# ESG PRINCIPLES IN FOOD INDUSTRY ENTERPRISES: EMPIRICAL EVIDENCE ON THE APPLICATION FRAMEWORK, SPECIFICS AND CHALLENGES RELATED TO FOOD SAFETY

# ZÁSADY ESG V PODNICÍCH POTRAVINÁŘSKÉHO PRŮMYSLU: EMPIRICKÉ DŮKAZY O RÁMCI PRO UPLATŇOVÁNÍ, SPECIFIKA A VÝZVY TÝKAJÍCÍ SE BEZPEČNOSTI POTRAVIN

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## Abstract

The issue of social and environmental risks and overall corporate governance disclosure needs will have to be taken into account in the implementation of the activities of economic entities and other institutions due to the legislative conditions of the EU member states. In the given context in order to identify their influence with respect to the relevant sets of elements of the external environment, specifically the elements of social, environmental and related reporting for external stakeholders. The system of independent assessment of the degree of achievement of the stated principles in individual sub-areas offers the possibility of a robust public relationship. This article aims at businesses active in food processing industry, where it uses empirical data of Food and Agriculture Benchmark provided by World Benchmarking Alliance. It uses evaluation data in the partial assessment areas to identify the influence of business "Environmental", "Social" and "Governance" attributes on food safety level as the inevitable part of the sustainable production concept.

Keywords: environmental, social and governance (ESG) principles, food safety, benchmarking

## Abstrakt

Problematika sociálních a environmentálních rizik a celková potřeba zveřejňování informační báze ohledně řízení hospodářských subjektů budou muset být zohledňovány při realizaci jak podnikatelských aktivit, tak v rámci činností taktéž dalších institucí, a to vzhledem k legislativním podmínkám členských zemí EU. V daném kontextu pak zejména za účelem identifikace jejich vlivu s ohledem na relevantní soubory prvků vnějšího prostředí, konkrétně prvky sociálního, environmentálního a souvisejícího reportingu pro externí zájmové skupiny. Systematika nezávislého hodnocení míry dosažení uvedených zásad v jednotlivých dílčích oblastech nabízí možnost robustního provázání daných činností s informovaností veřejnosti. Tento článek se zaměřuje na podniky působící v potravinářském průmyslu, kdy využívá empirická data z provedeného šetření Food and Agriculture Benchmark, které je ze strany jeho realizátora World Benchmarking Aliance poskytováno jako veřejně dostupná informace. V uváděném kontextu jsou zakomponována hodnoticí data v jednotlivých dílčích oblastech směrem k identifikaci vlivu podnikatelských atributů oblasti „environmentální", „sociální" a „řídící" na úroveň bezpečnosti potravin, coby nezbytné součásti konceptu udržitelné výroby potravin.

Klíčová slova: principy zodpovědného a udržitelného podnikání (ESG), bezpečnost potravin, benchmarkingová srovnání

## Introduction

From an economic point of view, it is possible to claim the food safety in the context of the development and financial stability of the whole agri-food value chains. The given sector has faced and is still facing specifically in EU member states a pressure to reduce food prices to artificially low levels, often below the level of production costs for their production, which can negatively affect food safety requirements. This situation then inevitably touches on the issue of wasting natural resources and related processed foods that do not meet the minimum legal requirements for their safety. Sustainable food production must be a counterbalance between the needs of price and quantitative availability of food for consumers and their comprehensive quality including safety, nutritional and other influencing criteria including last but not least, also the environmental sustainability of their production, or necessary processes associated with the disposal of unconsumed food.

Qualitative aspects of food production can generally be related to a controlled complex system of production in the relevant business entity or industry as a whole. Identifiable innovation activities are considered to be a change in general industrial conditions, such as the production structure and production systems, in order to increase the competitiveness of so called carriers of innovation. The above-mentioned innovation activities are very closely connected with partial changes in innovation factors, such as product innovation, marketing innovation, technological and environmental aspects of production also related to the management of human labor force, changes in capital and operating assets, changes in raw material inputs, etc. These aspects as a whole, they create the quality of production (Martinovičová *et al*., 2019).

Malliaroudaki *et al.* (2022) declare the necessity of adapting to changing climatic conditions for business activities in the agri-food industry, where they also connect these with the effects of the growth in food demand due to the growth of the global population. Therefore, they consider it essential to reduce energy consumption through energy savings, reduction of food waste and its management, when, however, these changes in themselves can have a negative impact on the quantity, quality and safety of food production (e.g. Li *et al*., 2021; Litvinenko *et al*., 2022).

Production of safe and nutritionally valuable food is therefore necessarily considered for a sustainable agri-food sector as a whole, including consumer awareness of food safety and the environmental impacts of its production and subsequent consumption.

Aim of this article is to identify the relationships between "Environmental", "Social" and "Governance" attributes on food safety level as the inevitable part of the sustainable production concept of businesses active in food processing industry. The research question is set up to prove dependency of food safety on partial sustainability measures, represented by the respective ESG factors.

## Methods

Cluster analysis was used to evaluate the similarity within the observed benchmark ratings list of food processing businesses publicly provided by World Benchmarking Aliance (©2021). In that benchmark the respective company can gain up to 100 points regarding the set of criterions. For the exploratory purposes of classifying a sample of benchmarked criteria of food processing businesses, the k-means clustering approach, is used. Meloun and Militký (2006) declare capability of this method to analyse both continuous and discrete type of data in order to classify businesses in the sample via clusters, while considering within observation sum of squares as a measure of similarity of multidimensional classifiers of individual businesses in the sample. In total, a sample of 317 benchmarked businesses was used, considering 5 evaluation criteria, 4 of which are aggregated - Governance and Strategy (MA1), Environment (MA2), Nutrition (MA3), Social Inclusion (MA4) and one partial as the specific selection regarding the aim of the article - Food Safety (C6). Due different scoring for the selected criterion a standardisation of the raw data is needed, using transformation of data according their mean over standard deviation multiple.

## Results

Partial results of the explorative study on ESG factors relationship to food safety reveals a dependency of food safety proxy indicator (C6) and partial ESG comprehensive factors proxies (MA1–MA4) (see Fig. 1).

Tab. I provides descriptive statistics for partial identified cluster 1 that is representing observed companies from the benchmarking with the 2$^{nd}$ highest values of food safety proxy indicator (C6). This cluster 1 is prevailingly covering businesses from Food and beverage processing industry. The highest observed variability for the food safety proxy indicator was identified for the industry "Agricultural inputs".

Fig. 2 provides further insight into the interaction between observed industries, total ESG score from the benchmark of the World Benchmarking Aliance and Food Safety proxy partial indicator. It reveals a prevailing worse results of the food safety within this observed industries.

It can be seen descriptive statistics in Tab. II for partial identified cluster 2 that is representing observed companies from the benchmarking with the worst values of food safety proxy indicator (C6). This cluster 2 is prevailingly covering similarly as cluster 1 businesses active in Food and beverage

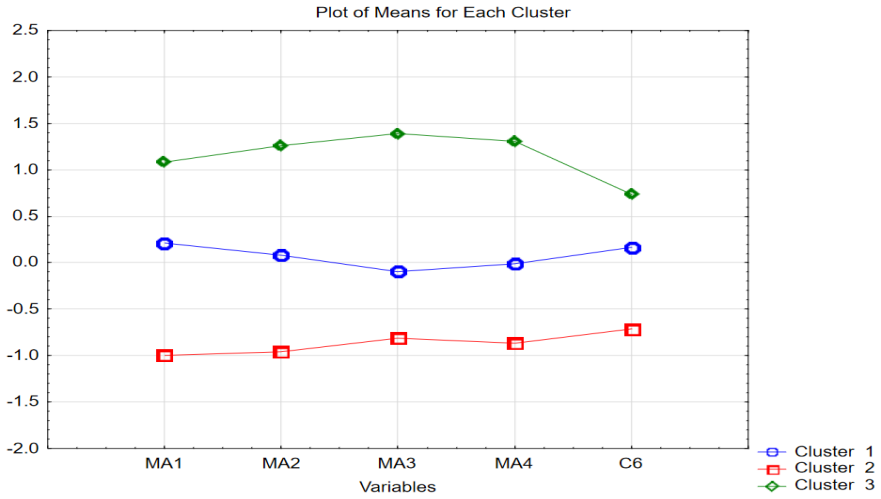


*Fig. 1: Resulting clusters multivariate visualisation within Agri-food ESG benchmark*
Source: own work using data of World Benchmarking Aliance (©2021)

*Tab. I: Descriptive statistics of resulting cluster 1*

| Item\Industry | Agricultural inputs | Agricultural products and commodities | Animal proteins | Food and beverage processors | Food retailers | Restaurants and food service |
|---|---|---|---|---|---|---|
| Observations | 6 | 69 | 40 | 98 | 24 | 12 |
| Partial criterion „Food Safety“ std. variation | 1.23 | 0.94 | 1.16 | 1.13 | 1.19 | 0.54 |
| ESG total score std. variation | 0.49 | 1.06 | 0.80 | 1.01 | 0.52 | 0.89 |

Source: own work using data of World Benchmarking Aliance (©2021)

processing industry. The highest observed variability for the food safety proxy indicator was identified for the industry “Animal proteins”.

Fig. 3 provides further insight into the interaction between observed industries, total ESG score from the benchmark of the World Benchmarking Aliance and Food Safety proxy partial indicator. It reveals a prevailing better results of the Food safety proxy indicator within the sample for the following industries - Agricultural products and commodities and Animal proteins.

It can be seen descriptive statistics in Tab. III for partial identified cluster 3 that is representing observed companies from the benchmarking with the best values of food safety proxy indicator (C6). This cluster 3 is also represented mainly by businesses active in Food and beverage processing industry. The highest observed variability for the food safety proxy indicator was identified for the industry “Agricultural Inputs”.

Fig. 4 depicts interaction between observed industries, total ESG score from the benchmark of the World Benchmarking Aliance and Food Safety proxy partial indicator for the cluster 3. It reveals a overperforming results of the Food safety proxy indicator within the sample for the following industries - Agricultural products and commodities and Food and beverage processors.

## Discussion

To consider ESG principles in food safety, it is essential to focus on the environmental, social, and governance aspects. Studies show that the most effective ESG principle is the common principle, followed by social and environmental principles, with governance principles having less significance (Kartal *et al.*, 2024a; Kartal *et al.*, 2024b; Schmuck, 2021). Additionally, the integration of ESG principles into strategic management is crucial for respective types of companies, emphasizing the importance of including ESG principles in development strategies to align with global transitions towards green economies (Ostrovskay *et al.*, 2023) Furthermore, the study on ESG disclosures and corporate governance highlights the contributions of ESG principles on ESG scores, suggesting that companies should prioritize highly important ESG principles and consider the moderating role of corporate governance on the link between ESG scores and disclosures (e.g. Mostova *et al.*, 2023; Escrig-Olmedo, 2019). Incorporating ESG principles in food safety practices involve prioritizing key ESG principles, integrating them into strategic management, and also considering the influence of corporate governance.

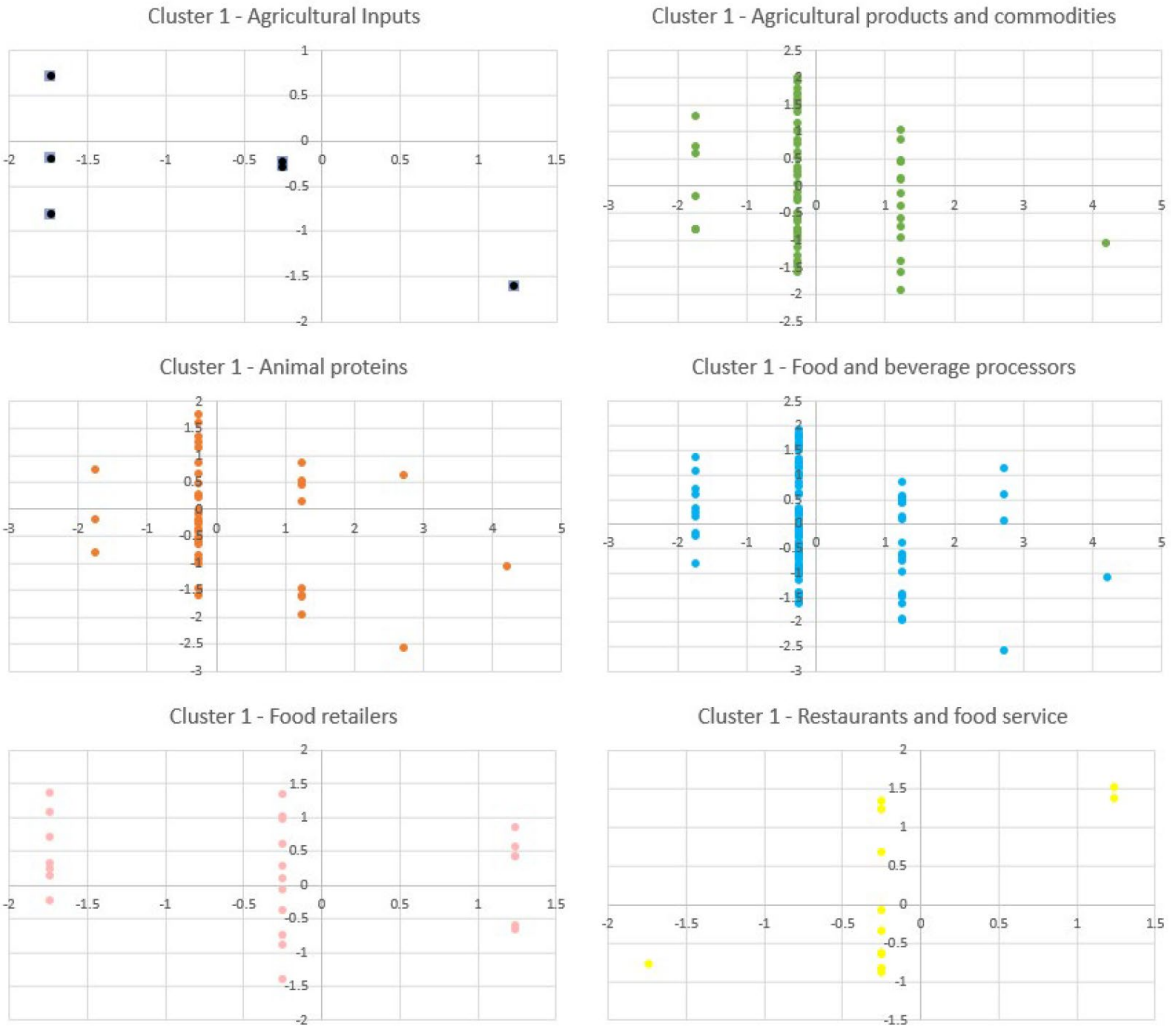


*Fig. 2: Resulting cluster 1 breakdown into industry branches*
Source: own work using data of World Benchmarking Aliance (©2021)

*Tab. II: Descriptive statistics of resulting cluster 2*

| Item\Industry | Agricultural inputs | Agricultural products and commodities | Animal proteins | Food and beverage processors | Food retailers | Restaurants and food service |
|---|---|---|---|---|---|---|
| Observations | 10 | 46 | 38 | 75 | 20 | 8 |
| Partial criterion „Food Safety“ std. variation | 0.75 | 1.05 | 1.11 | 0.92 | 0.50 | 0.78 |
| ESG total score std. variation | 0.85 | 0.85 | 0.83 | 1.04 | 1.24 | 1.35 |

Source: own work using data of World Benchmarking Aliance (©2021)

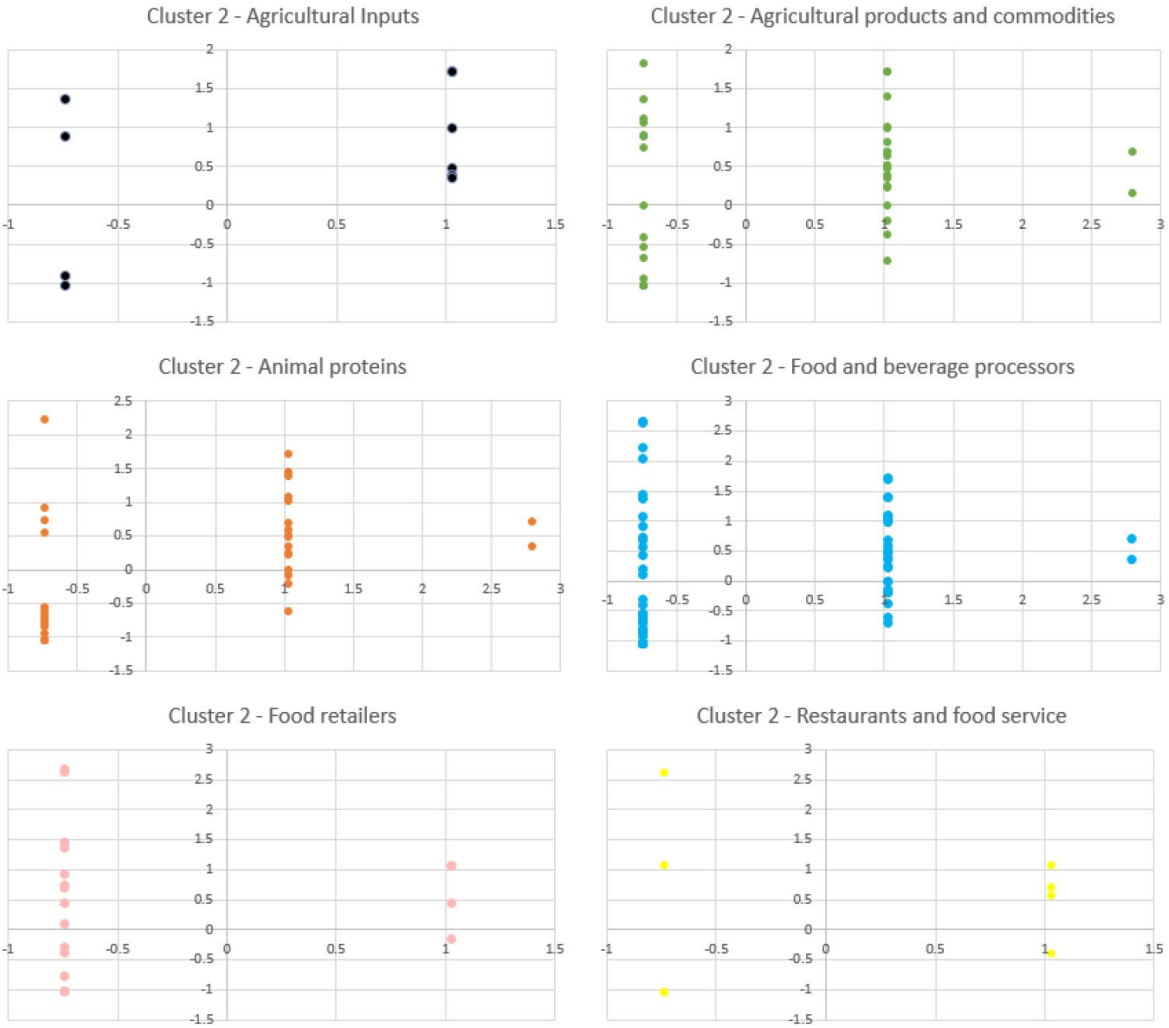


*Fig. 3: Resulting cluster 2 breakdown into industry branches*
Source: own work using data of World Benchmarking Aliance (©2021)

*Tab. III: Descriptive statistics of resulting cluster 3*

| Item\Industry | Agricultural inputs | Agricultural products and commodities | Animal proteins | Food and beverage processors | Food retailers | Restaurants and food service |
|---|---|---|---|---|---|---|
| Observations | 5 | 26 | 12 | 60 | 18 | 4 |
| Partial criterion „Food Safety“ std. variation | 1.52 | 1.33 | 1.02 | 0.89 | 0.25 | 0.21 |
| ESG total score std. variation | 0.53 | 0.45 | 0.59 | 1.05 | 0.42 | 0.23 |

Source: own work using data of World Benchmarking Aliance (©2021)

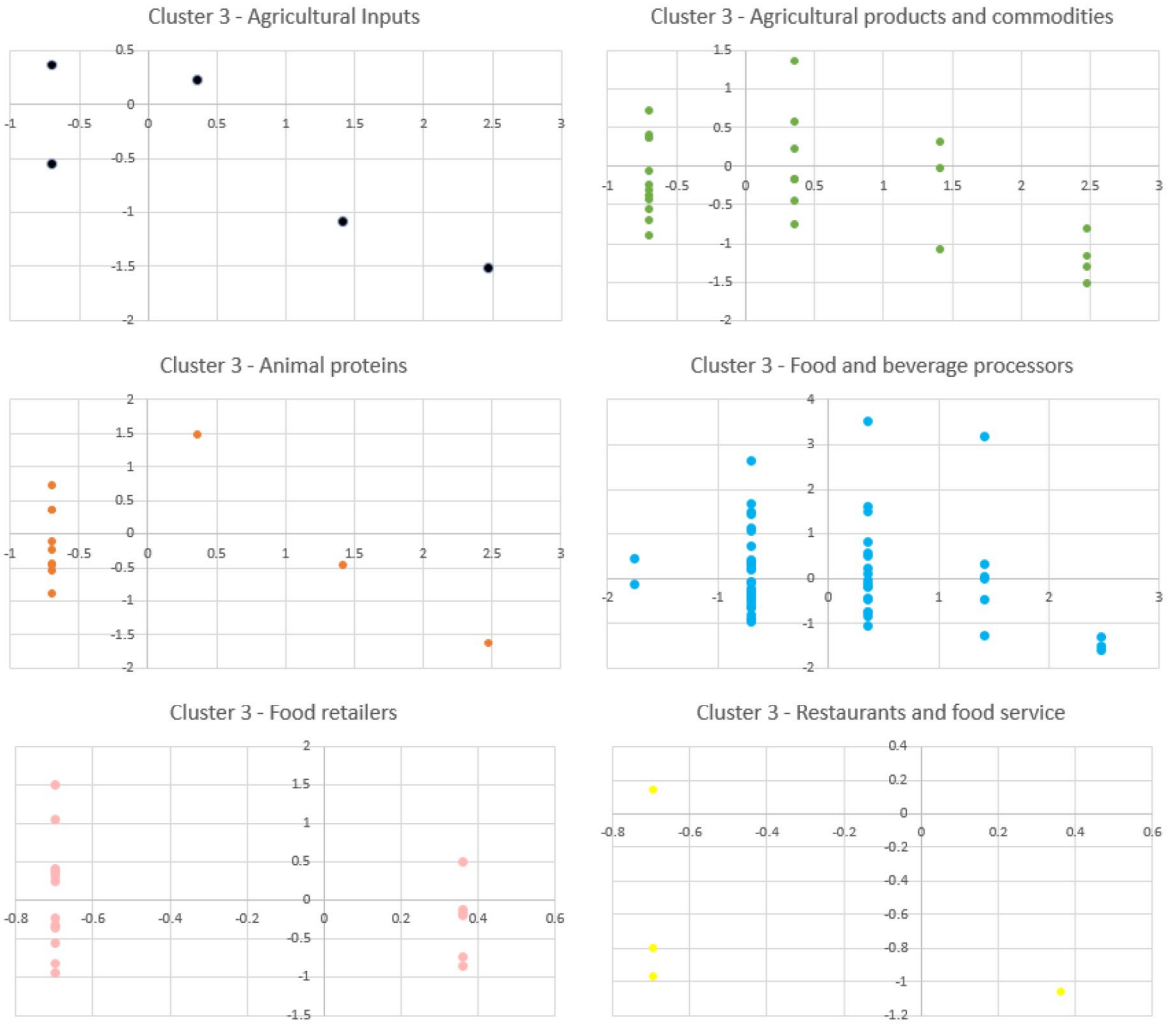


*Fig. 4: Resulting cluster 3 breakdown into industry branches*
Source: own work using data of World Benchmarking Aliance (©2021)

## Conclusion

Relationships between "Environmental", "Social" and "Governance" attributes on food safety level has been identified within the sample of businesses provided by the World Benchmarking Aliance (©2021). Nevertheless, the difference were observed within the respective industries. The outstanding one is the Food and Beverage processing industry that is represented by both best performances in food safety and on the other hand with the worst one. Further research has to be focused also on the corporate financial performance background and the respective related attributes.

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