THE RISE OF CORPORATE ENVIRONMENTAL RESPONSIBILITY IN SERBIAN ECONOMY: THE CASE OF AGRI-FOOD INDUSTRY

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ABSTRACT

The purpose of this paper is to investigate corporate environmental responsibility in the agri-food industry in the Republic of Serbia. Empirical research was conducted on a sample of 112 managers of agri-food organizations operating in the territory of the Republic of Serbia, randomly selected from publicly available databases, using Computer Assisted Web Interview - CAWI technique. Data analysis in this study consisted of descriptive statistics. Univariate analysis was used through individual ranking statistics. Nonparametric Kruskal-Wallis and post hoc Mann Whitney U test were used to test the significance of differences. Research results show above average level of corporate environmental responsibility in agri-food business world in the Republic of Serbia, yet, not sufficiently high comparing to Serbian consumers view, leaving room for improvement. Food processing organizations proved to be the most sensitive to corporate environmental responsibility issue followed by food manufacturing organizations, and agri-food supply and distribution chain organizations the least.

Introduction

Nowadays, environmental awareness appears as a universal European value, influencing and directing European business practices, strategies, and policies (Mihajlović, Voza, Milošević, Durkalić, 2016). Sustainable development policy is increasingly finding a place in economies of developed countries (Popović, 2009), leading to the rise of significance of corporate environmental responsibility (CER) as a tool for achieving environment preservance worldwide. Since the Republic of Serbia as a strategic objective has defined membership in the EU, a process of harmonization with current EU policies is inevitable. Agri-food sector is definitely an essential part of that process, since with the prospect of the accession of Serbia to the EU, the elaboration and implementation of agri-environmental measures and explicit requirements for farmers

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to use agri-environmental measures become highly important (Birovljev, Matkovski, Ćetković, 2014). However, economic sanctions, declining production and increasing poverty have significantly reduced the state's capacity to invest in consumer protection, as well as farmers' awareness of the need to protect the environment (Jovanić, 2013). Results of recent research study clearly show that Serbia is lagging behind the EU in the implementation of agri-environmental measures, and in the coming period Serbia will have to make additional efforts to create measures and mechanisms for more effective implementation of agri-environmental programs (Zekić, Maktovski, Kleut, 2018). Alignment of behavior with mandatory standards and rules from the corpus of agri-environmental measures and principles of good agricultural practice is an important step towards preserving the environment and protecting the health of humans, plants and animals. On the other hand, it is an important precondition for the export of agricultural products from Serbia (Jovanić, 2013).

The purpose of this paper is to provide a systematic analysis of CER issue in agri-food industry and to explore importance of this issue in Serbian economy. The paper is organized as follows: after the introduction part, an overview of the scientific and professional literature is given, followed by a description of the research with an analysis of results. Concluding remarks are provided at the end of the paper.

Literature review

Today many companies have accepted their responsibility to do no harm to the environment (Hart, 1997). Changes in citizens' values, lifestyles, and preferences, as well as a new business culture that considers environmental impacts of productive activity (Luhmann, Theuvsen, 2016; Hartmann, 2011), have increased interest in the agricultural economics field towards the concept of corporate environmental responsibility (Nazzaro, Stanco, Marotta, 2020).

Corporate environmental responsibility can be defined as the duty to cover environmental implications of company's operations, products and facilities; eliminate waste and emissions; maximize the efficiency and productivity of its resources; and minimize practices that might adversely affect the enjoyment of country's resources by future generations (Mazurkiewicz, 2004). Corporate environmental responsibility refers to an enterprise's active reduction of environmentally adverse behaviors and participation in environmentally beneficial activities in its daily business activities (Zeng, Qin, Zeng, 2019; Li, Cao, Zhang, Chen, Ren, Zhao, 2017). Banerjee, Iyer and Kashyap (2003) define corporate environmentalism as the recognition of the importance of environmental issues facing the firm and the integration of those issues into the firm's strategic plans. According to these researchers, corporate environmentalism contains two dimensions: (1) the environmental orientation, defined as the disposition of managers to consider environmental issues, and (2) the environmental strategy, which shows how environmental issues are addressed by the company and how they fit in the company's long-term strategy.

CER is significant for the food sector as this sector has a strong impact on the economy, the environment and the society in general (Hartmann, 2011). This sector is especially prone to problems in sustainability given its high impact and dependence on natural, human and physical resources (Topp-Becker, 2017; Vilkė, Pareigienė, Stalgienė, 2015; Genier, Stamp, Pfitzer, 2009). Sustainability challenges faced by the food sector are numerous, including environmental sustainability – reflected in the usage of natural resources, animal welfare, etc.; social sustainability – reflected in labor and work conditions, food safety, food quality etc.; and economic sustainability – reflected in energy usage, waste management, renewable energy resources etc. (Liapakis, Costopoulou, Tsiligiridis, Sideridis, 2017; Bilska, Wrzosek, Kołożyn-Krajewska, Krajewski, 2015; Stancu, 2012). In addition, agriculture is one of the biggest pollutants of the environment, next to industry, mining and traffic, which significantly affects the increasing importance of the growth of corporate environmental responsibility in this sector. Likewise, companies in the agri-food sector must also ensure CER practices application in everyday business activities, as well as observance of the food safety principles and consumer protection (Zaman, Panait, Voica, Ene, 2020). Not only that, according to some researchers, it is necessary that effective CER must affect the entire agri-food supply chain, and not to be limited to company boundaries (Manning, 2013; Amaeshi, Osuji, Nnodim, 2008), which carries the risk that a company that acts undesirably can damage the reputation of some or all of its associated companies (Wiese, Toporowski, 2013).

So far research clearly demonstrates that CER can be conceived as a tool through which agri-food companies can increase their competitiveness through not only achieving products' differentiation in the market, but also through companies' more efficient use of resources (Manning, 2013; Kong, 2012; Marotta, Nazzaro, 2012; Forsman-Hugg, Katajajuuri, Pesonen, Paananen, Makela, Timonen, 2008). CER generates value-added benefits by affecting consumers' perceptions towards companies and products, while increasing consumers' loyalty and satisfaction (Lerro, Raimondo, Stanco, Nazzaro, Marotta, 2019; Lerro, Caraciolo, Vecchio, Cembalo, 2018; Hartmann, Heinen, Melis, Simons, 2013), which leads to a higher willingness to pay for environmentally responsible companies' products (Lerro, Vecchio, Nazzaro, Pomarici, 2019). CER also increases a company's attractiveness as an employer, while enhancing employee satisfaction (Barakat, Isabella, Boaventura, Mazzon, 2016; Turban, 1997). CER positively influences innovation strategies, as it compels companies to constantly increase their products' quality and implement sustainable processes towards innovation. Therefore, CER strengthens companies' reputations, with benefits to their image and identity, and in consumers' recognition of the brand and the company's products (Nazzaro, Lerro, Stanco, Marotta, 2019; Briones Peñalver, Bernal Conesa, de Nieves Nieto, 2018; Marotta, Nazzaro, 2012).

While some of Serbian researchers are aware of the necessity of environmental protection due to the Serbian goal to enter the EU, and have proposed and investigated various, but still limited possible environmental protection measures, methods and techniques in food

production and processing, Serbian agri-food sector has not drawn researcher's attention on CER. In so far agri-food research in Serbia, from the environmental perspective, special attention is given only to biomass combustion environmental negative effects minimization, with recommendation of placing it under legal framework (Mladenović, Nemoda, Paprika, Marinković, Repić, 2016). Stojanović, Lopičić, Milojković, Lačnjevac, Mihajlović, Petrović and Kostić (2012) recommend introduction of the new method for removing pollutants from the environment in the form of biosorption that is to replace conventional technologies. Nikolić, Savić and Nikolić (2005) advocate that the integrated approach to plant protection prevents possible contamination of land and ensures the protection of the environment. Special place is given to the organic agriculture (Marković, 2018; Zimonja-Kaljević, Petrović, Vukadinović, 2012; Katić, Cvijanović, Cicea, 2008; Bošković, Simić, Hojka, Vukosav, Sarić, 2006; Kovačević, 2004), to the regionalization of agricultural production in Serbia (Babović, Veselinović, 2010), to the application of grain and oilseeds storage technology in an atmosphere of inert gases (Brkić, Šarić, Gnip, 2001), to the optimization of nitrogen fertilizer quantities (Milivojac, 2013), to grooming eco-vegetables (Lazić, 1991), to optimizing meat processing and production (Baras, Turubatović, Tadić, Matekalo-Sverak, 2004), to agri-protection windbreaks in the process of land consolidation, (Trifković, Lazić, Marinković, Nestorović, 2017), to annual forage plants (Ćupina, Erić, Mihailović, Mikić, Krstić, Vučković, 2007), to high-performance harvesters (Barać, Đokić, Biberdžić, 2005), to combat of eco-crime (Subošić, Cvetković, Vuković, 2012) as potential media for enhancing environment preservance in the processes of food production. However, there is no article that deals with CER itself, as well as measures the importance of CER in Serbian agri-food industry.

The objective of this paper is to start filling this gap by providing insight into the importance of CER in agri-food industry in Serbian economy from the point of view of Serbian agri-food managers, as a whole, and by agri-food business subsectors, such as food manufacturing, food processing, and food supply and distribution chain.

Materials and methods

In order to investigate corporate environmental responsibility within agri-food industry in the Republic of Serbia, an empirical study was conducted. The research was based on the application of data collection methods from primary sources. The research was organized respecting principles of the methodology of scientific research by Mihailović (2012), which consists of research problem identification, research design, and results analysis.

Research purpose and research questions

The purpose of the research is to examine perceptions and attitudes of managers of agri-food business organizations operating in the Republic of Serbia in relation to the corporate environmental responsibility and to use surveyed perceptions and attitudes of managers to evaluate the degree of significance and impact of the corporate environmental responsibility in agri-food business life of the Republic of Serbia.

Considering that agriculture and food industry include several business subsectors, in the following part, the purpose of managerial opinion research is aimed at examining the conditionality of the degree of influence and importance of corporate environmental responsibility with these factors. In this way, it is possible to find out for which agri-food business subsector corporate environmental responsibility is of the greatest importance.

In order to fulfill the purpose of the research, following research subjects are defined: (1) measuring attitudes of managers of agri-food business organizations operating in the Republic of Serbia about corporate environmental responsibility and the influence of the corporate environmental responsibility on business decision making; (2) identifying and measuring the impact of agricultural and food industry business subsector on attitudes and perceptions of respondents in relation to the corporate environmental responsibility.

The research had following defined goals: (1) determining the degree of significance of corporate environmental responsibility for managers of agricultural and food industry business organizations operating in the Republic of Serbia; (2) determining the existence of statistically significant differences between agricultural and food industry business subsector and the degree of significance of corporate environmental responsibility for managers of agri-food business organizations operating in the Republic of Serbia.

The research is expected to lead to answers to following research questions: (1) to what extent corporate environmental responsibility has an impact on agricultural and food industry business decision making and agricultural and food industry business life in the Republic of Serbia; (2) whether there is and what, if any, statistically significant difference, the connection, between the agricultural and food industry business subsector and respondents' attitudes regarding the corporate environmental responsibility of agricultural and food industry business organizations operating in the Republic of Serbia.

Research participants

Participants in the study were managers of agricultural and food industry business organizations operating in the territory of the Republic of Serbia. The survey was conducted on a convenient random sample of 112 respondents, out of which 32.14% are employed in the food manufacturing subsector, 46.43% in the food processing subsector, and 21.43% in the agri-food supply and distribution chain subsector. Total of 14.29% of participants occupies top management positions, 46.43% occupies middle management positions, and 39.28% occupies operational management positions. Majority of respondents possesses faculty degree (BSc), 67.87%, 10.71% possess high school education degree, and in the equal number masters degree. Totally 67.86% of respondents are of a younger age, less than 45 years old. Regarding respondents' managerial experience 46.43% works overall for more than 10 years in current position. Males and females were equally present. Sampled agri-food business organizations belong primarily to middle size organizations in terms of number of permanent employees, 53.57%, and small organizations, 35.71%, totally 10.71% of agri-food

business organizations belong to large organizations. Testing managers of business organizations has been conducted using quantitative research techniques via the Internet (Computer Assisted Web Interview - CAWI) with previous consent from each subject for participation in the study. As a sample frame, publicly available databases of agricultural and food industry business organizations in Serbia are used.

Research instrument

As a research tool for implementation of the method of collecting data from primary sources, the 7-point Likert scale questionnaire was used, established on the basis of review of the scientific and expert literature and as recommended by Mihailović (2012), Saunders, Lewis and Thornhill (2009), Babbie and Mouton (2007), Welman, Kruger and Mitchell (2005), Boyce (2003), and Dillman (2000), and in compliance with special needs of research. After demographic characteristics of respondents, and data about the organization, the questionnaire contained questions pertaining to corporate environmental responsibility. Results of Cronbach's alpha test of questionnaire as a measure of its reliability indicate the consistent reliability of results obtained ($\alpha>0.7$) (Cohen, Manion, Morrison, 2007).

Research model

The research model is based on examining perceptions and attitudes of managers of agri-food business organizations operating in the Republic of Serbia in relation to the corporate environmental responsibility, and its impact on their business decision choice. In the second step, the research model refers to the examination of the conditionality of the degree of influence and the importance of the corporate environmental responsibility with specific respondents' agricultural and food industry business subsector.

Data analysis

Items of the final questionnaire were analyzed using the statistical package SPSS v20. Univariate analysis containing individual ranking statistics was used. The non parametric Kruskal-Wallis test and post hoc Mann Whitney U test were used to test the significance of differences. Results with $p<0.05$ were declared significant.

Results and discussion

Evaluation of the importance of corporate environmental responsibility for agri-food managers in the Republic of Serbia

In order to evaluate the importance of corporate environmental responsibility for agricultural and food industry managers in the Republic of Serbia, univariate analysis containing individual ranking statistics was used. Research findings (Table 1.) reveal that most managers of agri-food business organizations operating in the Republic of Serbia recognize the crucial role that the corporate environmental responsibility plays for the success and sustainability of their operations, both in the domain of environmental

orientation and in the domain of environmental strategy, since they all carry means that are above average (μ>4.00). The domain of environmental orientation, measured via the degree of embeddedness of environmental awareness in everyday business decision making, received the highest rankings, but previous recent research shows that there is an evident difference between Serbian agri-food managers and Serbian consumers, in favour of Serbian consumers (5.13 vs. 6.32) (Milić, 2020), leaving room for improvement.

Table 1. Statistical summary of univariate analysis of the importance of corporate environmental responsibility for agricultural and food industry managers in the Republic of Serbia

Corporate environmental responsibility measure	Mean (μ)	Std. dev.
1. To what extent is the environmental awareness embedded in your business decision making	5.13	1.7395
2. Our organization focuses on protecting the natural environment as a stakeholder	5.08	1.7303
3. To what extent is the organization you work for involved in environmental activities	5.00	1.6777
4. To what extent are the activities of the organization in which you work related to environmental protection proactive	4.50	1.8657
5. To what extent is there a record of violations of environmental principles in your organization	2.64	1.6942

Source: author's research

Further, regarding the environmental strategy domain, measured via various gradual degrees of corporate environmental involvement, only slight corporate environmental orientation-strategy gap is detected, with received a bit lower rankings, demonstrating presence of some barriers that are more dominate than motivators for corporate environmental strategy development and deployment, but not at much higher level. Serbian agri-food organizations focus on protecting the natural environment as a stakeholder, and are actively involved in environmental activities, almost equally to the degree of their environmental awareness. However, though above average, study findings reveal that the activities of Serbian agri-food organizations related to environmental protection are not as much proactive with received significantly lower rankings. On the positive side, the lowest significance was assigned to the extent to which there is a record of violations of environmental principles in Serbian agri-food organizations, which received rankings significantly below average, but still demonstrating the existence of some agri-food organizations that do not follow environmental principles in doing business.

Research implication is that, even though received rankings are above average (μ>4,00), when compared to Serbian consumers view of this issue, corporate environmental orientation is not sufficiently present in managers' minds and business life within the agri-food industry in the Republic of Serbia, and hence, consequently, corporate environmental strategy development and deployment itself, altogether with present

slight corporate environmental orientation-strategy gap, cannot reach higher levels, missing opportunity to gain significant competitive advantage on Serbian market based on environmentally conscious business activities, hence demonstrating higher levels of corporate environmental responsibility in agri-food business world in the Republic of Serbia, so highly appreciated by Serbian consumers, and accordingly achieve better business performance results.

Evaluation of the influence of agri-food industry business subsector on corporate environmental responsibility importance for managers in the Republic of Serbia

In order to determine corporate environmental responsibility per agri-food industry business subsectors in the Republic of Serbia, the investigation of the influence of certain agri-food industry business subsectors, such as food manufacturing, food processing, and agri-food supply and distribution chain, on the perception of corporate environmental responsibility measured via its two basic dimensions: environmental orientation and environmental strategy is performed. The nonparametric Kruskal-Wallis and post hoc Mann Whitney U test were used to examine the significance of differences. Results with $p<0.05$ were declared significant (Table 2.).

Table 2. Agri-food industry business subsector impact on corporate environmental responsibility importance

CER measure	Agricultural and food industry business subsector rank			p
	Food manufacturing organization (x_1)	Food processing organization (x_2)	Agri-food supply and distribution chain organization (x_3)	
To what extent is the environmental awareness embedded in your business decision making	2857.5	2877.5	1525	P<0.05
Our organization focuses on protecting the natural environment as a stakeholder	2557.5	3792.5	2165	P>0.05
To what extent is the organization you work for involved in environmental activities	3185	3667.5	2327.5	P>0.05
To what extent are the activities of the organization in which you work related to environmental protection proactive	3070	3255	2190	P<0.01
To what extent is there a record of violations of environmental principles in your organization	1642.5	4180	2052.5	P<0.01

Source: author's research

In relation to the importance of corporate environmental responsibility for managers of agri-food business organizations operating in the Republic of Serbia, it was examined whether there are statistically significant differences between respondents coming from three agri-food industry business subsectors: food manufacturing, food processing, and agri-food supply and distribution chain. Results reveal that respondents from food processing business organizations comparing to respondents from food manufacturing, and agri-food supply and distribution chain business organizations, give more importance to embedding environmental awareness in business decision making (2857.5 vs. 2877.5 vs. 1525; $p<0.05$, Kruskal-Wallis test). Also, according to research results, respondents from food processing business organizations give more importance to proactive environmental behaviour comparing to respondents from food manufacturing, and agri-food supply and distribution chain business organizations (3070 vs. 3255 vs. 2190; $p<0.01$, Kruskal-Wallis test). As far as the record of violations of environmental principles is concerned, research results show that the highest rate of environmental violations is present in food processing organizations, followed by agri-food supply and distribution chain organizations, ending with food manufacturing organizations with the least (1642.5 vs. 4180 vs. 2052.5; $p<0.01$, Kruskal-Wallis test). Also, from the same data can be seen that food manufacturing sector attaches more importance to the same previously mentioned first two measures of corporate environmental responsibility comparing to agri-food supply and distribution chain sector. For all other investigated corporate environmental responsibility measures, no statistically significant differences were found ($p>0.05$).

For statistically significant measures, multiple comparisons were performed using the Kruskal-Wallis test of any pair of agri-food business subsectors. In this case, the test was identical to the Mann Whitney U test with normal approximation (Table 3.).

Table 3. Multiple comparisons of agri-food industry business subsectors per statistically significant CER measures

CER measure 5. To what extent is there a record of violations of environmental principles in your organization				
Pair	**Difference**	**H statistic**	**Critical value**	**p-value**
x_1-x_2	0	10.6102	5.7308	0.001125
x_1-x_3	0.5	5.0267	5.7308	0.02496
x_2-x_3	0.5	0	5.7308	1
CER measure 4. To what extent are the activities of the organization in which you work related to environmental protection proactive				
Pair	**Difference**	**H statistic**	**Critical value**	**p-value**
x_1-x_2	2.5	8.2436	5.7308	0.00409
x_1-x_3	0.5	0.3753	5.7308	0.5401
x_2-x_3	2	5.716	5.7308	0.01681
CER measure 1. To what extent is the environmental awareness embedded in your business decision making				
Pair	**Difference**	**H statistic**	**Critical value**	**p-value**
x_1-x_2	1.5	8.3406	5.7308	0.003877
x_1-x_3	0.5	0.7927	5.7308	0.3733
x_2-x_3	1	0.6296	5.7308	0.4275

Source: author's research

In relation to CER measure 5. "To what extent is there a record of violations of environmental principles in your organization", statistically significant differences were found in two pairs of agri-food industry sectors: (1) food manufacturing and food processing ($p<0.01$), and (2) food manufacturing and agri-food supply and distribution chain sector ($p<0.05$). In pair, food processing and agri-food supply and distribution chain sector, no statistically significant difference was found ($p>0.05$).

In relation to CER measure 4. "To what extent are the activities of the organization in which you work related to environmental protection proactive", statistically significant differences were found in two pairs of agri-food industry sectors: (1) food manufacturing and food processing sector ($p<0.01$), and (2) food processing and agri-food supply and distribution chain sector ($p<0.05$). In pair, food manufacturing and agri-food supply and distribution chain sector, no statistically significant difference was found ($p>0.05$).

In relation to CER measure 1. "To what extent is the environmental awareness embedded in your business decision making", statistically significant difference was found in one pair of agri-food industry sectors: food manufacturing and food processing sector ($p<0.01$). In other two pairs of agri-food industry sectors: (1) food manufacturing and agri-food supply and distribution chain sector, and (2) food processing and agri-food supply and distribution chain sector, no statistically significant difference was found ($p>0.05$).

Conclusions

This empirical research paper gives an overview of corporate environmental responsibility within the agri-food industry in the Republic of Serbia. The corporate environmental responsibility issue was considered, except from the general point of view of agri-food managers, also from the point of view of the influence of specific agri-food industry business subsector, on the other side. Obtained results show that corporate environmental responsibility in agri-food business world of Serbia has not reached the level of importance it has for Serbian consumers, raising research implication for Serbian agri-food managers, for developing and implementing environmentally based business activities as insufficiently exploited source of sustainable competitive advantage on domestic market. Also, slight corporate environmental orientation-strategy gap is detected, in favour of environmental orientation, demonstrating presence of some barriers that are more dominate than motivators for corporate environmental strategy development and deployment, indicating the necessity for revealing key CER barriers and actors. Serbian agri-food organizations focus on protecting the natural environment as a stakeholder, and are actively involved in environmental activities, almost equally to the degree of their environmental awareness, yet not in the sufficiently proactive manner. On the positive side, there is low rate of violations of environmental principles in Serbian agri-food organizations detected, but still demonstrating the existence of some agri-food organizations that do not follow environmental principles in doing business. Corporate environmental responsibility is, so far, especially appreciated by food processing organizations, followed by food manufacturing organizations, and by agri-food supply and distribution chain organizations the least, especially in the

domain of environmental orientation and proactive environmental behaviour, followed with the highest rate of environmental violations being present in food processing organizations, then in agri-food supply and distribution chain organizations, ending with food manufacturing organizations with the least. The food manufacturing sector is more environmentally oriented and proactive comparing to agri-food supply and distribution chain sector. Research indication is that, currently, agri-food business organizations which are more directly linked to potential environmental hazards are more devoted to CER issues, but still in insufficient manner.

The scientific contribution of the conducted empirical research is reflected in identifying the importance of corporate environmental responsibility for agri-food managers living and working in the Republic of Serbia, both in general, and by specific agri-food industry business subsector. The social contribution of the research refers to the possibilities of applying obtained results in practice. The analysis of research results should serve as a guideline and assistance to the management of agri-food businesses operating in the Republic of Serbia in creating successful business strategies, which should result in better positions on the Serbian market.

Conflict of interests

The authors declare no conflict of interest.

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