, their results, the indicators of evaluation for each result as well as the necessary resources destined for each activity are clearly indicated in a

single table, as requested in the programme guide. Some of the results listed at the beginning of the application, concerning the increase of turnover and the jobs created are not followed though at this point in the table, showing some inconsistency between chapters.

As for the financial sustainability of the project for a period of minimum three years after the end of the non-refundable financing, this aspect does not clearly surface from the text in ER' application, but is well underlined in VF's case.

Both projects are written so as to comply with the environmental policy of the EU and its principles of sustainable development ("the polluter pays" principle) and offer equal opportunities (for employment, for instance) according to EU rules. They also respect the national legal framework.

The promotion and information activity is correctly designed according to the rules laid out in the financing guide for the CCE Operational Programme for both applications.

The budget of the project and the sources of financing are clearly specified and detailed for both SMEs. The expenditure categories are well classified into eligible vs. not eligible costs. The total value of the project is clearly mentioned, as well as the non-refundable financial assistance requested and the financial contribution of the applicant.

When considering the formal aspects of writing the application, VF stands out through clarity and preciseness, even if some minor spelling errors can be found. In ER's case, spelling errors as well as editing errors occur more frequently in the text, there are no Romanian special characters, and the font differs throughout the application form. Sometimes difficult expressions are used, phrases are exceedingly long and complicated and some words are omitted.

These formal errors as well as the structural errors uncovered earlier leave the impression that the application in ER's case has been written in a hurry or superficially by the consulting agency, namely Agre` International, member of the Warrant Group. As a result, ER's application didn't earn enough points to qualify for the non-refundable financing after submission.

VF also relied on an external consulting firm for the writing of the project. This activity was outsourced to Goodwill Consulting GWC. VF's application earned a score high enough to be selected for financing in the CCE Operational Programme.

5. Conclusions and recommendations

Considering the investigations carried out throughout this paper, some lessons can be drawn for the future to avoid the difficulties encountered by Romanian SMEs in the process of writing and submitting applications for EU funding. This is relevant especially for the next programming period of EU funds, 2014-2020.

The true importance of EU financial assistance surfaces from the finding that Romanian SMEs lag considerably behind their European counterparts in performance indicators like productivity, value-added, and density, as shown in the second section.

The recent economic crisis has deepened the hardships faced by Romanian SMEs, as can be derived from the answers of owner-managers to a nationwide survey cited in the third section of the paper (CNIPMMR, 2012). Some of the most difficult obstacles indicated, e.g. decreasing demand, originate from the economic downturn. Unfortunately, several other difficulties are outside the power of managers, such as those caused by faulty institutional operation or tight credit conditions.

When considering the ways to improve absorption of EU funds by SMEs, we can divide the recommendations into 2 categories: those directed at institutions, and those directed at the companies themselves.

On the institutional side, the lessons to be learnt by Romanian authorities that assist SMEs should be clear by now, after seven years of slow processes, opaque regulations and excessive bureaucracy that attracted a lot of criticisms. After all, the CCE Programme has been ordered a pre-suspension by the European Commission in December 2012, especially for deficiencies in the control system of the Romanian Management Authority of the programme. Thus, public institutions should learn to review their procedures (evaluation, proper control of tenders, monitoring of payments, etc.) in view of the next financial perspective.

Other changes should aim to simplify the application process for SMEs, to place the technical compliance before the financial criterion in tenders, to hire enough and prepared staff to manage the programmes of funding, to carry out consistent information and promotion about the funds available and to avoid the lengthy delays of payments to beneficiaries that had a devastating effect for SMEs.

Turning to the credit conditions, it should be noted that the access of SMEs to finance is tightly bound to the cost of the financing

possibilities and the financial structure of the applicant. Lots of times though, financial intermediaries doubt the ability of SMEs to submit feasible projects to invest (see Silivestru, 2013) and impose exaggerated guarantees for loans. An easing of the financial burden associated with access to credit is therefore much needed.

Romanian SMEs could benefit from the new financial programmes of the EU if they also learn the lessons on their part. Most failures of projects were caused by a wrong assessment of the resource base, bad planning, lack of the necessary financial (and human) resources, and organizational inefficiency. Sometimes, an incompatibility of the characteristics of the firm with the requirements of the project, led to the demise of the project. For instance, the creation of new jobs imposed among the project criteria, was not suitable for the firm at that particular moment.

When considering the process of writing and submitting projects for non-refundable financing in particular, SMEs should outsource this activity to tested, trustworthy consulting agencies. Good cooperation with the consultant is essential to ensure that he/she has understood thoroughly the existing state of the company, as well as its needs and desires related to the project. Writing the project proposal should be treated seriously with respect to the assessment criteria, in order to avoid costly mistakes that could lead to a lower score, as demonstrated by the two SMEs analysed in the case study in the fourth section of the paper.

SMEs should also make a very realistic assessment of the correlation between the available resources, the implied costs and the envisaged impact of the project in order to successfully access EU funds.

REFERENCES

BTL Design Conference (2013), *Comments on "Scheme de ajutor de stat derulate prin Ministerul Finantelor Publice"*, Kolping Center, Brasov.

CNIPMMR (2012), *Carta alba a IMM-urilor din Romania*, Bucuresti.

Croucher, S. (2013), *SME Finance: Third of European Firms Hindered by Lack of Funding Access*, International Business Times,

http://www.ibtimes.co.uk/articles/522538/20131115/sme-finance-europe-banks-loans-ecb-european.htm (accessed November 17th, 2013).

De Fouloy, C.D. (n.a.), *The Treasure Hunt: EU Funding for SMEs*, European Enterprise Institute, http://www.insme.org/files/409 (accessed November 5th, 2013).

Ekins, P., Medhurst, J. (2006), "The European Structural Funds and Sustainable Development", *Evaluation*, 12, 4, pp. 474-495.

European Commission (2013a), *COSME, Programme for the Competitiveness of Enterprises and SMEs 2014-2020*, http://ec.europa.eu/cip/files/cosme/cosme_factsheet_ final_en.pdf (accessed on June 24th, 2013).

European Commission (2013b), *Budget 2013 in figures*, http://ec.europa.eu/budget/ figures/2013/2013_en.cfm (accessed on June 3rd, 2013).

EUROSTAT (2011), *Key figures on European business with a special feature on SMEs*, Publications Office of the European Union, Luxembourg.

Fundatia Post-Privatizare – FPP (2012), *Situatia curenta a intreprinderilor mici si mijlocii din Romania*, Bucuresti.

Ignatescu, V.D. (2010), "Financing of the SMEs in the European Union through Credit Institutions", *CES Working Papers*, II, 3, pp. 53-59.

Jaliu, D., Radulescu, C. (2013), "Six Years in Managing Structural Funds in Romania. Lessons Learned", *Transylvanian Review of Administrative Sciences*, no. 38, pp. 79-95.

Marchante, A.J., Ortega, B. (2010), "Evaluating Efficiency in the Implementation of Structural Funds Operations", *Evaluation*, 16, 2, pp. 193-209.

Marinescu, N. (2007), "Managerial Implications for Tourism SMEs in the Context of European Integration: The Case of Brasov", *Studia UBB, Negotia*, LII, 1, pp. 125-132.

Marinescu, N., Tanase, A. (2010), "The Hidden Costs of European Funds", *The 5th International Conference on Business Excellence*, Infomarket, Braşov, pp. 279-283.

Munday, M., Williams, G. (2009), "Comparing Gross and Net Employment Outcomes from Structural Fund Programmes", *Evaluation*, 15, 2, pp. 225-246.

Popa, A.S. (2013), "Performance Indicators for SMEs Accessing EU Funds", *Constanta Maritime University Annals*, XIV, 19, pp. 319-322.

Romanian Ministry of European Funds (2013), *Stadiul absorbtiei Fondurilor Structurale si de Coeziune pe fiecare Program Operational*, Bucuresti.

Senior-Nello, S. (2005), *The European Union*, McGraw-Hill, Maidenhead.

Silivestru, D.R. (2013), *Finanţarea IMM-urilor din Romania in context european*, PhD Thesis, Universitatea Babes-Bolyai, Cluj-Napoca.

SC ER SRL (2012), *Performante romanesti pentru piata europeana ale ER SRL*, Cerere de finantare pentru Programul Operational Sectorial Cresterea Competitivitatii Economice, Regiunea Centru.

SC VF SRL (2011), *Cresterea competitivitatii firmei VF SRL prin participare la targuri si organizare de seminarii*, Cerere de finantare pentru Programul Operational Sectorial Cresterea Competitivitatii Economice, Regiunea Centru.

STUDIA UBB NEGOTIA, LVIII, 4, 2013, pp. 69 - 90
(RECOMMENDED CITATION)

HOW BIG ARE 'BIG FOUR' COMPANIES – EVIDENCE FROM ROMANIA

SORIN ROMULUS BERINDE[1]

ABSTRACT. The audit market is divided between two main categories of auditors: Big Four auditors and Non Big Four auditors. The general accepted opinion is that the former cover most audit services. The objective of the study is to quantify the share covered by Big Four auditors at the level of Romanian market. In this respect one collected and processed data obtained from the audited companies from the North-West Region of Romania which is considered representative for extrapolating the results at national level. After processing the data there were established 14 parameters that characterize the activity of financial auditors divided in three categories: Big Four auditors, Non Big Four auditors and professionals in the audit field which operate within their individual offices. In order to establish the market share for each category of auditors one took into consideration all analyzed parameters. This objective was achieved by applying a specific method of quantitative competitive analysis: the comparison matrix method. The findings show that Big Four auditors have a significant market share, without covering a majority share. The study allows us to establish a profile of the beneficiaries of audit services for each category of auditors.

Key words: *Big Four companies, financial audit, corporate governance, foreign investments, market share*

JEL classification: M42, M41, M48

1. Introduction

The audit market actors are on one hand the beneficiaries of such services (the companies whose financial statements are audited)

[1] Lecturer, dr., Department of Business, Faculty of Business, Babes-Bolyai University, E-mail: sorin.berinde@tbs.ubbcluj.ro

and on the other hand the providers (individual and legal financial auditors). In general, the evolution of the audit market is closely linked to the economic forecasts at national level and in particular, to the development prospects, new investments made by the beneficiaries of audit services. At the same time, regardless of the business' prospects, every company needs its annual financial statements reviewed, activity which can be performed by a financial auditor. The following checks shall conduct to an independent opinion which will or will not support the idea that financial statements have been prepared in accordance with the applicable accounting rules (Romanian legislation or international standards of financial reporting). These checks are very important for the users of financial information: investors, managers, creditors and public institutions (Rachisan and Grosanu, 2010). Depending on the outcome of these checks (the opinion expressed by the financial auditor) one can make important decisions about investment or disinvestment, about changing or maintaining the management team. When referring to audit services providers, small companies are much more dynamic than large companies, the number of small audit providers widely ranging from year to year. If this dynamics is growing, it can be expected to adversely affect the market share of the big audit companies. The study divides auditors in three auditors: Big Four auditors, Non Big Four auditors and authorized individuals who practice within individual audit offices.

The objective of the present study is the substantiation of a methodology for measuring the market share held by the Big Four auditors at national level. This methodology involves the selection and subsequently processing of certain particularities of audited companies that could be able to determine their orientation towards a category of auditors or another. These particularities of the beneficiaries of audit services relate to: social capital structure, management team structure, frequency in changing the social capital structure, legal form of organization, field of activity, territorial dispersion, average length of the audit contract, level of social capital, value of turnover, of net result and average number of employees. This methodology is able to provide a relevant typology of services users upon which the big international audit companies orient their audit activity.

From the main objective of the study derive some side consequences with positive effects for contracting services by the audit companies. Firstly, one creates the premises for systematizing for each

category of auditors the strengths that can be found in the potential beneficiaries within an economy, from which they can benefit in order to increase their market share. This allows the international auditors to establish a set of parameters to analyze when they decide to focus their activity on one country or another. Secondly, the research methodology used will establish an ideal profile of the companies towards which each category of auditors focuses. This can provide more efficiency and effectiveness, by targeting optimal contracting efforts by auditors. Thirdly, by extension to national level, the result of the study allows Big Four companies to fundament their investment or disinvestment decision in a particular country, based on assessing the existence or lack of a favorable climate for business expansion, according to the profile of companies in that country.

The study includes a review of the macroeconomic and microeconomic aspects mentioned in literature as being defining for orientating beneficiaries of audit services towards Big Four or Non Big Four auditors. Authors consider these aspects critical for sharing the audit market between the two categories of financial auditors. The section *Material and methods* covers the competitive analysis method used for processing the data: the comparison matrix method and the manner in which the sampling of audited entities was chosen, explaining at the same time its representativeness in order to extrapolate the results at national level. The section *Results and Discussions* presents a ranking of the three categories of auditors by aggregating the values of the 14 parameters taken into consideration for characterizing the beneficiaries of audit services, and the *Conclusions* section includes an estimation of the market share held by each company based on the accumulated scores. In this section some of the profile features of the company audited by each category of auditors are being outlined.

2. Literature Review

The studies that approach the relationship between audit beneficiaries and auditors refer to a fairly large variety of factors that are able to substantiate the option of audited companies to contract audit services from one category of auditors or another. The companies that prepare financial statements in accordance with the international accounting regulations will mainly focus on Big Four auditors, therefore

they will facilitate the expansion of Big Four auditors. Therefore, **the adoption of the international financial and accounting regulations at national level** is a factors able to create the premises for the access of Big Four companies to audit services (Tsipouridou and Spathis, 2012; Hodgdon et al., 2009). The high level of complexity of these international accounting standards compared to some national legal frameworks is able to increase the time allocated to the development of an audit operation (Habib and Bhuiyan, 2011). On the other hand, there are also advantages of providing an unitary basis for preparing the financial statements: one can have the opportunity to compare the auditors' reports (Big Four or not) at international level.

The high percentage of **large companies and high performance at the level of a national economy** is a factor able to support business expansion for Big Four auditors. An economy with profitable companies that can afford high fees will help the Big Four companies (Francis, 1984). However, the monopolization of the market share by the Big Four auditors also depends on a certain evolution of particular indicators linked to the level of dividends, debts, revenue, working capital or taxes (Walace, 1998). Complementary, in addition to the fact that these profitable companies are mainly orienting towards Big Four auditors, they are associated and with a more rapid completion of audit activity (Abidin et al., 2012; Alkhatib and Marji, 2012).

The tendency of companies to resort to the services of Big Four auditors depends directly proportional to the competence and performance of governance systems (Houqe et al., 2012). The countries with transparent governmental policies where the international standards of financial reporting are adopted create favorable premises for selecting the audit services provided by the Big Four auditors. Other authors argue the opposite, how the supervision of financial statements by the Big Four auditors is due precisely to the reduced confidence in public institutions and governance mechanisms, and reaching for the Big Four auditors aims to give investors a boost of confidence in these circumstances (Srinidhi, 2009). In addition, the weaknesses of national legal systems induce to constraints from the audited companies, defined by the increase of exigency when performing audits (Kwon et al., 2007; Ettredge et al., 2009).

Some academic studies (Wang and Xin, 2011; Chung, et al., 2003; Francis et al., 1999; Becker et al., 1998) indicate that some companies that record **lower levels of discretionary accruals** manifest a

predominance in contracting services of audit for their financial statements from Big Four auditors, and others indicate that this detail is not necessarily able to generate changes in the market share for a particular category of auditors in favor of others (Jeong and Rho, 2004).

Big Four auditors are notorious for predominantly auditing companies that report **internal control weaknesses** (Ge and McVay, 2005), other studies find an opposite, negative but insignificant relationship between the Big Four companies and the internal control impairments (Krishnan and Visvanathan, 2007).

The quality of audit services rendered and the frequency of quality control of the work performed by the auditors conducted by professional institutions is a factor able to influence the orientation of the audit services beneficiaries towards Big Four or Non Big Four auditors. Non Big Four audit companies treat their important clients more strictly, which in some circumstances may generate an increase of their market share (Hunt and Lulseged, 2007). The change in market share in favor of one category of auditors or another starting from the quality of the provided audit services can be measured (Carcello et al., 2011). There are studies that verify the evolution of audit market after the quality controls performed by the accredited professional institutions to the audit services provided, in connection with which auditors performing poor audit work are pressured to leave the market (DeFond and Lennox, 2011; Lennox and Pittman, 2010). Moreover, the quality of audit services and the financial scandals in which some large companies have been involved had as a consequence the decrease of market share for these companies (Boone et al., 2010).

The influence of the selection process of the auditor can be carried out also by the activity field in which the beneficiary of audit services operates (Craswel et al., 1995). A company that operates in the production (manufacturing) sector will have a more complex activity, which will generate a higher volume of specialized knowledge and work. An economy where the **share held by the production sector at national level is high** will be a market much more easily monopolized by Big Four auditors.

The audit fees charged by Big Four auditors, contrary to expectations, do not necessarily lead to a decrease in their market share, if this can be justified by the high complexity of the audit that requires international expertise of certain employees of Big Four Auditors (Carson,

2009). According to published studies, the increase of audit fees for these reasons (audits in accordance with International Standards on Auditing, need for knowledge on international capital markets or corporate governance) can vary between 16% and 228% (Wang and Iqbal, 2009; Carson and Fargher, 2007; Basioudis and Francis, 2007; Fergusson et al., 2006; Francis et al., 2005; Ferguson et al., 2003; DeFond et al., 2000).

The level of financing the audited companies through the capital market is a defining factor in terms of choosing a Big Four auditor. The countries where companies are significantly financed through the capital market provide a high level of legislative protection of shareholders. They have real opportunities to sue auditors for negligence or other professional errors. These are the countries where Big Four companies have a favorable environment to expand their business in terms of auditing services (Francis and Krishnan, 1999).

The expansion of activity of the Big Four auditors in terms of auditing services is related to the **level of foreign investments in a country**. A high level of foreign investments in a country can be a determinant factor in contracting audit services from Big Four companies (Citron and Manalis, 2001) or more determining in others' opinion (Guedhami et al., 2009). Foreign shareholders prefer to hire Big Four auditors as the audited company has more credibility in the eyes of current and potential international investors. The change of the auditor by foreign shareholders in order to increase the credibility of financial statements is made more frequently in favor of Non Big Four companies (Tu, 2012).

A performing structure of corporate governance within audited companies will ensure the premises for large audit companies to gain ground (Rizzotti and Greco, 2013; Lin and Liu, 2009). The companies with a poor corporate governance structure (reduced size of the supervisory board or the function of CEO and chairman of board of directors is held by the same person) will tend to choose a smaller auditor or of inferior quality in order to easily influence the auditor's opinion due to the functions' incompatibility (suspicious gains).

The frequency of restructuring the activity of audited companies is an element able to influence the choice for a certain category of auditors. Corporate takeovers can have an influence on the dimension of the selected auditor, especially when the business specific of the absorbent company is different of that of the absorbed company

(Firth, 1999). It seems that in this context the studies reveal that Non Big Four auditors can more likely provide expert advice for merger transactions (Louis, 2005).

The level of national culture is decisive for selecting or not a financial auditor from the Big Four (Jenkins and Velury, 2011; Hope et al., 2008). The companies where the organizational culture requires a lower opening to the public and are more conservative (less financed through the capital market) will prefer less a Big Four auditor and vice versa, internationalization being the only one able to mitigate these effects. Also, conservative companies audited by Big Four companies are more operational in terms of reporting negative events (Jenkins et al., 2007).

Therefore, the literature focuses on the following factors which are decisive for the increase or decrease in market share of audit companies as shown in figure no.1:

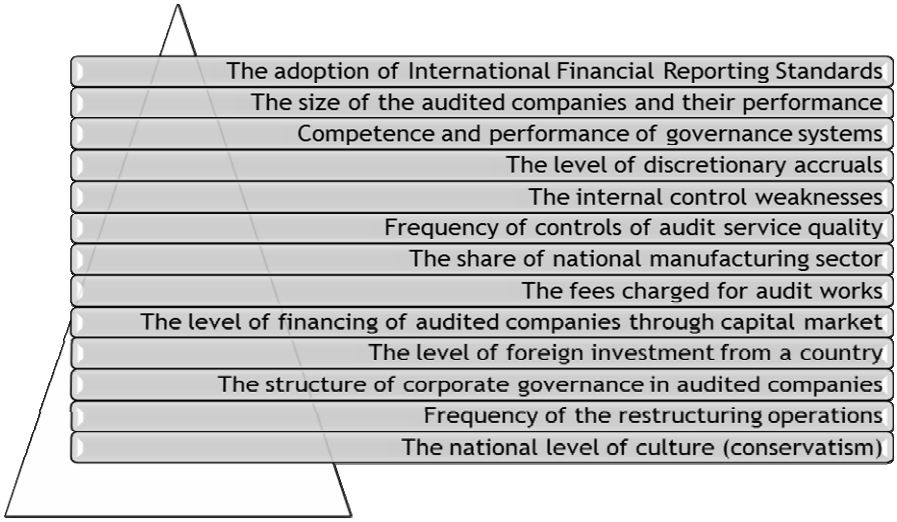


Figure 1. Determinant factors for the increase of market share of audit companies approached by literature
Source: Processing performed by authors

3. Material and methods

The methodology of the study is specific to the quantitative competitive analysis and it involves obtaining a score, and thus achieve a ranking of companies included in the study, starting from the indicators considered representative for the final ranking. One such method

frequently presented in the literature is the comparison matrix method (Achim, 2009). The usefulness of this method results from the fact that it allows taking into consideration in an aggregate manner of a large number of features of the analyzed companies in order to establish the final score achieved by each analyzed company.

The general conditions of applying the quantitative method of comparative matrix involves the evaluation of company performances using a matrix where the lines (i) represent the selected performance criteria, and the columns (j) represent the places occupied by the companies in the ranking according to the criterion i. The ranking based on criteria is made according to the optimization manner of each criterion. Certain performance criteria are optimized by maximization (the best value is the highest value), and others are optimized by minimization (the best value is the lowest value).

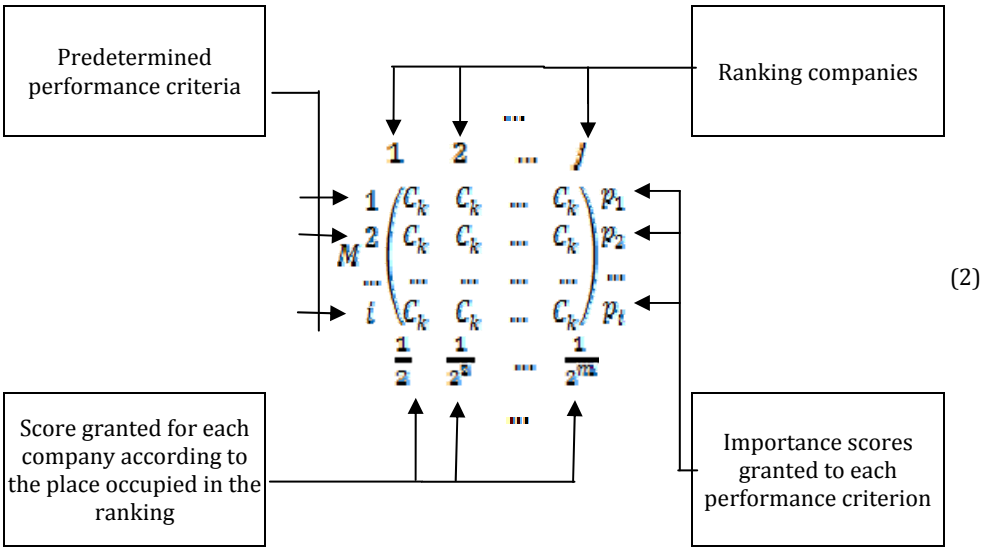
For the general construction of the matrix, for each place of the hierarchy one assigns a calculated score in a descending order as it follows:

$$If \in \left\{\frac{1}{2}, \frac{1}{2^2}, \frac{1}{2^3}, \dots, \frac{1}{2^m}\right\}, j = \overline{1,m} \quad (1)$$

Where:

- m - number of companies included in the study (coinciding with the number of places in the ranking).

Building the corresponding comparison matrix M is made as it follows:



$$M \quad \begin{array}{c} \\ 1 \\ 2 \\ \dots \\ i \end{array} \begin{array}{c} \begin{array}{cccc} 1 & 2 & \dots & j \end{array} \\ \begin{pmatrix} C_k & C_k & \dots & C_k \\ C_k & C_k & \dots & C_k \\ \dots & \dots & \dots & \dots \\ C_k & C_k & \dots & C_k \end{pmatrix} \\ \begin{array}{cccc} \frac{1}{2} & \frac{1}{2^2} & \dots & \frac{1}{2^m} \end{array} \end{array} \begin{array}{c} \\ p_1 \\ p_2 \\ \dots \\ p_i \\ \\ \\ \dots \end{array} \quad (2)$$

In these conditions the matrix construction can be accomplished in two ways:

- if one does not take into account the economic signification of each initially selected performance criterion (statistical approach).

In this case the score accumulated by each company is calculated as a weighted sum of the number of occurrences in a certain place (*j*), for each of the companies included in the study (*k*) and the score granted to that place in the ranking (*Ij*), as it follows:

Where:

$$Ms(k) = \sum_{j=1}^{m} Ij \; x \left(\sum_{i=1}^{n} nij(k) \right) \quad (3)$$

- $Ms(k)$ - the calculated value incorporating the performance of company k;
- Ij - the accumulated score for the place j from the ranking;
- $nij(k)$- the score corresponding to the occurrence of each company k, on each of the j places, according to each criterion of performance i.

- if one takes into account the economic signification of each initially selected performance criterion (economic approach):

Where:

$$Me(k) = \sum_{j=1}^{m} Ij \; x \left(\sum_{i=1}^{n} nij(k) x \; pi \right) \quad (4)$$

- $Me(k)$- the calculated value incorporating the performances of company k;
- pi - the predetermined economic importance share for each performance criterion i.

This second approach involves a resort to professional judgment to determine an order of the economic importance of each criterion and based on this situation to grant a corresponding score for each level of importance (Achim, 2009). This means that a performance criterion that is appreciated to be able to strongly determine changes of market share for the financial auditors will generally receive a higher score.

The company that accumulates the highest score will occupy the highest place in the ranking; therefore the ranking will be in reverse order of the calculated indicator values. The current study aims to design a methodology to establish a ranking regarding the market share held in Romania by three categories of audit entities: Big Four companies, Non Big Four companies and auditors authorized individuals. Particularizing, there will be three places in the ranking. Therefore, the study is proposing an inductive research method consisting in starting from practical data in order to create theoretical models (Topor et al., 2012).

To apply the methodology one resorted to the stratified sampling method used in literature to test a hypothesis or to verify a statistical model (Cuzdriorean et al., 2010). We selected the companies audited at the level of the North-West Region of Romania. That certain region is representative for the Romanian economy according to the data published by the National Forecasts Comission from June 2013 concerning the projection of the main economic and social indicators in territorial profile by 2016. One estimate that the regional indicators calculated for the North-West area will have a regional average level close to the national average, and the evolution will be in tune with the national average in the period 2013-2014, as shown in table 1:

Table 1.

Positioning of the North-West Region in the national context according to the forecast made for the period 2013-2016

No. crt.	***Analyzed economic indicators***			***Forecasted evolution of indicators***			
	Indicator denomination	***M.U.***	***Coverage area***	***2013***	***2014***	***2015***	***2016***
1	Gross domestic product – disparity indices North-West region/ National level (optimal value 100%)	%	North-West Region	84	84	84	84
2	Monthly net average wage - disparity indices North-West Region/ National level (optimal value 100%)	%	North-West Region	84	83	83	82
3	Gross domestic product national level	%	Total economy	*1.6*	*2.2*	*2.4*	*3.0*
			North-West Region	1.8	2.2	2.5	3.0
4	Gross domestic product in the industry	%	Total economy	*1.6*	*1.8*	*2.1*	*2.9*

No. crt.	*Analyzed economic indicators*			*Forecasted evolution of indicators*			
	Indicator denomination	***M.U.***	***Coverage area***	***2013***	***2014***	***2015***	***2016***
			North-West Region	2.2	1.8	2.2	3.1
5	Monthly gross average wage	Euro/ employee	Total economy	*502*	*528*	*552*	*573*
			North-West Region	416	436	452	466
6	Rate of unemployment	%	Total economy	*5.2*	*5.0*	*4.7*	*4.5*
			North-West Region	4.1	3.9	3.7	3.5
7	Average number of employees by region	Number	Total economy	*561*	*568*	*576*	*587*
			North-West Region	577	581	586	593
8	The structure of the average number of employees by reference to the national level	%	North-West Region	13	13	13	13
9	The structure of the number of unemployed by reference to the national level	%	North-West Region	11	11	11	11

Source: Statistical processing performed by author based on National Forecats Comission data for period of time 2013 - 2016

For the indicators gross domestic product and monthly net average wage, the disparity indices range between 82% - 84%. Since the optimal level is 100% we can appreciate that distance between the levels achieved for these indices by the North-West Region is very close to the national level. For five other economic indicators of the North-West Region (gross domestic product at national level and in the industry, the monthly gross average wage, the rate of unemployment and the average number pf employees by region) one estimates an evolution very close to the national level in the period 2013-2016. The percentage of employed and unemployed forecasted for the North-West Region of Romania is 13%, respectively 11% from the total estimated at national level, approximately equal with that from the other 7 development regions of Romania. Considering the level of foreign direct investments, the North-West Region occupies a medium ranking within the ranking at national level, namely position 5 from 8, in comparison with the other development regions predetermined at national level. Regarding the companies' activity, this region is characterized by a

sparkling economic environment, with indicators that often exceed the national average. Moreover, taking into consideration the notions of gross domestic product and number of employees at regional level represents a means used in literature to substantiate the studies connected to the accounting and financial field (Sucală et al., 2009; 2010). Regarding the activities of research and development, this region ranks second in the national hierarchy according to the press release periodically sent by the North-West Regional Development Agency in 2013. According to the same report, the region concentrates 15% from the total number of doctoral schools at national level, 74% from the total of research entities existent at national level and it occupies the third place at national level in terms of number of persons engaged in the research and development activity and costs incurred by this activity. These are the judgments for which the North-West Region can be considered representative at national level for selecting a sampling of audited companies in this area. This will allow the extrapolation at national level of the results achieved in this region.

Subsequently, there were selected at the level of the North-West Region the companies that between 2005 and 2012 were subjected to financial auditing. In order to be audited, Romanian companies must meet in two consecutive financial years two of the three size criteria established by the national legislation in accordance with the European directives in the accounting field: total assets of 3.650.000 Euros, 7.300.000 Euros net turnover and average number of employees of 50 during the financial year. Therefore, there were selected the companies that had published financial statements for a period of 5 years, in each of the financial years 2008 – 2012 (this sampling procedure was used in literature by Grosanu and Rachisan, 2009). For these, data were extracted through the National Trade Register Office and the Ministry of Finance. For data extraction we took into account the quantification of certain sizes that can be able to determine the change of market share of financial auditors of these companies. Thus, the audited companies were been grouped in three big categories according to the auditors' typology: Big Four auditors, Non Big Four auditors: companies and authorized individuals.

For each of these three categories we extracted representative data for the 14 factors that are able to determine the increase of market share of auditors synthesized in this study. These data which cover all

three categories of audited companies included in the study relate to: the size of social capital, the existence or lack of certain changes within the structure of the activity and/or of the social capital, the field of activity: industry or not, the typology of corporate governance and the shareholding structure: the existence or lack of foreign elements, the typology of the company's form of organization: joint stock companies or limited liability companies, the spatial extent of these companies (number of secondary branches and working points), the duration of the audit contract and for the last five financial years we extracted from the financial statements the values especially referring to the three parameters of auditing: turnover, total assets and average number of employees and in addition the level of equity and of net result (profit or net loss).

4. Results and discussions

In order to establish the market share of the three categories of auditors in Romania, by applying the quantitative competitive method, the study took into consideration 14 aspects as performance criteria, able to condition the increase or decrease in the market share of a category of auditors or another.

Table 2.

Performance criteria analyzed for establishing the ranking regarding the market share of the financial auditors in Romania based on the financial statements published by the audited companies in the period 2008-2012

No. crt.	***Denomination performance criteria*** *(i)*	***M.U.***	***Optimization***	***Share of economic importance*** *(pi)*	***Achieved level of performance criteria***		
						Non Big Four Auditors	
					Big Four Auditors (C_{BF})	***Companies*** (C_{NBF})	***Authorized Individuals*** (C_{PA})
1	Number of audited companies from total auditable	%	Maximization	0.07	8.65	72.97	18.38
2	Number of audited companies with foreign management	%	Maximization	0.07	17.14	68.57	14.29
3	Number of audited companies with foreign capital	%	Maximization	0.07	17.22	65.52	17.26

No. crt.	*Denomination performance criteria* (i)	*M.U.*	*Optimization*	*Share of economic importance* (pi)	*Achieved level of performance criteria*		
						Non Big Four Auditors	
					Big Four Auditors (C_{BF})	*Companies* (C_{NBF})	*Authorized Individuals* (C_{PA})
4	Number of audited companies that registered restructuring operations	%	Minimization	0.06	8.59	74.23	17.18
5	Number of companies organized as limited liability companies	%	Minimization	0.06	37.50	50.00	12.50
6	Number of audited companies in the industry	%	Maximization	0.09	13.52	72.88	13.60
7	Average number of working points of the audited companies	Number	Maximization	0.07	72	5	2
8	Average duration of an audit contract	Years	Maximization	0.07	1.69	2.67	2.26
9	The cumulated annual average value of turnover	%	Maximization	0.08	70.09	26.82	3.09
10	The cumulated average value of social capital	%	Maximization	0.07	53.98	44.25	1.77
11	The cumulated annual average value of total assets	%	Maximization	0.09	81.76	16.12	2.12
12	The cumulated annual average value of equity	%	Maximization	0.07	68.31	27.97	3.72
13	The level of cumulated annual average value of net result	Loc/ Value (thous. eur)	Minimization / Maximization	0.05	1/ 94.042	3/ -20.843	2/ -1.254
14	The cumulated annual average value of the number of employees	%	Maximization	0.06	42.29	52.75	4.96

Source: Statistical processing performed by authors

Some of the established criteria are able to increase the market share of auditors by increasing the value of these criteria (optimization by

maximization, and others condition the increase of market share through a level as low as possible (optimization by minimization). Based on these performance criteria, in order to establish a ranking of the three categories of entities we built the following comparison matrix:

$$M = \begin{array}{c} \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 8 \\ 9 \\ 10 \\ 11 \\ 12 \\ 13 \\ 14 \\ \\ \end{array} \begin{array}{c} \begin{array}{ccc} 1 & 2 & 3 \end{array} \\ \begin{pmatrix} C_{NBF} & C_{PA} & C_{BF} \\ C_{NBF} & C_{BF} & C_{PA} \\ C_{NBF} & C_{PA} & C_{BF} \\ C_{BF} & C_{PA} & C_{NBF} \\ C_{PA} & C_{BF} & C_{NBF} \\ C_{NBF} & C_{PA} & C_{BF} \\ C_{BF} & C_{NBF} & C_{PA} \\ C_{NBF} & C_{PA} & C_{BF} \\ C_{BF} & C_{NBF} & C_{PA} \\ C_{BF} & C_{NBF} & C_{PA} \\ C_{BF} & C_{NBF} & C_{PA} \\ C_{BF} & C_{NBF} & C_{PA} \\ C_{BF} & C_{PA} & C_{NBF} \\ C_{NBF} & C_{BF} & C_{PA} \end{pmatrix} \\ \begin{array}{ccc} 1/2 & 1/2^2 & 1/2^3 \end{array} \end{array} \begin{array}{c} \\ 0.07 \\ 0.07 \\ 0.07 \\ 0.06 \\ 0.06 \\ 0.09 \\ 0.07 \\ 0.07 \\ 0.08 \\ 0.07 \\ 0.09 \\ 0.07 \\ 0.05 \\ 0.06 \\ \\ \end{array} \tag{5}$$

The results of processing the data from the comparison matrix have been centralized in a ranking in table 3, for both application alternatives of the method: the statistical approach (without taking into consideration the shares of economic importance) and the economic approach (by taking into consideration the shares of economic importance based on a professional judgment according to the signification of the estimated impact of each performance criterion on the market share).

Table 3.

The ranking of financial auditors through the comparison matrix method – both approaches

Financial Auditors-Typology		**Statistical approach**			**Economic approach**		
Category	*Symbol*	*Score*	*Hierarchy*	*Market share*	*Score*	*Hierarchy*	*Market share*
Big Four Companies	C_{BF}	4.750	I	38.78%	0.330	II	38.46%
Non Big Four Companies	C_{NBF}	4.625	II	37.76%	0.331	I	38.58%
Authorized individuals	C_{PA}	2.875	III	23.47%	0.197	III	22.96%
Total		**12.250**		**100.00%**	**0.858**		**100.00%**

Source: Statistical processing performed by authors

According to this ranking, based on the statistical variation the Big Four auditors have the highest market share (38.78%) established by concomitantly taking into consideration all 14 aspects able to influence the increase the business size of audit companies. If the 14 performance criteria are differentiated based on the professional judgment according to the impact that each of them has on the market share, it seems that the Big Four companies rank second concerning market share (38.46%) immediately after the Non Big Four audit companies (38.58%).

If we restrict the typology of auditors in two categories: Big Four auditors and Non Big Four auditors (companies and authorized individuals included), the results of the study indicate that the Non Big Four auditors hold a share of 61.23% according to the statistical approach, respectively 61.54% according to the economic approach. The remaining percentage represents the market share of the Big Four auditors.

The results revealed by the two methods are relatively close, which highlights their credibility and relevance for the study's results. This is a confirmation of the fact that the value of the importance coefficients established through professional judgment is founded.

However, in order to have a more complete picture of the structure of the audit market, it is appropriate a centralization method of the two approaches, so that the users of the information derived from this study to have a centralized image of it. This objective can be achieved by granting a score to each auditor according to the position occupied in the ranking for each approach – statistical and economic – and their centralization by adding the individual scores obtained by each category of auditors.

Table 4.

Ranking of financial auditors through comparison matrix method – centralization

Place in ranking	**Granted score**	**Company hierarchy**								
		Statistical approach			**Economic approach**			**Centralization**		
		Company	*Cumulated score*	*Granted score*	*Company*	*Cumulated score*	*Granted score*	*Company*	*Cumulated score*	*Granted cumulated score*
I	3	C_{BF}	4.750	3	C_{NBF}	0.331	3	C_{BF}	5.081	5
II	2	C_{NBF}	4.625	2	C_{BF}	0.330	2	C_{NBF}	4.955	5
III	1	C_{PA}	2.875	1	C_{PA}	0.197	1	C_{PA}	3.072	2

Source: Statistical processing performed by authors

After adding all the scores presented in table 4, the results of the study show that the Big Four and Non Big Four companies occupy the same market share (approximately 41.67% each), while the auditors – authorized individuals would hold the rest of the market share (approximately 16.66%). Therefore, according to the present research methodology the Big Four companies do not hold a market share which could provide a significant deployment in compassion with the share held by the Non Big Four companies. Moreover, if we are to split the audit market by dividing the auditors in two categories, it would result that the Big Four companies hold 41.67% while the rest of the auditors (smaller audit companies and authorized individuals) hold a cumulate share of 58.33%.

The assessment of these results depends on the perspective from which we look at them. From a global perspective, by comparing the two percentages, it appears that international auditors (Big Four companies) hold a rather small market share in comparison with national auditors (Non Big Four companies and authorized individuals). If we look at the results in terms of number of auditors from each category, it appears that Big Four companies actually hold a very large share of the audit market. That is, each Big Four audit company has an average of 10.42% from the market overtaken by these four audit companies. At the same time, Non Big Four auditors and authorized individuals, although they cumulated a greater market share (58.33%), the average percentage of cumulated market share accruing to each is much lower (0.94%). This happens because, based on the sampling substantiating the present study, a large market share is divided between a great number of auditors belonging to this category (62 local financial auditors).

5. Conclusions

At Romania's level, in order to assess whether the Big Four are actually big or not involves taking into consideration two perspectives. In terms of the percentage held from the national market of audit services, these companies hold an inferior percentage (41.67%) in comparison with the Non Big Four companies and authorized individuals (58.33%). The prevalence of Big Four companies is not insured although they audit the beneficiaries with the best financial performances, the largest businesses, the highest value of assets and equity, respectively with the largest

territorial dispersion. In Romania, although the national auditors divided in the study in two categories (companies and authorized individuals) are smaller, they can cover a greater market share compared to the larger auditors, but less numerous from the Big Four category. On the other hand, if we look closer to the results of the study and take into consideration the fact that the four companies from the Big Four category hold 41.67% from the audit market share, while a number of 62 Non Big Four companies hold 58.33%, only then we can conclude that Big For companies are actually big in Romania.

The factors that influence the business of each category of auditors are different from one case to the other. For national auditors the increase of market share is supported by the companies with foreign corporate governance, by the great number of companies that did not register changes within the structure of social capital and activity (mergers, divisions), by the relatively large number of audited companies whose form of organization is limited liability company, by the high number of audited companies which operate in the industrial sector, by the fact that the audit contracts are usually concluded for a large period of time and by the companies with a large number of employees. These auditors provide services for companies that register a low territorial dispersion, reduced profits or even accounting losses, and the business level is a modest one. On the other hand, the Big Four auditors hold the market share revealed by this study because of the predilection towards auditing companies with a large territorial dispersion (average number of secondary branches and working points 72) and with high values of turnover, social capital, total assets, equity and profits. The increase of foreign investments, foreign management or of audited companies which operate in the industrial sector are not factors able to increase the market share of the Big Four auditors. The methodology of this study can be useful for the Big Four auditors in their decision to expand or restrict their activity in a country according to the percentage of auditable entities in the economy's structure which have the above mentioned profile.

The study includes financial data reported by the audited companies between 2008 and 2012. They were taken into account by considering the average level by performing a simple arithmetic means. The limits of the study are given by the fact that the current situation can be slightly different from the average of the last five financial years taken into consideration. In order to complete these aspects, it is

possible to continue the research by establishing, based on the methodology provided by the comparison matrix method, an annual market share level of the companies from the Big Four category and hence verifying the possibility of establishing an evolutionary trend in the future. This would facilitate anticipation based on a statistical regression model of the evolution of the business of Big Four companies in Romania by explaining the evolution of the influential factors forecasted for the period for which the forecast is made.

REFERENCES

Abidin, S., Ahmad-Zaluk, N.A. (2012) Auditor industry specialism and reporting timeliness, *Procedia - Social and Behavioral Sciences*, vol. 65(3), pp. 873-878;

Achim, M.V. (2009) Analiza economico-financiară, Ed. Economică, Bucureşti

Alkhatib, K., Marji, Q. (2012) Audit Reports Timeliness: Empirical Evidence from Jordan, *Procedia - Social and Behavioral Sciences*, vol. 62, pp. 1342-1349;

Basioudis, I. G., & Francis, J. R. (2007) Big 4 audit fee premiums for national and office-level industry leadership in the United Kingdom., *Auditing: A Journal of Practice & Theory*, 26(2), pp. 143–166;

Becker, C. L., DeFond, M. L., Jiambalvo, J., & Subramanyam, K. R. (1998) The effect of audit quality on earnings management, *Contemporary Accounting Research*, vol. 15(1), pp.1–24;

Carcello, J.V., Hollingsworth, C., Mastrolia, S.A. The effect of PCAOB inspections on Big 4 audit quality, *Research in Accounting Regulation*, vol. 23(2), pp. 85-96;

Carson, E. (2009) Industry specialization by global audit firm networks, *The Accounting Review*, 84(2), pp. 331–354;

Carson, E., & Fargher, N. (2007) Note on audit fee premium to client size and industry specialization, Accounting & Finance, 47(3), pp. 423–446;

Citron, D.B., Manalis, G. (2001) The international firms as new entrants to the statutory audit market: an empirical analysis of auditor selection in Greece, 1993 to 1997, *European Accounting Review*, vol. 10(3), pp .439-459;

Chung, R., Firth, M., & Kim, J. B.(2003) Auditor conservatism and reported earnings, *Accounting and Business Research*, 33(1), pp.19–32;

Craswell, A.T., Francis, J.R., Taylor, S.L. (1995) Auditor brand name reputations and industry specializations, *Journal of Accounting and Economics*, vol. 20(3), pp. 297-322;

Cuzdriorean, D. D., Fekete, Sz., & Sucală, L. (2010) An attempt at measuring the fiscal influence over accounting of Romanian listed companies, *Annales Universitatis Apulensis Series Oeconomica*, vol. *1*(12), pp.95-111;

DeFond, M. L., Francis, J. R., & Wong, T. J. (2000) Auditor industry specialization and market segmentation: Evidence from Hong Kong, *Auditing: A Journal of Practice & Theory*, 19(1), pp. 49–66;

DeFond, M.L., Lennox, C.S. The effect of SOX on small auditor exits and audit quality, *Journal of Accounting and Economics*, vol. 52(1), pp. 21-40;

Ettredge, M., Kwon, S. Y., Lim, C. Y. (2009) Client, industry, and country factors affecting choice of Big N industry expert auditors. Journal of Accounting, Auditing and Finance, vol. 24(3), pp. 433–467;

Ferguson, A., Francis, J. R., & Stokes, D. J. (2006) What matters in audit pricing: Industry specialization or overall market leadership?, *Accounting and Finance*, 46, pp. 97–106;

Ferguson, A., Francis, J. R., & Stokes, D. J. (2003) The effects of firm-wide and office-level industry expertise on audit pricing, *The Accounting Review*, 78(2), pp. 429–448.

Firth, M. (1999) Company takeovers and the auditor choice decision, *Journal of International Accounting, Auditing and Taxation*, vol. 8(2), pp. 197-214

Francis, J.R., (1984) The effect of audit firm size on audit prices: A study of the Australian Market, *Journal of Accounting and Economics*, vol. 6(2), pp. 133-151;

Francis, J. R., & Krishnan, J.(1999) Accounting accruals and auditor reporting conservatism, *Contemporary Accounting Research*, vol. 16(1), pp. 135–16;

Francis, J.R., Maydew, E. L., & Sparks, H. C.(1999) The role of Big Six auditors in the credible reporting of accruals, *Auditing: A Journal of Practice and Theory*, vol. 12(2), pp.17–34;

Francis, J. R., Reichelt, K., & Wang, D. (2005). The pricing of national and city-specific reputations for industry expertise in the US audit market, *The Accounting Review*, 80(1), 113–136;

Ge, W., McVay, S. (2005) The disclosure of material weaknesses in internal control after the Sarbanes-Oxley Act, Accounting Horizons, vol. 19(3), pp. 137–158;

Groşanu, A., Răchişan, P.R. (2009), "Study regarding the organization of management accounting in the context of responsibility centers", Annals of Faculty of Economics, Vol. 3, No. 1, pp. 966-972.

Guedhami, O., Pittman, J.A., Saffar, W. (2009) Auditor choice in privatized firms: Empirical evidence on the role of state and foreign owners, *Journal of Accounting and Economics*, vol. 48(2-3), pp. 151-17;

Habib, A., Bhuiyan, B.U. Audit firm industry specialization and the audit report lag, *Journal of International Accounting, Auditing and Taxation*, vol. 20(1), pp. 32-44;

Hodgdon, C., Tondkar, R.H., Adhikari, A., Harless, D.W. (2009) Compliance with International Financial Reporting Standards and auditor choice: New evidence on the importance of the statutory audit, *The International Journal of Accounting*, vo. 44 (1), pp. 33-55;

Hope, O.K., Kang, T., Thomas, W., Yoo, Y.K. (2008) Culture and auditor choice: A test of the secrecy hypothesis, *Journal of Accounting and Public Policy*, vol. 27(5), pp. 357-373;

Houqe, M.N., Monem, R.M., Van Zijl, T. (2012), "Government quality, auditor choice and adoption of IFRS: A cross country analysis", *Advances in Accounting*, vol. 28 (2), pp. 307-331.

Hunt, A.K., Lulseged, A. (2007) Client importance and non-Big 5 auditors' reporting decisions, *Journal of Accounting and Public Policy*, vol. 26(2), pp. 212-248;

Jenkins, D. S., Kane, G. D., Velury, U. (2007) Earnings conservatism, audit quality: An examination of the late 1990s, *Journal of Forensic Accounting*, vol. 8, pp. 287–302;

Jenkins, D.S., Velury, U. (2011) The emergence of second-tier auditors in the post-SOX era: An analysis of accounting conservatism, *Research in Accounting Regulation*, vol. 23(2), pp. 172-176;

Jeong, S.W., Rho, J. (2004) Big Six auditors and audit quality: The Korean evidence, *The International Journal of Accounting*, vol. 39(2), pp. 175-196;

Krishnan, G. V., Visvanathan, G. (2007) Reporting internal control deficiencies in the Post-Sarbanes-Oxley era: The role of auditors and corporate governance, *International Journal of Auditing*, vol. 11(2), pp. 73–90;

Kwon, S. Y., Lim, C. Y., Tan, P. M.-S. (2007) Legal systems and earnings quality: the role of auditor industry specialization, Auditing: A Journal of Practice & Theory, vol. 26(2), pp. 25–55;

Lennox, C., Pittman, J. (2010) Auditing the auditors: evidence on the recent reforms to the external monitoring of audit firms, *Journal of Accounting and Economics*, vol. 49(1-2), pp. 84-103;

Lin, Z.J., Liu, M. (2009) The impact of corporate governance on auditor choice: Evidence from China, *Journal of International Accounting, Auditing and Taxation*, Vol. 18 (1), pp. 44-59;

Louis, H. (2005) Acquirers' abnormal returns and the non-Big 4 auditor clientele effect, *Journal of Accounting and Economics*, vol. 40(1-3), pp. 75-99;

Răchişan, P. R., Groşanu, A. (2010), "Challenges of the auditing profession in the context of economic crisis", Studia Universitatis Babeş Bolyai-Negotia, Vol. 3, pp. 69-76.

Rizzotti, D., Greco, A.M. (2013) Determinants of Board of Statutory Auditor and Internal Control Committee Diligence: A Comparison Between Audit Committee and the Corresponding Italian Committees, *The International Journal of Accounting*, vol. 48(1), pp. 84-110;

Srinidhi, B., Yeow, L.C., Hossain, M. (2009) Effects of country-level legal, extra-legal and political institutions on auditing: A crosscountry analysis of the auditor specialization premium, *Journal of Contemporary Accounting & Economics*, 5, pp. 34–46;

Sucală, L., Vladu, A.B., Fekete, Sz., Fătăceanu, Gh. (2009 Social Welfare And Taxation Effects On Insurance. An International Empirical Study, *Annals of Faculty of Economics*, vol. *3*(1), pp. 1176-1181;

Sucală, L., Cuzdriorean, D.D., Fekete, Sz., Ienciu, N. (2010 Empirical Evidence On The Effects Of Social Welfare And Taxation On Insurance, *Annals of Faculty of Economics*, vol. *1*(1), pp. 595-600;

Topor D., Căpuşneanu S., Puţan A. (2012) Evolution and performance analysis for wine entities in Romania, Annales Universitatis Apulensis Series Oeconomica, vol. 14(2), pp. 403-412;

Tsipouridou, M., Spathis, C. (2012) Earnings management and the role of audithors in an unusual IFRS context: the case of Greece, *Journal of International Accounting, Auditing and Taxation*, vol. 21, pp. 62-78.

Tu, G. (2012) Controller changes and auditor changes, *China Journal of Accounting Research*, vol. 59(1), pp. 45-58;

Wallace, W. (1998) Changes in European and Australian companies when they choose a Big 5' auditor?, *European Management Journal*, vol. 16(6), pp. 653-659;

Wang, K., & Iqbal, S. O. (2009) Audit pricing and auditor industry specialization in an emerging market: Evidence from China, *Journal of International Accounting, Auditing and Taxation*, 18, pp. 60–72;

Wang, B., Xin, Q. (2011) Auditor choice and accruals patterns of cross-listed firms, *China Journal of Accounting Research*, *vol.4(4), pp. 233-25;*

STUDIA UBB NEGOTIA, LVIII, 4, 2013, pp. 91 - 107
(RECOMMENDED CITATION)

USING MATHEMATICAL MODELS OF DYNAMIC PROGRAMMING FOR ENVIRONMENTAL INVESTMENT PROJECTS

DORU IOAN ARDELEAN[1], TANIA ANGELICA LAZAR[2]

ABSTRACT. This paper aim is to approach the problem of optimizing the functions with restrictions, applying specific methods, algorithms and software to optimize the financial investments for the ecological rehabilitation. The final aim is the improvement of the economic and technological management, therefore increasing the efficiency of implementation.

Key words: *environmental projects, financing, dynamic programming.*

JEL classification: Q56, C53, C61

1. Introduction

The investment decisions of government agencies or private companies are circumscribed by budgets whose magnitudes are largely beyond their control.

Using mathematical programming tools to explore the choice of optimal investment project combinations is not a new concern of researchers and practitioners. For example, Baumol and Quandt (1965) were interested in the issue of capital rationing in investment projects as limiting case of diverging of borrowing and lending-rate problems and used mathematical programming for optimal decision. Cord (1964) developed a

[1] Lecturer dr., Faculty of Economics Sciences, Vasile Goldis Western University of Arad, dard2706@yahoo.com

[2] Teaching Assistant dr., Faculty of Automation and Computer Science, Technical University of Cluj-Napoca, tanialazar@mail.utcluj.ro

model for optimally selecting capital investments with uncertain returns, under conditions of limited funds using dynamic programming is used to compute solutions. Other authors embraced and developed the idea of optimization of funds allocation in investment projects (Krolak, 1970; Shechter and Hammer, 1970; Harvey &Cabot, 1974; Heidenberger, 1996)

The problem of funds allocation in investment projects was formulate in several studies in a stochastic linear programming framework, highlighting that the borrowing rate is an important factor in determining the optimal solution (Kira et al, 2000).

Regarding the problem of funding sources allocation in investment projects, Vasilescu et al. (2000) and Cistelecan (2002) pointed out that in the investment projects, the methods of dynamic programming are appropriate and tools for investment optimizations can be developed.

As regards to the environmental investments project, the range of sources for funding them in Romania comprises the following possibilities (Vacarel et al., 1999; Platon, 1997, 2004): economic agents funds; budgetary funds - the national budget assigns sources for: investments in environment protection, fiscal advantages, subsidizing bank interests, funding of research and development activities; special funds dedicated to some major actions for environment protection; loans granted by World Bank and United Nation Development Program for environment protection; guaranties - collection systems for waste to recycle them; issue of negotiable permits; mandatory insurances against pollution risks; conversion of external debt of some developing countries in funds for environment protection and restoration; Structural Funds of the European Union.

As a difference from developed countries where are used specific and differentiated funds for environmental project, specific for Romania, as the other developing countries, is that the funds are *polyvalent*, funding of ecological restoration for several domains being possible. Because of the scarcity of traditional budgetary funds, the funding of environment projects is based on extra-budgetary mechanisms (Stanciu, 2004). But in a healthy economy, the financing of the environment protection costs has to be provide from private sources, according to the principle ”the polluter pays”. This means that the polluter has to cover the costs of pollution prevention and control. This principle is not applicable in Romania, where it is misunderstood, as a coercive instrument applied to those who violate the allowed pollution norms.

In line with the above considerations, any allocation strategy of environmental projects funding has to take into consideration the whole range of available sources. This situation generates the need to optimize the allocation of financial sources in order to support the decision making for environmental investment projects.

The present paper is unique in its purpose, by offering a decisional model based on mathematical programming, useful for private and public entities from Romania for their funding strategies of environmental projects. In the paper it is described a set of financing alternatives, based on optimization procedures of the funding sources allocation.

We consider the topic of this paper quite useful today due to the fact that from the European Union there are available funds of billions of Euros for environmental projects but the Romanian public and private actors are not able to attract them. Thus, we consider relevant to analyse the reasons leading to such situation and to identify the solutions to overcome this shortfall. One of the main reasons of the very low level of environment funds accessing is the fact that the beneficiaries of such funds are local administrative authorities which fail to adapt their own resources to the funding process of investments carried out during several years. This fact leads to the stoppage of such investments. As a solution for this phenomenon, we consider useful to use mathematical models in environmental investment projects in order to optimize the distribution in time and space of the available sources, which allows the amendment of the annual funding sources structure, based on a model of optimization.

Our paper represents a part of the first study dedicated to ecological restoration of rivers courses from the North-Western region of Romania (Ierului, Turului and Barcaului Valley) having as objective to establish an optimal set of required works for the ecological rehabilitation of these valleys. The approach comprises ecological as well as financial implications for the public and private actors involved in such investments.

Generally, the structure of funding an environmental investment project includes: own funds or initial sources, amortization and external sources (grants or bank loans).

Currently, the problem of funding sources allocation in investment projects can be solved through linear programming, but in the case of investment for ecological restoration, the dynamic programming is more appropriate, due to the different sequences carried out during several years.

The mathematical models of dynamic programming investment consists of a system of recurrence relations and an objective function (Vasilescu et al., 2000), for example referring to maximize profit of the beneficiary obtained during the execution of the investment objective of its output on production capacities put into operation during this period.

The paper "Mathematical Programming using MS Excel Solver, Management Scientist, Matlab" (Cocan and Vasilescu, 1999) is addressed to specialists in various fields, generally managers and all those who want to improve the efficiency of their performance, by taking scientifically based effective decisions. The MS Excel Solver allows calculating solutions for the what-if type scenarios constructed by cells with variable values and cells with restrictions. The Solver module is launched from the Tools menu of the application running MS-Excel, by Solver command.

Further, we illustrate the dynamic programming models using an ecological rehabilitation project for the Ierului Valley.

2. Mathematical models of dynamic programming

Let M a subset of Euclidean space R^n, specified as a set of limitations on the possibilities (equalities or inequalities), called restriction and/or system of recurrence relations which members of M must satisfy. Elements of M are called *admissible solutions*. Les also f be a function defined on M to set R called the *objective function.* An admissible solution that minimizes (or maximizes, if that is the purpose) the objective function is called an *optimal solution.*

The function f has a *local minimum point* x^* if there exists some $\delta > 0$ such that $f(x^*) \leq f(x)$, for all x in M, with $\| x - x^* \| \leq \delta$. Similarly, the function f has a *local maximum point* x^* if there exists some $\delta > 0$ such that $f(x^*) \geq f(x)$, for all x in M, with $\| x - x^* \| \leq \delta$ (Lazar et al., 2009). A global optimum is a point from M which provides the lowest value for all x in M (global minimum) or the highest value (global maximum) for all x in M. Additional conditions about the function f (e.g. the function is convex) are necessary to ensure that the local optimum is also global optimum.

Based on description of the function f and of the subset M, we can classify the problem as linear, non-linear, quadratic, multiple-objective, discrete optimization problem and so on.

Dynamic programming models are carried out in different stages and the results to be obtained in the following periods depend on the decisions that were taken in previous moments (Vasilescu et al., 2000).

Model number 1 - mathematical model of dynamic programming of the proposed investments for the ecological rehabilitation of Ierului Valley.

In order to develop the first mathematical model of dynamic programming we use the symbols:

x - the investment values of ecological rehabilitation, (all the used indicators are expressed in thousands);

i - the year for which the calculation is made;

x_i - the investment values of ecological rehabilitation in years 2010+i-1 (where i = 1,...,10);

$$\sum_{i=1}^{10} x_i = x_1 + x_2 + x_3 + x_4 + x_5 + x_6 + x_7 + x_8 + x_9 + x_{10};$$

Model number 2 - mathematical model of dynamic programming of the proposed investments for the ecological rehabilitation of Ierului Valley based on costs.

In order to develop the second mathematical model of dynamic programming we use the symbols:

x - the investment values of ecological rehabilitation, (all the used indicators are expressed in thousands);

c – constants related to values of investment ***x***;

i – index of value of the investment x_i where i = 1,...,40;

x_i– the value i for the investment of ecological rehabilitation where i = 1,...,40;

c_i – the constant ***i*** (rate) on the principal amount x_i where i = 11,...,40;

$x_i * c_i$ – costs related to the amount x_i for the ecological rehabilitation investment where i = 11,...,40.

Regarding this, we must do the following considerations:

- x_i – the total investment value for the ecological rehabilitation in 2010+i-1, where i = 1,...,10;
- if i = 11,...,40; j=mod(i-10,3); k=round((i-9)/3); for:
  - j = 0, x_i are the values of total own resources (self-financing) for ecological rehabilitation and $x_i * c_i$ are the investment costs in 2010+k-1 (where i = 11,...,40) ;
  - j = 2, x_i are the values of total attracted sources for investments in ecological rehabilitation and $x_i * c_i$ are the investment costs in 2010+k-1 (where i = 11,...,40);

- j = 1, x_i are the values of total bank loans for investment of ecological rehabilitation and $x_i * c_i$ are the investment costs in 2010+k-1 (where i = 11,…,40).

For i = 1,…,10; j = 10+(i-1)*3, we have:

$$x_i = x_{j+1} + x_{j+2} + x_{j+3}.$$

The total investments value for ecological rehabilitation in 2010 + i-1 are equal to the total own resources (self-financing) for ecological rehabilitation investments in 2010 + i-1, plus total investment attracted sources for ecological rehabilitation in 2010 + i -1 and plus the whole amount of bank loans for ecological rehabilitation investments in 2010 + i-1 (where i = 1, ..., 10).

For i = 11 …,40: $\sum_{i=11}^{40} x_i * c_i = x_{11}*c_{11} + x_{12}*c_{12} + x_{13}*c_{13} + x_{14}*c_{14} + x_{15}*c_{15} + x_{16}*c_{16} + x_{17}*c_{17} + x_{18}*c_{18} + x_{19}*c_{19} + x_{20}*c_{20} + x_{21}*c_{21} + x_{22}*c_{22} + x_{23}*c_{23} + x_{24}*c_{24} + x_{25}*c_{25} + x_{26}*c_{26} + x_{27}*c_{27} + x_{28}*c_{28} + x_{29}*c_{29} + x_{30}*c_{30} + x_{31}*c_{31} + x_{32}*c_{32} + x_{33}*c_{33} + x_{34}*c_{34} + x_{35}*c_{35} + x_{36}*c_{36} + x_{37}*c_{37} + x_{38}*c_{38} + x_{39}*c_{39} + x_{40}*c_{40}$;

3. Optimal model of distributing resources in space and time (material, human and financial) available for an ecological rehabilitation project

Dynamic programming models of investments in ecological rehabilitation are based on the knowledge of Ierului Valley investments funds.

It follows to establish the ecological and economic production capacity to be built in each year of implementation, the quantities of materials required for their operation and their recovery, so that the profit obtained during the execution of the ecological and economic objective, would be maxim.

An example of structure of the sources of financing for ecological rehabilitation projects is:

Financing sources for ecological rehabilitation projects initiated between 2010 - 2014 in Appendix 1, together with data obtained by dynamic programming ecological rehabilitation project financing during 2010-2019 in Appendix 2, allow us to build the table below, which contains the sources of financing for ecological rehabilitation projects during 2010-2019.

Table 1.

Structure of financing sources for ecological rehabilitation projects of Ierului Valley for the period 2010-2019

- thou RON -

Financing sources	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total	Weight (%)
1. Own resources (self-financing)												
Criş Waters Directorate Oradea	0	0	0	0	0	0	0	0	0	0	0	
- Someş-Crişuri Branch ANIF Oradea	0	0	800	800	800	800	800	800	800	800	6400	50,778756
Forestry Departments Bihor and Satu Mare	200,2	200,2	200,2	200,2	200,2	200,2	200,2	200,2	200,2	200,2	2002	
- County Councils Bihor and Satu Mare	31,28	31,28	31,28	31,28	31,28	31,28	31,28	31,28	31,28	31,28	312,8	
- Local Councils	57,76	57,76	57,76	57,76	57,76	57,76	57,76	57,76	57,76	57,76	577,6	
- money	25,76	25,76	25,76	25,76	25,76	25,76	25,76	25,76	25,76	25,76	257,6	
- land	0	0	1600	1600	1600	0	0	0	0	0	4800	
- deposits interests	0,26	0,26	0,26	0,26	0,26	0,26	0,26	0,26	0,26	0,26	2,6	
- local parishes (land)	0	400	400	400	0	0	0	0	0	0	1200	
- local population	528,56	528,56	528,56	528,56	528,56	528,56	528,56	528,56	528,56	528,56	5285,6	
TOTAL 1 OWN RESOURCES (SELF-FINANCING)	***843,82***	***1243,82***	***3643,82***	***3643,82***	***3243,82***	***1643,82***	***1643,82***	***1643,82***	***1643,82***	***1643,82***	***20838,2***	
2. Attracted sources												
Criş Waters Directorate Oradea	0	0	160	160	160	160	160	160	160	160	1280	42,593118
- Someş-Crişuri Branch ANIF Oradea	16	16	16	16	16	16	16	16	16	16	160	
Forestry Departments Bihor and Satu Mare	160	0	160	0	160	0	0	0	0	0	480	

Financing sources	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total	Weight (%)
- Governmental funds	928	928	928	928	928	928	928	928	928	928	9280	
-Governmental credits	0	0	0	1040	0	0	0	0	0	0	1040	
-Environment Agency Fund	0	0	800	800	800	0	0	0	0	0	2400	
- EU structural funds	0	0	1879,04	0	0	0	0	0	0	0	1879,04	
- LIFE Programme + (Environment agency Bihor and Satu Mare)	0	0	160	0	0	0	0	0	0	0	160	
-Cofinances (various)	0	0	680	0	0	0	0	0	0	0	680	
- Bonds (agricultural companies)	0	0	0	120	0	0	0	0	0	0	120	
TOTAL 2 Attracted Sources	***1104***	***944***	***4783,04***	***3064***	***2064***	***1104***	***1104***	***1104***	***1104***	***1104***	***17479,04***	
3. Bank loans												
-Commercial Banks Romania	0	800	800	800	0	0	0	0	0	0	2400	6,6281261
- European or international banks (repayable funds)	0	0	0	320	0	0	0	0	0	0	320	
TOTAL 3 Bank loans	***0***	***800***	***800***	***1120***	***0***	***0***	***0***	***0***	***0***	***0***	***2720***	
TOTAL 1-3	***1947,82***	***2987,82***	***9226,86***	***7827,82***	***5307,82***	***2747,82***	***2747,82***	***2747,82***	***2747,82***	***2747,82***	***41037,24***	**100**

Data analysis resulting from the calculation of the optimal model of distribution in space and time of hypothetical resources (material, human and financial) available to finance environmental investments of Ierului Valley leads to the following conclusion: the weight of investment projects to finance environmental investments of Ierului Valley represents only about 8% of the hypothetical financial funds held by the actors in the area, to be allocated in an optimistic scenario for the rehabilitation

of Ierului Valley and about 11% of the hypothetical expected value to be allocated in the pessimistic variant of the ecological rehabilitation. This leads to the conclusion that **there are real conditions for ensuring the material, human and financial resources** to its portfolio of investment projects on the rehabilitation of Ierului Valley.

In what follows, we are going to proceed by implementing *the model 2 - the mathematical model of dynamic programming sources available to finance projects on the rehabilitation of Ierului Valley depending on costs.*

Based on the data obtained from the table no. 1, we consider:

- the total annual values obtained by Model no. 1 as fixed and achievable;
- the financing basic structure remains the same, but we change the value of the three components of the process of financing: own resources (self-financing), attracted sources and the bank loans, to achieve - given the actual conditions of the crisis – the optimal alternative, in terms of costs and real economic opportunities of project stakeholders.

We will study 6 alternatives:

1. The reduction of credits at 0.
2. Reduction of own income to 50%: at Someş-Criş Branch of ANIF Oradea, Bihor and Satu Mare Forestry Department; to 0 for: Bihor and Satu Mare county councils, local councils in the area and businesses in the agriculture of the area.
3. Reduction of own incomes to 25% on: Someş-Criş Branch of ANIF Oradea, Bihor and Satu Mare Forestry Department; to 0 for: Bihor and Satu Mare county councils, local councils in the area and businesses in the agriculture of the area.
4. Reduction of attracted funds to 50% on: Someş-Criş Branch of ANIF Oradea, Bihor and Satu Mare Forestry Department; to 0 for: Bihor and Satu Mare county councils, local councils in the area, businesses in the agriculture of the area, the population in the area.
5. Reduction of attracted funds to 25% on: Someş-Criş Branch of ANIF Oradea, Bihor and Satu Mare Forestry Department; to 0 for: Bihor and Satu Mare county councils, local councils in the area, businesses in the agriculture of the area, the population in the area.
6. Standard version with own resources, normal attracted sources (100%) and reduced bank loans, as resulting from the display environmental financed projects *Ierului Valley*.

In this model, for the above six alternatives we have the following common restrictions:

- $\boldsymbol{x_i}$ (where i=1, ..., 10) are the investment values of the financing sources of initial investments of ecological rehabilitation for *Ierului Valley* during 2010, ..., 2019.

The recurrence relations for $\boldsymbol{x_i}$ (where i=1,...,5) will be constructed from the values given in Appendix 1. These relationships are:

- total financing sources in 2010, in amount of 1947.816 thousand RON

$$x_1 \geq 1.947{,}816$$

- total additional financing sources in 2011 than in 2010, in amount of 1,040 thousand RON

$$x_2 - x_1 \geq 1.040$$

- total additional financing source in 2012 than in 2010, in amount of 7279.04 thousand RON

$$x_3 - x_1 \geq 7.279{,}04$$

- total additional financing source in 2013 than in 2010, in amount of 5,880 thousand RON

$$x_4 - x_1 \geq 5.880$$

- total additional financing source in 2014 than in 2010, in amount of 3,360 thousand RON

$$x_5 - x_1 \geq 3.360$$

- the difference in total financing source in 2015 to 2014 is 1,600 thousand related to own resources (self-financing) - land value in the agriculture businesses in the area, 800 thousand RON attracted sources from the Agency Fund for the Environment, 160 thousand RON attracted sources from the Directorate Criş Waters Oradea

$$x_5 - x_6 \geq 2.560$$

- $x_i \geq 0$, i = 1,...,5;
- $x_i = x_{i+1}$ i = 6,...,9;
- *the objective function* is $\boldsymbol{\min\left(\sum_{i=11}^{40} x_i^* \, c_i\right)}$, and represents the total investment costs for financing ecological rehabilitation projects of Ierului Valley during 2010-2019, where:

- for i = 11,...,40; j=mod(i-10,3); k=round((i-9)/3):
- j = 0, x_i are the values of total own resources (self-financing) for

ecological rehabilitation investments and xi*c_i , the related costs to 2010 + k-1 (where i = 11, ..., 40) $c_i = 0$;

- j = 2, x_i are the values of total attracted sources for ecological rehabilitation investments and $x_i * c_i$ the related costs to 2010+k-1 (where i = 11,…,40) $c_i = 0$;
- j = 1, x_i are the values of total bank loans for ecological rehabilitation investment and $x_i * c_i$ the related costs to 2010+k-1 (where i = 11,…,40) $c_i = 15/100$;

- for i = 1…,10, j = 10+(i-1)*3, we have by default the following restrictions:

$$x_i = x_{j+1} + x_{j+2} + x_{j+3},$$

common to the 6 alternatives (the total investment value for ecological rehabilitation in 2010 + i-1 are equal to the total own resources) ecological rehabilitation investment in 2010 + i-1, plus the total attracted sources for investments in ecological rehabilitation 2010 + i-1 and the whole amount of bank loans for ecological rehabilitation investments in 2010 + i-1.

4. Choosing the optimal alternative for financing ecological rehabilitation projects of Ierului Valley

Analyzing the optimization procedures on the allocation of financial resources based on appropriate software, we reach some results that lead to optimal decisions.

Choosing the optimal financing, it can either be done for each project, either considering the amount value of all ecological rehabilitation projects for Ierului Valley, as we are going to do.

We consider that the amount of financing for all ecological rehabilitation projects for Ierului Valley is 41,037,260 RON, for any optimization alternative. We note that the value used to finance those projects may change, for example by increasing the relative cost taking into consideration the cost for obtaining borrowed sources **(**interest, commission, unfavorable exchange rate differences, etc.).

In table no. 2 there are synthesis results on the *structure of financing and the cost of obtaining financing on the all 6 alternatives of optimization.*

For the purpose of this paper, the funding sources of environmental investment projects can be divided in three categories: *own, attracted* and *borrowed* (bank loans) (see Cistelecan M.L., 2002). We consider as

own sources the budgetary funds foreseen in the annual budgetary plan of public administrative entities or private entities (investments' beneficiaries) and available for co-funding the environmental investments, we refer to *attracted sources* as funds acquired from various donors or financers, through their financing programmes (i.e. European Union, Romanian Government Agencies) and by *borrowed sources* we mean contracted funds through bank loans.

Table 2.

Financing sources for ecological rehabilitation projects of Ierului Valley and financing costs suitable to optimization scenarios

Alternatives	Own sources		Attracted sources		Borrowed sources		Total financing sources		Purchase cost financing sources (RON)
	value (RON)	weight of the total (%)	value (RON)	weight of the total (%)	value (RON)	weight of the total (%)	value (RON)	weight of the total (%)	
1.	23.558.220	57,41	17.479.040	42,59	-	-	41.037.260	100	-
2.	10.201.000	24,86	17.479.040	42,59	13.357.180	32,55	41.037.260	100	2.003.580
3.	8.100.500	19,74	17.479.040	42,59	15.457.680	37,67	41.037.260	100	2.318.650
4.	20.838.200	50,78	16.399.040	39,96	3.799.980	9,26	41.037.260	100	570.000
5.	20.838.200	50,78	14.599.040	35,58	5.5.99.980	13,65	41.037.260	100	840.000
6.	20.838.200	50,78	17.479.040	42,59	2.720.000	6,63	41.037.260	100	408.000

It should be noted from the very beginning that the projects financing cost is directly proportional with the weight of the interest bearing borrowed sources in the total financing sources.

-***Version 1***-The financial costs are 0.00 RON, because financing is based on a maximum level of own sources (57.41%) and of attracted sources (42.59%).Therefore, loans are not needed (0.00%). However, *this alternative is not applicable to current conditions* because generally, the public actors interested in projects financing do *not have sufficient own sources* and also they are not willing to fully exhaust them on financing only environmental investment projects. On the other hand, getting funds for environment projects is marked by uncertainty due to the increasing national and international competition for Community Funds. Therefore, *version 1 is not used in any real situation*.

- ***Version 2*** *h*as a *large financing cost* of 2.003.580 RON, plus the value of the initial financing, resulting in a total financing of ecological rehabilitation projects of Ierului Valley of 43,040,840 RON (financing increase with 4.88%). There are used a *few own sources* (24.86%) – that are much reduced during the crisis - and *the highest level of attracted*

sources (42.59%), desirable situation for players with weak economic and financial power, especially in crisis conditions. Appealing to more borrowed sources (32.57%), increases the cost of financing. Therefore, *loans purchased are acquired over a longer period of time* (at least in the medium term), that is after the financial crisis. But this version is marked by uncertainty, especially in terms of attracted funds.

-Version 2 has a *higher financing cost* of 2.003.580 RON, to which is added the value of initial financing, resulting a total amount for ecological rehabilitation projects for the Ierului Valley of 43,040,840 RON (a financing increase of 4.88%). The level of own sources is low (24.86%) - the decrease is due to the economic crisis- and that of attracted sources is the highest (42.59%). It is a desirable situation for economically and financially weak players, especially during the economic crisis. By using more borrowed sources (32.57%) the financing cost is increasing. As a result, the *purchased loans* are acquired for a longer period of time (at least on the medium term). However, this version is marked by uncertainty, especially in terms of attracted funds.

- ***Version 3***. It uses the *lowest weight of own sources* (19.74%) and the *maximum weight of attracted sources (*42.59%) and also of the *borrowed sources* (37.67%), which will lead to higher final costs (2.318.650 RON) and the project financing cost will increase to 41.037.260 + 2.318.650 = 43.355.910 RON, meaning a increase of 5.65%. This version has several drawbacks, such as: high financing cost (5.65%) and the uncertainty to provide a high level of attracted sources (42.59%). *Therefore, this version is not preferred under normal conditions.*

- ***Version 4*** has the following financing structure: *a high weight of own sources* (50.78%), *a modest weight of attracted funds* (39.96%) and *the lowest weight of loan sources* (9.26%). It is a version with a lower financing cost of only 570.000 RON. It would be a plausible option if public actors could provide their own financial resources.

- ***Version 5*** consists of : a *high weight of own sources* (50.78%), a *lower weight of attracted funds* (35.58%) and *reasonable borrowed sources* (13.65%), resulting a reasonable cost of buying sources, of 840.000 RON. In this case, the project depends on the high level of own sources.

- ***Version 6*** is considered a normal one. The financing sources comprise: a *high weight of own funds* (50.78%) and *attracted funds* (42.59%) and *low weight of loans* (6.63%). The *financing cost is reduced* to the level of 408.000 RON. This is *the best option for projects financing*

under a normal financial statement, but not recommended due to the high level of own resources very difficult to be provided in times of crisis.

5. Conclusions

The project of ecological restoration of Ierului Valley had as a main aim to conserve and protect wet areas containing reminiscences of ancient primary and secondary vegetation and flora existing in this location. It is expected at the end of restoration project of the Ierului Valley to regain its former look, disappeared as a result of sewerages and inning, and to offer to the local population the needed natural resources from rehabilitated ecosystems

The economic crisis of 2008-2012 had a direct impact on the amount of financial resources available at the level of administrative entities involved in the project, called 'own resources'.

Due to this situation, the best financing alternative for the project under scrutiny is that using a lower level of 'own sources' category.

As such the second and third versions (alternatives) proposed above are suitable. Thus, the second version might be better since it has the lowest final cost (24.86 % own funds + 42,59% attracted sources + 32,55 % borrowed sources at a cost of 2.003.580 RON).

This means that there is an alternative to contract a bank loan of 13.357.100 RON, but due to bank interests and fees, it can be refunded in a medium term of 5-10 years, when the crisis will be past.

Therefore, given the current conditions, the established goals cannot be achieved with a minimum level of costs and a maximum level of effects.

Certainly, if the general financial situation will improve and the actors interested in environment projects will possess an enhanced ability to attract community resources and higher budgetary funds, the optimization program proposed in our paper allows to pass to another financing version, for example to alternative 4, 5 or 6, with lower financing costs between 408.000 – 840.000 RON.

The paper highlights various alternatives useful for administrative entities in their decision taking process on financing environment projects. They can choose the appropriate alternative taking into consideration the availability of budgetary funds dedicated to 'own resources' in financing environment projects.

REFERENCES

Baumol, W.J and Quandt, R.E (1965), *Investment and discount rates under capital rationing-a programming approach*, The Economic Journal, Vol. 75, 298, pp.317-329

Cistelecan M.L. (2002), *Economia, eficienta si finantarea investitiilor*, Ed. Economica, Bucuresti;

Cocan M., Vasilescu A. (2000), *Programarea matematică folosind MS Excel Solver, Management Scientist, Mathlab,* 2nd edition, Ed. Albastra, Cluj-Napoca;

Cord, J. (1964), *A method for allocation funds to investments projects when returns are subject to uncertainty*, Management science, vol.10, issue 2,pp.

Heidenberger, K. (1996), *Dynamic project selection and funding under risk: A decision tree based MILP approach*, European Journal of Operational Research, 95(2), pp.284-298

Herbei M., Mazuru L., Foroglu I. (2006), *Gestiune financiară*, Ed. Mirton, Timisoara;

Kira, D.,Kusy, M., Rakita, I. (2000), *The effect of project risk on capital rationing under uncertainty*, The Engineering Economist, 45 (1), pp.37-55

Krolak,P.D. (1971), *Portofolio evaluation & re-evaluation: an experiment in subjective probability, man-machine learning and decision making*, Decision science 2(2), pp:225-238

Lazar V., Lazar T., Petrusel G. (2009), *Matematici aplicate in economie*, Ed. Casa Cartii de Stiintă, Cluj-Napoca;

Platon, V. (1997), *Protecția mediuluis si dezvoltarea economica. Institutii si mecanisme in perioada de tranzitie*, Editura Didactica si Pedagogica, Bucuresti;

Platon, V. (2004), *Finantarea activitatilor de protectie a mediului. Intre teorie si practica*, Editura Economica, Bucuresti;

Shechter,M. and Hammer, P.L. (1970), *A note on the dynamic planning of investment projects*, European Economic Review 2(1), pp.111-121

Stanciu, V., Bran, A.G., Bran, Fl. (2004), *Politici financiare de protectia mediului*. In Volumul Sesiunii de Comunicari Stiintifice "Lumea financiara-prezent si perspective" Cluj Napoca, 12-13.12.2004, p.700-704;

Vasilescu I., Romanu I., Cicea Cl. (2000), *Investitii*, Ed. Economica, Bucuresti;

Vacarel, I., Angelache, G., Bercea, F., Bistriceanu, Gh.D., Bodnar, M., Mosteanu, T., Georgescu, Fl. (2000), *Finante publice*, Editia a II-a, Editura Didactica si Pedagogica;

Vivien F.D. (1994), *Economie et écology*, Ed. La Décuverte, Paris.

Appendix 1

Structure of financing sources for ecological rehabilitation projects of Ierului Valley for the period 2010-2014

Financing sources	2010	2011	2012	2013	2014	Total
1. Own resources (self-financing)						
Cris Waters Directorate Oradea	0	0	0	0	0	0
- Somes-Crisuri Branch ANIF Oradea	0	0	800	800	800	2400
Forestry Departments Bihor and Satu Mare	200,2	200,2	200,2	200,2	200,2	1001
- County Councils Bihor and Satu Mare	31,28	31,28	31,28	31,28	31,28	156,4
- Local Councils	57,76	57,76	57,76	57,76	57,76	288,8
- money	25,76	25,76	25,76	25,76	25,76	128,8
- land	0	0	1600	1600	1600	4800
- deposits interests	0,26	0,26	0,26	0,26	0,26	1,30
- local parishes (land)	0	400	400	400	0	1200
- local population	528,56	528,56	528,56	528,56	528,56	2642,8
TOTAL Own resources (self-financing)	***843,82***	***1243,82***	***3643,82***	***3643,82***	***3243,82***	***12619,10***
2. Attracted sources						
Cris Waters Directorate Oradea	0	0	160	160	160	480
- Somes-Crisuri Branch ANIF Oradea	16	16	16	16	16	80
Forestry Departments Bihor and Satu Mare	160	0	160	0	160	480
- Governmental funds	928	928	928	928	928	4640
- Governmental credits	0	0	0	1040	0	1040
- Environment Agency Fund	0	0	800	800	800	2400
- EU structural funds	0	0	1879,04	0	0	1879,04
- LIFE Programme + (Environment agency Bihor and Satu Mare)	0	0	160	0	0	160
- Cofinances (various)	0	0	680	0	0	680
- Bonds (agricultural companies)	0	0	0	120	0	120
TOTAL 2 Attracted sources	***1104***	***944***	***4783,04***	***3064***	***2064***	***11959,04***
3. Bank loans						
- Commercial Banks from Romania	0	800	800	800	0	2400
- European or international banks (repayable funds)	0	0	0	320	0	320
TOTAL 3 Bank loans	***0***	***800***	***800***	***1120***	***0***	***2720***
TOTAL 1-3	**1947,82**	**2987,82**	**9226,86**	**7827,82**	**5307,82**	**27298,14**

Appendix 2

Dynamic programming sources of financing environmental rehabilitation projects of Ierului Valley during 2010-2019

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}	
-1	1	0	0	0	0	0	0	0	0	1.040,00
-1	0	1	0	0	0	0	0	0	0	7.279,04
-1	0	0	1	0	0	0	0	0	0	5.880,00
-1	0	0	0	1	0	0	0	0	0	3.360,00
0	0	0	0	1	-1	0	0	0	0	2560
1	0	0	0	0	0	0	0	0	0	1.948
0	1	0	0	0	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	0	0	0	0
0	0	0	0	1	0	0	0	0	0	0
0	0	0	0	0	1	0	0	0	0	0
0	0	0	0	0	-1	1	0	0	0	0
0	0	0	0	0	-1	0	1	0	0	0
0	0	0	0	0	-1	0	0	1	0	0
0	0	0	0	0	-1	0	0	0	1	0
1	1	1	1	1	1	1	1	1	1	
1.947,82	2.987,82	9.226,86	7.827,82	5.307,82	2.747,82	2.747,82	2.747,82	2.747,82	2.747,82	41.037,2

STUDIA UBB NEGOTIA, LVIII, 4, 2013, pp. 109 - 117
(RECOMMENDED CITATION)

COMPARISON OF THE PROFITABILITY OF FRUIT PRODUCTION FOR FARMS – BELONGING AND NOT BELONGING TO PRODUCER ORGANIZATIONS

PIOTR BRZOZOWSKI[1], **KRZYSZTOF ZMARLICKI**[2]

ABSTRACT. In order to respond to modern market demands and stringent fiscal and labour rules, the nowadays farms are shifting more and more to small enterprises. At the present days the supermarkets chains are the main sales channel with still increasing rule, so only farms organized in bigger production and sales units gain the possibility to act as an equal partner for them. The research was carried out in Poland on thirty commercial fruit farms mostly with apple production in the years 2012-2013. Owners of sixteen farms were members of Producer Organizations (POs) and fourteen farms were owned by non-members. All data necessary for the calculation of the costs and profitability were obtained from producers who answered special questionnaires and participated in additional interviews. By calculating the profitability of the farms the subsidies belonged to POs were not directly taken into the account, because they go to the organization not to a single producer. Fruit growers in Poland, members of producer organizations have many economic benefits over their non-PO-members competitors. Accordingly to inquiry done during the investigation the most important advantage is to sale greater quantities of fruit at lower unit costs due to maintaining shared (mutually owned) storages, grading and packaging facilities. The others most important are reduced economical risk and lower transaction costs. The achieved unit price was on average 21.5% lower in the case of the members of PO's, and the unit costs were on average 29.5% lower than those ones for individual farms. Then the total income of farm was taken into account the POs were unquestioned winners, with bigger value of market output per farm and higher net income per farm. The average

[1] Researcher, Research Institute of Horticulture, Skierniewice, Poland, piotr.brzozowski@inhort.pl
[2] Researcher, Research Institute of Horticulture, Skierniewice, Poland, krzysztof.zmarlicki@inhort.pl

individual farm selling fruits on its own had lower total net income per farm and smaller market output. The owners of individual farms also spend much more time to sell their fruit. By joining the cooperative farmers could increase their sale of fruit and save the time they otherwise spend for selling them individually. The members of POs have more time for better production practices which are very important for the quality of produced fruit.

Key words: profitability, fruit, farms, PO's

JEL Classification: O13, Q15

1. Introduction and literature review

Poland was one of the very few communist countries with small individually owned farms. Although communist administration favoured state owned and collective farms, small peasant farms survived and at the time of transition in 1989, occupied 77 per cent of total agricultural land. Fruit farms were economical leaders among them due to higher farm income. Thanks to government support and assistance programmers provided by EU agencies they successfully fixed the most evident deficiencies in storage and packaging facilities. Despite those significant achievements some challenges and threats remained in respect to still growing supply and rising cost of production. To effectively sell their products farmers join the Producer Organizations (POs). This is also because the EU assistance is offered to farmers through POs mostly. The majority of buyers prefer products in big quantities as the supermarkets chains do, which recently became the main sales channel with still increasing rule. Only farmers organized in bigger production and sales bodies have the possibility to act as an equal partner for them. In addition to this POs create a broader market access for small growers also as an export operator (anon, 2004). This is why the number of POs in Poland was growing fast and in 2012 exceeded 300. Due to big number of small farms in Poland being a member of POs can be the only way for small producers to stay in the food business and become competitive (Zmarlicki, 2009). According to Cogeca (2010) cooperatives have a significant market share in the European food sector, controlling 60%

of the food product market, while in some countries this percentage is even higher, 80%. Confronted with market requirements and aware of own limitations they are evolving to more dynamic organization form with increasing role of investors (Cook et al., 2008) and even more of appointed by them managers (Rufio et al., 2001).

Many of fruit farmers in Poland object the POs membership due to the bad experiences with collective acting from communist time or simply due to the strong commitment to individual spirit. Some of the opponents claim the higher profitability of independent selling of own fruit.

The objective of this research was the evaluation of profitability of fruit production for both groups of farms – belonging and not belonging to POs. The results of the study are very important to the fruit farmers particularly to those who hesitate to join Producer Organization for fear their farms could become less profitable.

2. Material and method

The research was carried out in the years 2012-2013 on thirty commercial fruit farms with mostly apple production. Owners of sixteen farms were members of Producer Organization and fourteen farms were owned by non-members. All data necessary for the calculation of the costs and profitability were obtained from producers who answered special questionnaires and participated in additional interviews. By calculating the profitability of the farms, the subsidies belonged to POs were not directly taken into the account, because they go to the organization not to a single producer. All investigated farms were located in central part of Poland. The size of the apple orchards in research ranged from 2.5 hectare to 11.5 hectare for the non-PO-members group, and from 2.0 hectare to 20.5 hectare for the group of POs belonging farms. The density of planting was from 1000 trees per hectare to 2660 trees per hectare.

3. Results and discussions

Average apple yields in both groups of farms in the year 2012 were very similar. In the group of independent growers amounted 30.5 tons per hectare while in the POs members' 31.5 tons per hectare. The achieved average unit price in the former group was 1.33 PLN per kg of sold apples while in the latter was 21.5% lower respectively 1.04 PLN per kg. Among the most important advantages the POs have over

individual farms are lower production costs. With 21418 PLN per hectare the production cost of the PO members' farms were only 71.1 % of those of their individual counterparts (Tab. 1). This was due to mutually owned storages, grading and packaging facilities. Because all of investigated POs allowed their members to sell some parts of produced fruits on their own as formalized in cooperative's bylaws, so some individual storages and packages of POs members were still in use. Results of this work regarding the lower production cost of fruit farms belonging to POs, confirm those achieved for Poland by other authors (Bieniek-Majka 2011; Domagalska-Grędys 2012). The reasons for cost advantages the POs have over their individual counterparts indicated in this paper are the same as pointed out by mentioned above authors. In addition they raise the issue of eliminating by POs the middlemen in the trade chain and sharing information about the best production practices among POs members.

Table 1.

Economic measures for apple farms belonging and not belonging to Pos

	Non-POs -members	***POs -members***	***Non-POs = 100***
Yields [t ha $^{-1}$]	30.5	31.0	101.6
Average price [PLN kg $^{-1}$]	1.33	1.04	78.2
Gross income in [PLN ha $^{-1}$]	40565	32240	79.5
Direct cultivation cost [PLN ha $^{-1}$]	12566	13267	105.6
Recapture of estab. cost [PLN ha $^{-1}$]	3735	3735	100.0
Grading costs[PLN ha $^{-1}$]	3168	732	23.1
Storage cost [PLN ha $^{-1}$]	6072	1481	24.4
Overhead [PLN ha $^{-1}$]	1624	1637	100.8
Sales costs [PLN ha $^{-1}$]	2725	566	20.8
All costs (total) [PLN ha $^{-1}$]	29890	21418	71.7
Net income [PLN ha $^{-1}$]	10675	10822	101.4
Support payments [PLN ha $^{-1}$]	732	732	100,0
Final economic result [PLN ha $^{-1}$]	11407	11554	101.3
Average area of apple orchard on the farm [ha]	7.35	9.45	128.6
Market output of farm[PLN]	298152.75	305854.45	102.6
Net farm income [PLN]	78461.25	103455.29	131.8

Source: Authors own study; 1 EUR = 4.15PLN

Taking the total income of farm into account the POs were unquestioned winners, with the average value of 305854 PLN market output per farm and average net income of 103455 PLN per farm, what

means income about 30% higher per farm than individual farm selling on its own (Table 1) The average individual farm selling fruits on its own had smaller total net income per farm of 78461 PLN and market output of 298152 PLN due to smaller area of orchards.

Among the major incentives to join a cooperative, members point out no need to sell own fruit, what is particularly difficult in the case of dessert fruit during the years with good crops in Poland and possible oversupply. Then some producers are forced to sell a part of dessert apples for processing at much lower prices. In the years of economic decline much more farmers apply for a membership in POs than in periods of prosperity. Accordingly to other authors the biggest incentive for producers to establish a new group were the EU subsidies, with which up to 75% of investments made by preliminary recognized producer group was reimbursed (Bieniek-Majka 2011). The storage cost and grading cost for POs particular members are respectively 1481 PLN per hectare and 732 PLN per hectare, which are 24.4 % and 23.1 % of those compared with independent (unaffiliated) farmers (Figure 1). Much more evident is the advantage of POs at sales cost, which with 566 PLN per hectare is only 20.8 % of those of unaffiliated farmers. Direct cultivation cost (originated in orchard) for POs members accounted for 13267 PLN per hectare and were 5.6 % higher than those for independent farmers. The establishments cost (for new orchard) and the overhead cost for both groups of farms were almost on the same level, because those groups of farms are very similar, when total farm acreage and percentage of apples in total farm production are taken into account. Unaffiliated farmers have 50.9% higher costs of utilized materials and human labour (Figure 2). That is because they sale all their fruits by themselves and so they are storing and grading them. Material costs for unaffiliated farms with 9214 PLN per hectare were 49,5 % higher than for POs members. The costs of own and family labour with 6252 PLN per hectare were 50.9% higher for unaffiliated farmers and the cost of hired labour with 2160 PLN per hectare were 34.3% higher. The sale of apples on local retail markets is very time consuming for independent farmers. It takes about 8 hours on average to sale 1 tone of apples. In our investigation the independent farmers spend 320 hours per hectare for selling fruit, farmers affiliated in POs only 35 hours per ha (for the part of apples they were allowed to sale on their own). Generally the needs for human labour at unaffiliated

farms are as high as 1050 hours per hectare and at affiliated in POs as high as 730 hours per hectare. The POs members were more concentrated on production and they accomplished more orchard works on their own so the amount of hired hours per hectare was about 315, in the case of independent farms it was about 420 hours per hectare. The cost of machinery and buildings depreciation were higher in the case of independent producers, they accounted for 4299 PLN per ha while on farms of POs members only for 3200 PLN per hectare, that was mostly due to bigger storage capacity of independent producers.

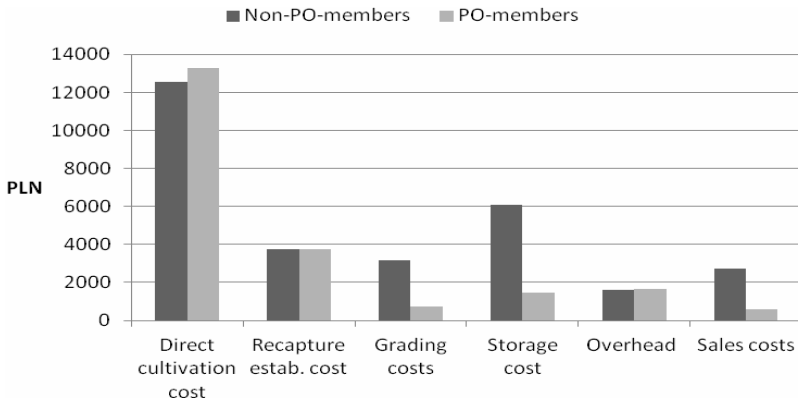


Figure 1. Structure of costs for both groups of apple producers by the kind of main activities.
Source: Authors own study; 1 EUR = 4.15PLN

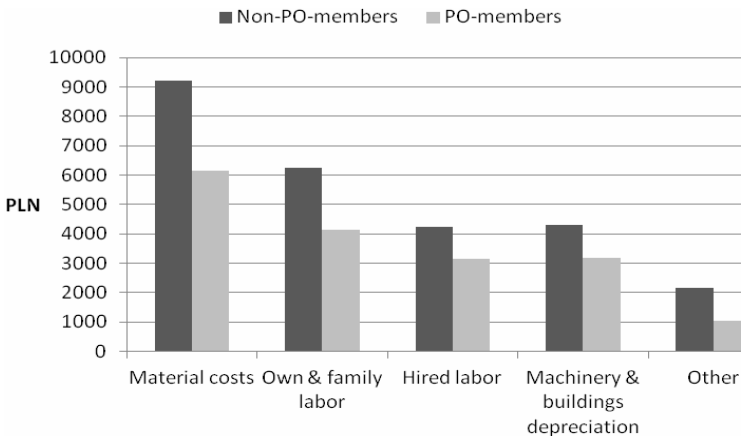


Figure 2. Structure of costs for both groups of apple producers by the kind of inputs**.**
Source: Authors own study; 1 EUR = 4.15PLN

With the total amount of 13267 PLN per hectare the POs members spend more for each particular activity in orchard like: plant protection, harvesting, fertilizer application and soil cultivation (Figure 3). They also spend more money per hectare for insecticides, fungicides and less for fuel and electricity (Figure 4) With 920 PLN per hectare the spending for fuel on farms of POs members are only 46.9 % of those of unaffiliated farmers and respectively with 750 PLN per hectare the spending for electricity are only 24.0 % of them.

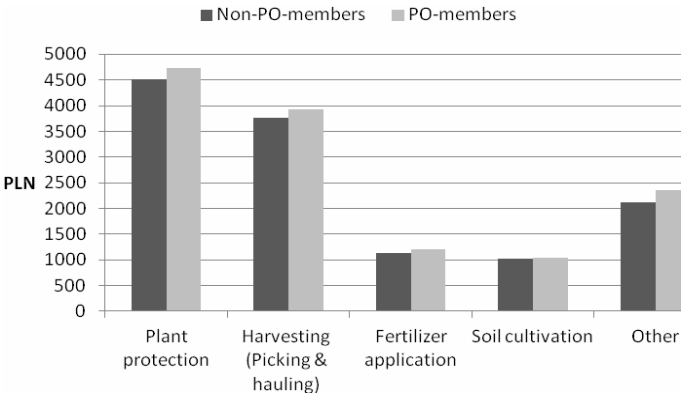


Figure 3. Structure of costs originating in orchard for both groups of apple producers.
Source: Authors own study; 1 euro = 4.15PLN

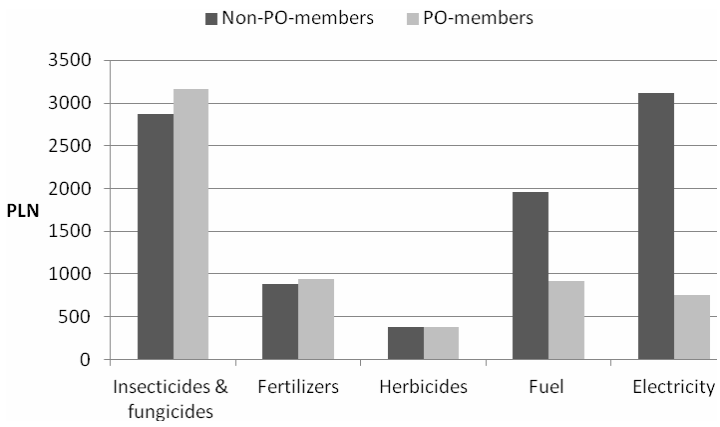


Figure 4. Structure of material costs for both groups of apple producers
Source: Authors own study; 1 euro = 4.15PLN

4. Conclusions

To our knowledge, this study is one of the firsts conducted in Poland to evaluate the economical effectiveness of fruit farms owned by members of Producer Groups and to compare it with effectiveness of farms of unaffiliated producers. The aim of the research was reached. Fruit farms owned by members of Producers Groups turned out to be more profitable and better adopted to today's market shaped by supermarkets chains. The other most important advantage of fruit farm belonging to Producer Organization in Poland is to sale bigger quantities of fruit and to have the higher market output per farm than average fruit farm not belonging to PO. The other important assets the farms belonging to POs have over their unaffiliated counterparts are the units cost, which are about 30% lower due to maintaining shared storages and other facilities. The farms belonging to POs had about 30% higher net income per farm than farm selling fruits on its own. This study contributes to the fruit farmers particularly to those who hesitate to join Producers Organization for fear their farms will become less profitable. The continuous growth of the number of POs with fruit production in Poland is predicted if the EU support will remain on present level and even bigger growth is expected in the number of farms joining existing POs particularly if the economic conditions on the fruit market will worsen in the next years. Further research on the subject is needed due to changing economic and political conditions particularly apple producers' dependency on the Russian imports.

RERERENCES

Anonymous (2004), The role of Producer Organizations in creating market access, Report IAC, Wageningen.

Bieniek-Majka M.(2011), Korzyści i bariery tworzenia grup producentów owoców i Warzyw, Roczniki Ekonomiczne Kujawsko-Pomorskiej Szkoły wyższej w Bydgoszczy, No. 4, pp.11-19 .

COGECA (2010), Agricultural Cooperatives in Europe, Main Issues and Trends, Brussels. Cook, M.L., Burress, M.J., & Iliopoulos, C. (2008), New Producer Strategies: The Emergence of Patron-Driven Entrepreneurship, In 12th EAAE Congress, People, Food and Environments: Global Trends and European Strategies, Gent, Belgium.

Domagalska-Grędys M. (2012), Rozwój gospodarstw rolnych poprzez działania grupowe producentów, Wydawnictwo Uniwersytetu Rolniczego w Krakowie, Kraków.

Ruffio, Ph., Guillozo, R., & Perrot, P. (2001), Stratgies d'alliances et nouvelles frontières de la coopérative agro-alimentaire, Economie Rurale, 264–265 (Juillet-October), pp. 76–87.

Zmarlicki K., Ozkan B., Sayin C. (2009), Producers Organizations (PO) in Poland after EU Enlargement in 2004, AB – Turkiye Sivil Toplum Diyalogunum Cok Yonlu Gelistirilmesi Uluslararasi Sempozyumu Bildiri Kitabi, Akdeniz Universitesi Iktisadi ve Idari Bilimler Fakultesi Yayin No.5, 2009, Antalya,Turkey, pp. 195-201.