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DETERMINANTS OF SUSTAINABLE DEVELOPMENT OF INDUSTRIAL ENTERPRISES IN POLAND IN THE PERIOD FROM 2010 TO 2019 – A STATISTICAL EVALUATION

DETERMINANTY ZRÓWNOWAŻONEGO ROZWOJU PRZEDSIĘBIORSTW PRZEMYSŁOWYCH W POLSCE W LATACH 2010-2019 − OCENA STATYSTYCZNA

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Summary: The main aim of this paper is to assess the impact of internal and external determinants for the sustainable development of industrial enterprises in Poland in the period from 2010 to 2019. The sustainable development of enterprises means the development in economic, social and ecological spheres. Its level depends on a number of external factors, which, for the needs of the study, have been identified with the quantitative socio-economic development of the country, and internal factors, which have been limited to assessing the financial situation. The first part of this paper presents the basic theoretical issues related to sustainable development and its determinants. The second, main part presents the results of the study, which show that both internal and external factors affect the sustainable development of enterprises. In the vast majority of cases, macroeconomic factors have a greater impact.

Keywords: sustainable development of the enterprises, determinants of the development.

Streszczenie: Podstawowym celem artykułu jest ocena wpływu determinant wewnętrznych i zewnętrznych na zrównoważony rozwój polskich przedsiębiorstw przemysłowych w latach 2010-2019. Zrównoważony rozwój przedsiębiorstw oznacza rozwój w trzech sferach: ekonomicznej, społecznej i ekologicznej. Jego poziom uzależniony jest od czynników, zewnętrznych, które na potrzeby badania utożsamiono z ilościowym rozwojem społeczno-gospodar-

czym kraju, oraz czynników wewnętrznych, które ograniczono do oceny sytuacji finansowej. W artykule zaprezentowano podstawowe zagadnienia teoretyczne związane ze zrównoważonym rozwojem i jego determinantami. Przedstawiono także wyniki badania, które pozwalają stwierdzić, że czynniki zarówno wewnętrzne, jak i zewnętrzne mają wpływ na zrównoważony rozwój przedsiębiorstw. Przy tym w większości przypadków wyższy wpływ mają czynniki makroekonomiczne.

Słowa kluczowe: zrównoważony rozwój przedsiębiorstw, determinanty rozwoju.

1. Introduction

The traditional business paradigm based on profit maximization has been replaced by the idea of sustainable development. Sustainable development is a way of doing business that takes into account the implementation of economic, social and environmental goals. The basis of the concept of sustainable development is the natural environment, economics is a tool, while the primary goal is the well-being of society. Sustainable development is one of the main problems and challenges for modern enterprises. The growing importance of social issues and environmental protection is a consequence of the increase in public awareness of the negative impact of economic activities on society, the environment and the limited natural resources.

The activities of enterprises for sustainable development are determined by two groups of factors, internal and external. External development conditions include the level of socio-economic development of the country, regulations on environmental protection, and the level of external support for ecological initiatives. The basic internal conditions are the financial and property situation of the business and the ecological awareness of managers and employees.

This paper is both theoretical and empirical. The theoretical part describes selected problems of sustainable development and its determinants. The main part of this paper contains the results of the conducted research. The main hypothesis was formulated as follows: "Internal determinants are key to the sustainable development of industrial enterprises in Poland in the period from 2010 to 2019". The authors estimated the statistical relationship between the synthetic indicators using the Ordinary Least Squares Method.

2. Sustainable development of the enterprise and its determinants − selected theoretical problems

Enterprise development is a necessary process in order to survive and continue functioning on the market. It leads to changes in the level and structure of company components. Sustainable development is one of the key trends in the functioning of modern organizations. The new approach to business management is the result of increased awareness about the negative impact of economic activity on the environment.

The term "sustainable development" has several meanings, is flexible and open to interpretation (Barbosa, Drach, and Corbella, 2014; Blewitt, 2008; Ciegis and Zeleniute, 2008; Gadomska-Lila and Wasilewicz, 2016; Gatto, 1995; Kowalska and Misztal, 2019; Paehlke, 2005). The most popular definition of sustainable development was presented in 1987 by the Brundtland Commission in its report, called "Our Common Future". According to the Report, it is "a development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (United Nations, 1987, p. 43). Most researchers emphasize that this is a way of managing that will enable future generations to carry out tasks and live at the same level as today (Ciegis and Zeleniute, 2008; Dernbach, 2003; Emas, 2015; Klarin, 2018, pp. 68-69; Poskrobko, 2008; Sterling, 2010; Stoddart, 2011; Vare and Scott, 2007; Weidinger, 2014). Examples definitions of the term "sustainable development" are presented below:

- "implies a conceptual socio-economic system which ensures the sustainability of goals in the form of real income achievement and improvement of educational standards, health care and the overall quality of life" (Pearce and Turner, 1990);
- "a social construction derived from the long-term evolution of a highly complex system – human population and economic development integrated into ecosystems and biochemical processes of the Earth" (Meadows, 1998);
- "process of changes, where resources are raised, the direction of investments is determined, the development of technology is focused and the work of different institutions is harmonized, thus the potential for achieving human needs and desires is increased as well" (Vare and Scott, 2007);
- "sustainable development gives a possibility of time unlimited interaction between society, ecosystems and other living systems without impoverishing the key resources" (Marin, Dorobanțu, Codreanu, and Mihaela, 2012);
- "a process which involves human's intelligence, decision making efficiency, planning and management skills, power of imagination, entrepreneurship, development and production with environmental safety etc. Usually, sustainable development is a human subject" (Sagar, 2018, p. 161).

Sustainable development has three dimensions: economic, social and environmental. The implementation of the concept of sustainable development is associated with the following issues: maximization of net profit, effective asset management, appropriate choice of financing sources, the development of employees and local communities, and taking actions to limit the negative impact of activities on the natural environment (Ciegis and Zeleniute, 2008; Duran, Gogan, Artene, and Duran, 2015; Misztal, 2018; Piontek, 2010).

An enterprise on the path of sustainable development should consider the natural environment and the social issues in all its activities (Grudzewski, Hejduk, Sankowska, and Wańtuchowicz, 2010; Marszałek and Kuna-Marszałek, 2011, p. 296). The ecological development of the enterprise can be achieved using a reactive or preventive approach. The first relates to the elimination or minimization of pollution

and waste, while the second refers to the taking of active measures to introduce eco-innovation, low-carbon production, and the production of environmentally friendly products (Kaczmarek, 2011, p. 508).

The company's sustainable development depends on a number of factors that can be divided into two main groups (Jabłoński, 2010; Kowalska and Misztal, 2019, pp. 24-30; Misztal, 2018):

- external, such as the level of socio-economic development, environmental policy, environmental awareness of consumers, financial support for pro-ecological solution;
- internal, related to the financial situation, property status, environmental awareness, business model and strategy.

A good socio-economic situation may have a positive impact on the functioning of enterprises. Friendly legal regulations, a liberal tax system and financial support are very important for the sustainable development of enterprises. It should be emphasized that previous research carried out in the enterprise sector indicated that internal factors are crucial for undertaking green investments. The implementation of ecological investments largely depends on the financial and property situation of the enterprise. From this point of view, having financial security is fundamental.

One of the key challenges for assessing the sustainable development of enterprises is the limited access to data. Only a small percentage of enterprises (mainly large enterprises) report the impact of their activities on society and the environment (for example CSR reports). The comprehensive data is prepared in accordance with GRI guidelines. The Global Reporting Initiative (GRI) is an international reporting template for responsible business and sustainable development for companies. Data on the economic, social and environmental performance of enterprises is also collected by Eurostat, OECD and Central Statistical Offices (CSO) in countries.

In the literature on the subject, there are a number of measures and indicators that enable to assess the level of sustainable development. Most research concerns the macro level, the analysis focus on the sustainable development of countries and regions (Hongfang, Zheng, Xinfeng and Shaolin, 2003, pp. 1363-1368; Tarabusi and Palazzi, 2004, pp. 185-186; Roszkowska and Filipowicz-Chomko, 2016, pp. 94-118). The issue of sustainable development at the microeconomic level is hardly recognized, and mainly concerns the sustainable development of enterprises. Research is devoted to an analytical technique to model and assess sustainable development index in enterprises, the importance of innovation for sustainable development, and the link between economic, social and environmental development indicators (Dvořáková and Zborková, 2014, pp. 686-695; Garbie, 2014, pp. 4876--4915; Shao, 2009, pp. 143-146).

The components of sustainable development are closely related and dependent on each other. The research results indicate that economic issues are key to the sustainable development of enterprises. The financial and asset situation, according to most researchers, has a fundamental importance for undertaking actions for social

and environmental development (Eslami, Dassisti, Lezoche, and Panetto, 2018, pp. 5194-5214; Latoszek, Proczek, and Krukowska, 2016, pp. 7-11; Trojanowski, 2015, pp. 239-244).

3. The research methodology

The main aim of this paper is to assess the impact of internal and external determinants for the sustainable development of industrial enterprises in Poland in the period from 2010 to 2019. Data for the study are taken from CSO and Eurostat. The research hypothesis is formulated as follows: "Internal determinants are key to the sustainable development of industrial enterprises in Poland in the period from 2010 to 2019".

For the purposes of the study, the authors formulate a synthetic macroeconomic indicator of the economy of Poland (SI_{makro}), a synthetic indicator of the financial situation of industrial enterprises in Poland (SI_{afs}), and a synthetic indicator of the sustainable development of industrial enterprises in Poland (SI_{sd}). Synthetic indicators are selected in terms of availability, comparability as to the research time period and divided into stimulants and destimulants.

The normalization of analytical indicators are made on the basis of the following formulas:

- stimulants:

$$S_{ij} = \frac{x_{ij}}{max\, x_{ij}},$$

where: x_{ij} – value of the *i-th* measure for the *j-th* year, $max\ x_{ij}$ – maximum value of the *i-th* measure for the *j-th* year;

- destimulants:

$$S_{ij} = \frac{min\, x_{ij}}{x_{ij}},$$

where: *min xij* – minimum value of the *i-th* measure for the *j-th* year.

Synthetic indicators are created based on the formula:

$$S_j = \frac{1}{n}\sum_{i=1}^{n} S_{ij},$$

where: S_j – aggregate metric for *j*-th year, n – number of indicators used in the model.

The synthetic macroeconomic indicator of the economy of Poland is developed using the following analytical indicators:

- stimulants: average life expectancy (year), number of live births, average monthly disposable income per person in the household (PLN), number of flats completed, density of expressways and motorways per 1000 km² (km), number of

broadband connections per 100 inhabitants, the percentage of households with broadband Internet access at home (percentage), the number of doctors (with the right to practice a medical profession) per 10000 population, the number of university graduates, expenditure on R&D (mill. PLN), number of beds in general hospitals, sold production of industry (mill. PLN), exports (mill. PLN), number of SMEs per 10000 inhabitants, gross fixed capital formation (mill. PLN), GDP (mill. PLN);

- destimulants: total greenhouse gas emissions (ton), the unemployed (thous.), average monthly expenses per person in a household (PLN), HICP (percentage), imports (mill. PLN).

The synthetic indicator of the financial situation of industrial enterprises in Poland is developed based on the formula:

$$SI_{afs} = SI_{fl} + SI_p + SI_e + SI_d + SI_{ofs},$$

where: SI_{fl} − synthetic financial liquidity indicator, SI_p − synthetic profitability indicator, SI_e − synthetic performance (effectiveness) indicator, SI_d − synthetic debt indicator, SI_{ofs} − synthetic indicator of the overall financial situation.

The components of the synthetic indicator of the financial situation of an enterprise − analytical indicators are presented in Table 1.

Table 1. Analytical indicators of enterprise assets − financial situation

Analytical indicators of the enterprise assets and financial situation	Indicator pattern	Stimulants	Destimulants
1	2	3	4
Financial liquidity indicators			
Current financial liquidity (III degree liquidity)	total current assets / current liabilities	x	
Quick liquidity (II degree liquidity)	(total current assets inventories – prepayments) / current liabilities	x	
Profitability indicators			
Return on sales (ROS)	net profit / sales revenues ·100%	x	
Return on assets (ROA)	net profit / total assets ·100%	x	
Return on equity (ROE)	net profit / equity · 100%	x	
Performance (effectiveness) indicators			
Inventory rotation in days (inventory cycle)	(inventory / sales revenues) · number of days in the period		x
Receivables rotation in days (receivables cycle)	(total short-term receivables / sales revenues) · number of days in the period		x
Payables turnover in days (payables cycle)	(current liabilities / sales revenues) · number of days in the period	x	

Table 1, cont.

1	2	3	4
Operating cycle in days	inventory cycle in days – receivables cycle in days		x
Total assets turnover	sales revenues / total assets	x	
Level of operating costs	operating expenses / sales revenues		x
Debt and debt service indicators			
Share of equity in financing assets (self-financing)	equity / total assets · 100%	x	
General debt	foreign capitals (group B) / total assets · 100%		x
Debt to equity – financial leverage	foreign capitals (group B) / equity · 100%		x
Long-term debt	long-term liabilities / equity ·100%		x
Coverage of liabilities with tangible fixed assets	tangible fixed assets / long-term liabilities · 100%	x	
Indicators of overall financial situation			
Asset structure	fixed assets / current assets	x	
Overall financial situation of the enterprise	capital structure indicator / asset structure indicator	x	

Source: own study based on CSO data.

The synthetic indicator of the sustainable development of industrial enterprises in Poland is created based on the sum of synthetic indicators relating to the components of the sustainable development of an enterprise:

$$SI_{sd} = SI_{eco} + SI_{soc} + SI_{env},$$

where: SI_{eco} − synthetic indicator of the economic development of the enterprise, SI_{soc} − synthetic indicator of the social development of the enterprise, SI_{env} − synthetic indicator of the environmental development of the enterprise.

The components of the synthetic indicator of the sustainable development of an enterprise is are developed using the following analytical indicators:

- synthetic indicator of the economic development of the enterprise − stimulants: revenues from total activity (thou. PLN), current assets (thou. PLN), short-term investments (thou. PLN), gross financial result (thou. PLN), production value (thou. PLN), added value (thou. PLN), destimulant: short-term liabilities (thou. PLN);
- synthetic indicator of the social development of the enterprise − stimulants: average monthly salary (PLN), number of employees, number of women employed in relation to the number of men employed, destimulant: victims of accidents at work;

- synthetic indicator of the environmental development of the enterprise – destimulants: carbon dioxide emissions (ton), methane emissions (ton), nitrous oxide emissions (ton), hydrofluorocarbon emissions (ton), sulfur oxide emissions (ton), ammonia emissions (ton).

An econometric model is constructed to determine the relationship between the analyzed synthetic indicators. The analysis is carried out using the Ordinary Least Squares Method. The linear regression model took the following form:

$$Y = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \varepsilon,$$

where: Y − explained variable (synthetic indicator of the sustainable development of industrial enterprises in Poland), X_1 − explanatory variable (synthetic indicator of the financial situation of industrial enterprises in Poland), X_2 − explanatory variable (synthetic macroeconomic indicator of the economy of Poland), $\alpha_0, \alpha_1, \alpha_2$ > model parameters, ε − random component.

4. The research results

The analysis covered the sections: B − Mining and quarrying, C − Manufacturing, D − Electricity, gas, steam and air conditioning supply, E − Water supply; sewerage, waste management and remediation activities. The share of industrial enterprises (total) in economic entities in the analyzed time period did not exceed 11%. The basic group among industrial enterprises are Manufacturing enterprises, numbering about 94% of the analyzed population (Table 2).

Table 2. Number of industrial enterprises in Poland in the period from 2010 to 2017

PKD 2007	Year							
	2010	2011	2012	2013	2014	2015	2016	2017
Mining	1 789	2 013	1 945	1 658	1 840	2 002	2 048	2 121
Manufacturing	176 390	179 155	174 754	174 462	180 506	187 247	195 411	197 880
Electricity	2 068	2 506	2 730	2 552	2 543	3 134	3 652	4 271
Water supply [..]	5 765	6 303	6 794	6 691	7 057	7 432	7 361	7 714
Industry	**360 334**	**366 626**	**358 247**	**357 273**	**369 909**	**383 928**	**400 231**	**405 595**
Total enterprises	1 726 663	1 784 603	1 794 943	1 771 460	1 842 589	1 914 141	2 013 364	2 077 027

Source: own study based on CSO data.

Based on selected analytical indicators relating to the macroeconomic situation, a synthetic macroeconomic indicator of the economy of Poland in the period from 2010 to 2019 is created (Table 3). In the analyzed time period, the average value and median of the synthetic macroeconomic indicator of the economy of Poland amounted to 0.90, while the minimum and maximum values – 0.80, 0.99. The

synthetic macroeconomic indicator of the economy of Poland is characterized by a positive upward trend. The trend line took the form:

$$y = 0.0206x + 0.786, R^2 = 0.9891.$$

Table 3. Synthetic macroeconomic indicator of the economy of Poland in the period from 2010 to 2019

Country	Year										Descriptive statistics			
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Max	Min	Mean	Median
Poland	0.80	0.83	0.86	0.86	0.89	0.91	0.92	0.96	0.97	0.99	0.99	0.80	0.90	0.90

Source: own study based on CSO data.

A synthetic indicator of the financial situation of industrial enterprises in Poland in the period from 2010 to 2019 is presented in Table 4. Among individual industry sections in Poland, the highest median and average value of the synthetic indicator of the financial situation is recorded in the enterprises of the Manufacturing section – 0.94, while the lowest median and average value of the indicator is observed in the enterprises of the Mining and quarrying section – 0.52, 0.51.

In the analyzed time period, the average value and median of the synthetic indicator of the financial situation of industrial enterprises in Poland (total) 0.80 and 0.79, while the maximum and minimum value – 0.76, 0.87. The synthetic indicator of the asset-financial situation of industrial enterprises (total) is characterized by a negative trend. The trend line took the form:

$$y = –0.0091x + 0.8472, R^2 = 0.5008.$$

Table 4. The synthetic indicator of the financial situation of industrial enterprises in Poland in the period from 2010 to 2019

PKD 2007	Year										Descriptive statistics			
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Max	Min	Mean	Median
Mining	0.71	0.93	0.63	0.54	0.47	0.35	0.40	0.55	0.32	0.27	0.93	0.27	0.52	0.51
Manufacturing	0.91	0.89	0.91	0.93	0.92	0.95	0.96	0.96	0.97	0.98	0.98	0.89	0.94	0.94
Electricity	0.88	0.80	0.80	0.83	0.80	0.83	0.84	0.83	0.88	0.89	0.89	0.80	0.84	0.83
Water supply	0.91	0.86	0.86	0.91	0.86	0.89	0.93	0.91	0.91	0.92	0.93	0.86	0.90	0.91
Industry	**0.85**	**0.87**	**0.80**	**0.80**	**0.76**	**0.76**	**0.78**	**0.81**	**0.77**	**0.76**	**0.87**	**0.76**	**0.80**	**0.79**

Source: own study based on CSO and Eurostat data.

A synthetic indicator of the sustainable development of industrial enterprises in Poland in the period from 2010 to 2019 with the basic descriptive statistics are presented in Table 5. Among individual industry sections in Poland, the highest median and average value of the synthetic indicator of sustainable development

of enterprises is recorded in the enterprises of the Manufacturing section – 0.91, 0.90, while the lowest median and average value of the indicator is observed in the enterprises of the Mining and quarrying section – 0.80, 0.81.

Table 5. Synthetic indicator of sustainable development of industrial enterprises in Poland in the period from 2010 to 2019

PKD 2007	Year										Descriptive statistics			
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Max	Min	Mean	Median
Mining	0.81	0.89	0.83	0.82	0.81	0.73	0.77	0.83	0.77	0.76	0.89	0.73	0.80	0.81
Manufacturing	0.84	0.84	0.85	0.88	0.89	0.91	0.94	0.96	0.97	0.99	0.99	0.84	0.91	0.90
Electricity	0.86	0.84	0.84	0.86	0.88	0.89	0.90	0.92	0.92	0.93	0.93	0.84	0.88	0.89
Water supply	0.84	0.83	0.83	0.85	0.86	0.87	0.89	0.90	0.90	0.91	0.91	0.83	0.87	0.87
Industry	**0.84**	**0.85**	**0.84**	**0.85**	**0.86**	**0.85**	**0.88**	**0.90**	**0.89**	**0.90**	**0.90**	**0.84**	**0.87**	**0.86**

Source: own study based on CSO and Eurostat data.

In the analyzed period of time, the average value and median of the synthetic indicator of sustainable development of industrial enterprises in Poland (total) – 0.87 and 0.86, while the maximum and minimum value – 0.84, 0.90. The synthetic indicator of sustainable development of industrial enterprises (total) is characterized by a positive upward trend. The trend line took the form:

$$y = 0.0073x + 0.826, R^2 = 0.8328.$$

The analysis of the impact of the financial situation of industrial enterprises and the macroeconomic situation of the economy of Poland on the sustainable development of industrial enterprises in the period from 2010 to 2019 is carried out using the Ordinary Least Squares Method (Table 6).

In Poland, individual industry sections and industry (total) are characterized by a statistically significant, positive impact of the financial situation and the macroeconomic situation of the economy of Poland on the sustainable development of enterprises. In all analyzed sections and in industry (total), the coefficients before the variable x are positive, which means that the increase in the level of the synthetic indicator of the asset-financial situation of industrial enterprises and the macroeconomic situation of the economy of Poland will increase the synthetic indicator of the sustainable development of industrial enterprises.

In sections: B − Mining and quarrying, D − Electricity, gas, steam and air conditioning supply and E − Water supply; sewerage, waste management and remediation, the higher impact of the macroeconomic situation of the economy of Poland than in the asset-financial situation of industrial enterprises on the sustainable development of industrial enterprises in Poland, is observed (the highest impact is in section D − Electricity, gas, steam and air conditioning supply). In section C − Manufacturing, higher impact of the asset-financial situation of industrial enterprises

in Poland than in the macroeconomic situation of the economy of Poland on the sustainable development of industrial enterprises in Poland, is observed. The reason for this situation may be the fact that the enterprises from sections B, D and E are subject to special state regulations.

Table 6. The results of the Ordinary Least Squares Method

Dependent variable (SI_{sde})	OLS	Coefficient	SD	*P*- value	R^2
Mining	constant	0.355	0.172	0.0777*	0.877
	SImacro	0.333	0.166	0.0849*	
	SIfs	0.287	0.052	0.0008***	
Manufacturing	constant	−0.282	0.142	0.0872*	0.983
	SImacro	0.518	0.126	0.0046***	
	SIfs	0.771	0.258	0.0205**	
Electricity	constant	0.278	0.858	0.0143**	0.926
	SImacro	0.440	0.061	0.0002***	
	SIfs	0.251	0.112	0.0594*	
Water supply	constant	0.196	0.073	0.0311**	0.968
	SImacro	0.412	0.039	1.53e-05***	
	SIfs	0.337	0.092	0.0082***	
Industry	constant	0.179	0.096	0.1033	0.948
	SImacro	0.491	0.047	1.69e-05***	
	SIfs	0.307	0.077	0.0051***	

Source: own study based on CSO and Eurostat data.

Taking into account the industrial enterprises in Poland (total), the linear regression model took the following form:

$$SI_{sd} = 0.179 + 0.307\ SI_{afs} + 0.491_{SImakro}$$

An increase in the synthetic macroeconomic indicator of the economy of Poland by 1, will increase the synthetic indicator of the sustainable development of industrial enterprises in Poland by 0.491, while an increase in the synthetic indicator of the asset-financial situation of industrial enterprises in Poland by 1, will increase the synthetic indicator of the sustainable development of industrial enterprises in Poland by 0.307, $R^2 = 0.948$ − variable variability explained is explained in 95%. In industrial enterprises (total) one can observe a higher impact of the macroeconomic situation of the economy in Poland than in the asset-financial situation of industrial enterprises on the sustainable development of industrial enterprises in Poland.

The research does not allow for the unequivocal acceptance of the research hypothesis set out at the beginning of the study: "Internal determinants are key to

the sustainable development of industrial enterprises in Poland in the period from 2010 to 2019". With the proposed construction of synthetic indicators, all individual industry sections and industry (total) are characterized by a statistically significant, positive impact of the financial situation of industrial enterprises as well as the macroeconomic situation of the economy of Poland on sustainable development of industrial enterprises in the period from 2010 to 2019. However, the obtained results indicate that in the research time period, in Poland virtually in all the individual industry sections and industry (total), there is a higher impact of the macroeconomic situation of the economy in Poland than of the financial situation of industrial enterprises on the sustainable development of industrial enterprises is observed (except for C sector enterprises).

5. Conclusions

The implementation of the concept of sustainable development at enterprise level is associated with the simultaneous implementation of economic, social and environmental goals. The development of business entities is complicated and comprehensive, depending on several exogenous and endogenous factors. The financial situation of the enterprise and the macroeconomic situation of the economy are of decisive importance for the functioning of economic entities. According to the results of the study, it can be concluded that all individual industry sections and industry (total) are characterized by the statistically significant, positive impact of the financial situation of industrial enterprises in Poland as well as the macroeconomic situation of the Polish economy on the sustainable development of industrial enterprises from 2010 to 2019. In the analyzed period, virtually in all individual industry sections and industry (total), a higher impact of the macroeconomic situation of the economy of Poland, than the financial situation of industrial enterprises on the sustainable development of industrial enterprises in Poland, is observed, except in enterprises from the C − Manufacturing sector. The main hypothesis must be rejected and the appropriate conclusion is that the macroeconomic conditions are more significant than the financial situation for the sustainability of the industrial enterprises in Poland in the period from 2010 to 2019. The justification for such results may be the fact that the analysis is at the level of the sector and not of a single enterprise. Further research will be devoted to indicating the determinants of the sustainable development of enterprises in the European Union.

References

Barbosa, G. S., Drach, P. R., and Corbella, O. D. A. (2014). Conceptual Review of the Terms Sustainable Development and Sustainability. *International Journal of Social Sciences*, *3*(2), 1-15.

Blewitt, J. (2008). *Understanding sustainable development.* London: Earthscan.

Ciegis, R. (2009). The concept of sustainable development and its use for sustainability scenarios. *Inzinerine Ekonomika − Engineering Economics*, *20*(2), 28-37.

Ciegis, R., and Zeleniute, R. (2008). Ekonomikos plėtra darnaus vystymosi aspektu. *Taikomoji Ekonomika: Sisteminiaityrimai*, *2*(1).

Dernbach, J. C. (2003). Achieving sustainable development: The centrality and multiple facets of integrated decision making. *Indiana Journal of Global Legal Studies*, 10(1), 247-285.

Duran, C. D., Gogan, L. M., Artene, A., and Duran, V. (2015). The components of sustainable development − a possible approach. *Procedia Economics and Finance*, (26), 806-811.

Dvořáková, L., and Zborková, J. (2014). Integration of sustainable development at enterprise level. *Procedia Engineering*, 69, 686-695.

Emas, R. (2015). *The concept of sustainable development: Definition and defining principles* (Brief for GSDR).

Eslami, Y., Dassisti M., Lezoche M., and Paneto, H. (2018). A survey on sustainability in manufacturing organisations: Dimensions and future insights. *International Journal of Production Research*, (57), 5194-5214.

Gadomska-Lila, K., and Wasilewicz, J. (2016). Zrównoważony rozwój i społeczna odpowiedzialność z perspektywy biznesowej, *Studia i Prace WNEIZ US*, (46), 299-309.

Garbie, I. H. (2014). An analytical technique to model and assess sustainable development index in manufacturing enterprises. *International Journal of Production Research*, (52), 4876-4915.

Gatto, M. (1995). Sustainability: Is it a well defined concept?, *Ecological Applications*, *5*(4).

Grudzewski, W. M., Hejduk, I. K., Sankowska, A., and Wańtuchowicz, M. (2010). *Sustainability w biznesie czyli przedsiębiorstwo przyszłości, zmiany paradygmatów i koncepcji zarządzania*. Poltext: Warszawa.

Hongfang, L., Zheng Y., Xinfeng, Z., and Shaolin, P. (2003). A new energy index for urban sustainable development. *Acta Ecologica Sinica*, *23*(7), 1363-1368.

Jabłoński, A. (2010). Zrównoważony rozwój a zrównoważony biznes w budowie wartości przedsiębiorstw odpowiedzialnych społecznie. *Zeszyty Naukowe Wyższej Szkoły Humanitas. Zarządzanie*, (2).

Kaczmarek, B., (2011). Formułowanie polityki i strategii ekologicznego rozwoju przedsiębiorstwa − zarys problematyki. *Budownictwo i Inżynieria Środowiska*, (2), 507-510.

Klarin, T. (2018). The Concept of Sustainable Development: From its Beginning to the Contemporary Issues. *Zagreb International Review of Economics & Business*, *21*(1), 67-94.

Kowalska, M., and Misztal, A. (2019). *Rozwój ekologiczny przedsiębiorstwa*. Łódź: Wydawnictwo Uniwersytetu Łódzkiego.

Latoszek, E., Proczek M., and Krukowska, M. (2016). *Zrównoważony rozwój a globalne dobra publiczne w teorii i praktyce organizacji międzynarodowych*. Wydawnictwo Szkoły Głównej Handlowej w Warszawie, Warszawa.

Lele, S. M. (1991). Sustainable development: A critical review. *World Development*, (19), 607-621.

Marin, C., Dorobanțu, R., Codreanu, D., and Mihaela, R. (2012). The fruit of collaboration between local government and private partners in the sustainable development community case study: County Valcea. *Economy Transdisciplinarity Cognition*, *15*(2), 93-98.

Marszałek, J., and Kuna-Marszałek, A. (2011). Zarządzanie środowiskowe w kontekście zrównoważonego rozwoju przedsiębiorstw. *Acta Universitatis Lodziensis. Folia Oeconomica*, (261), 293-305.

Meadows, D. H. (1998). *Indicators and information systems for sustainable development. A report to the Balaton Group 1998.* The Sustainability Institute.

Misztal, A. (2018). Zrównoważony rozwój polskich przedsiębiorstw − ewaluacja, *Handel Wewnętrzny*, *2*(373), 27-40.

Paehlke, R. (2005). Sustainability as a bridging concept. *Conservation Biology*, *19*(1), 36-38.

Pearce, D., and Turner, R. K. (1990). *Economics of Natural Resources and Environment,* New York*:* Harvester Wheatsheaf.

Piontek, B. (2010). Współczesne uwarunkowania rozwoju społeczno-gospodarczego (ujęcie systematyczne). *Problemy Ekorozwoju*, (2).

Poskrobko, B. (2009). *Zrównoważony rozwój gospodarki opartej na wiedzy*. Wydawnictwo Wyższej Szkoły Ekonomicznej w Białymstoku, Białystok.

Roszkowska, E., and Filipowicz-Chomko M. (2016). Ocena realizacji koncepcji zrównoważonego rozwoju województw Polski w zakresie rozwoju społecznego w roku 2005 oraz 2013. *Optimum. Studia Ekonomiczne*, *3*(81), 94-118.

Sagar, S. (2018). Higher education and sustainable development. *Economic Development of India*, *1*(1), 160-169.

Shao, C. (2009). Research on evaluation index system of enterprise innovation culture based on sustainable development. *Journal of Sustainable Development*, *2*(1), 143-146.

Sterling, S. (2010). Learning for resilience, or the resilient learner? Towards a necessary reconciliation in a paradigm of sustainable education. *Environmental Education Research*, 16, 511-528.

Stoddart, H. (2011). *A pocket guide to sustainable development governance.* Stakeholder Forum.

Tarabusi, E. C., and Palazzi, P. (2004). An index for sustainable development. *PSL Quarterly Review*, *57*(229), 185-206.

Trojanowski, T. (2015). Przedsiębiorstwa wobec wyzwań zrównoważonego rozwoju. *Zeszyty Naukowe Politechniki Śląskiej. Organizacja i Zarządzanie*, (1927), 239-244.

United Nations. (1978). *Report of the World Commission on Environment and Development. Our common future*.

Vare, P., and Scott, W. (2007). Learning for a change exploring the relationship between education and sustainable development. *Journal of Education for Sustainable Development*, (1), 191-198.

Weidinger, C. (2014). Business success through sustainability. *Sustainable Entrepreneurship*, 287-301.