

Sustainable Development of Transport Enterprises in Poland - Statistical Assessment

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The main purpose of this paper is to show a statistical evaluation of the sustainable development issues at the transport enterprises level. Initial considerations are devoted to the discussion of theoretical issues related to sustainable development businesses. The main part of the article is devoted to the statistical analysis of the sustainable development of Polish transport companies. The results of the study made it possible to assess that the sustainable development of transport companies in 2009-2015 takes place. This development is more rapid compared to the average development of the entire enterprise sector. The average level of the indicator of sustainable development of transport enterprises in the whole analysed period it amounted to 0.89. At the same time, it should be noted that economic development is accompanied by improvement of conditions and quality of work and reduction of negative impact on natural resources.

Keywords: sustainable development, transport enterprise.

1. INTRODUCTION

Sustainable development is now stated as a principal policy goal of many major international institutions and enterprises. It has been defined in many ways. As a rule, sustainable development is an idea for meeting economic and social development goals while at the same time sustaining the ability of natural systems to provide the natural resources for present and next generation. This concept can be considered at the macroeconomic and microeconomic level. At the microeconomic level, the implementation of sustainable development is conditioned by a proper management of enterprises and awareness of risks associated with production and consumption. At the enterprise level, sustainable development means improvement of quantitative and qualitative conditions for running a business. The goal of this paper is to present the result of the research evaluating the sustainable development of transport and storage enterprises in Poland in the years 2009-2015. The first part of the paper presents basic data on the economic, social, and environmental situation of enterprises from the transport and warehouse management section. The

second part shows the results of a statistical evaluation of the sustainable development at the level of a transport enterprise.

2. THEORETICAL CONSIDERATIONS ON SUSTAINABLE DEVELOPMENT OF ENTERPRISE

The general goal of sustainable development is “*the long-term stability of the economy and environment; this is only achievable through the integration and acknowledgement of economic, environmental, and social concerns throughout the decision making process* [Emas 2015, p. 2]”. Although the essence of the idea of sustainable development is easily understandable, the defining of sustainable development has caused strong discussions [Ciegis 2004]. The most popular definition with frequent citations has been specified by the Bruntland Commission published in its report *Our Common Future*. According to the report, sustainable development means “*the ability to make development sustainable—to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs* [United Nations General

Assembly, 1987, p. 43]”. The definition of sustainability should include the following elements: globalization, a long period of time, external effects, environmental policy and the cradle to grave approach [Radermacher 1999, pp. 339-354].

It should be noted that in different subjects sustainable development is defined differently:

- *“in economics it is development ensuring that the per capita income of future generations is not lower than that of the present generation,*
- *in sociology it is development that preserves the community, i.e. maintains close social relationships in communities,*
- *in ecology it is development that preserves the diversity of biological species, essential ecosystems, and ecological processes [Ciegis, Zeleniute 2008]”.*

Business model based on the concept of sustainable development should include integration of a objectives in three areas:

- economic objectives (economic growth, return of investment, added value, maximization of value of the company),
- environmental objectives (protecting environment, recycling, minimalization of negative impact on environmental),
- social objectives (social development, welfare, health protection, respect of human rights) [Lorenc, Sorokina 2015, p.70].

Sustainable development at the enterprise level means that the company is on path toward sustainability which is also the ultimate goal the firm seeks [Dvořáková, Zborková 2013, p. 688]. The idea of sustainable development can be promoted on the basis of social and environmental responsibility and many instruments and tools: quality management systems, IT systems, eco-innovation, management system of health and safety at work etc. Most of the present companies realize that the performance evaluation must include not only financial indicators, but also non-financial aspects of conducting a business. The success of development is dependent on implementation the principles of sustainable development into all business processes (management, clients relationships, cooperation with suppliers and local communities, planning of production, sales of products etc.).

The researchers have a different view on the issue of sustainable development of enterprises. Selected concepts are presented in Table 1.

Sustainable development is based on economic, social and environmental aspects. Innovation and modern technology of processes is also essential for successful development of every enterprise (Hilson, Murcka 2000, pp. 228-229). The most important indicators for economic sustainability are: profitability, productivity, product quality, customers satisfaction. The indicators of the social conditions include the indicator of working conditions, social security, employee satisfaction, support for community, human rights. To assess the level of impact on the natural environment, one should include the index of environmental management efficiency, pollution, use of resources, biodiversity, dangerousness, ecosystems, risk management (Grudzewski, Hejduk, Sankowska, Wańtuchowicz 2010, p. 27).

3. PURPOSE AND METHODOLOGY OF THE STUDY

In the practice of business operations, sustainable development should be a factor determining all decisions made. Sustainable development of the enterprise means improvement of the financial and property situation of the entity, while improving the conditions and quality of its employees' operations and ensuring the improvement of standards related to the protection of the natural environment (Misztal 2018). From the point of view of sustainable development, the data published by the GUS (Central Statistical Office) allows for a more comprehensive assessment of sustainable development of enterprises.

Table 1. Selected concepts on the issue of sustainable development.

The International Institute for Sustainable (1992)	For the business enterprise, sustainable development means adopting business strategies and activities that meet the needs of the enterprise and its stakeholders today while protecting, sustaining and enhancing the human and natural resources that will be needed in the future. Sustainable development is a pervasive philosophy to which every participant in the global economy (including consumers and government) must subscribe, if we are to meet today's needs without compromising the ability of future generations to meet their own.
M. Wilson (2003)	The contribution of sustainable development to corporate sustainability is twofold. First, it helps to set out the areas that companies should focus on. Second, it provides a common social goal for companies, governments, and civil society to work towards: environmental, social, and economic sustainability. The need of business to be sustainable is not subjected to discussion as developed countries have already progressed to a state at which critical question is how could organizations be transformed, leading to its contribution to sustainable development.
Porter & Kramer, (2007)	The goal of a company is to create value together with society, the value which combines the development of society with the economic development. Every company should take decisions considering the common value.
John R. McIntyre, Silvester Ivanaj, Vera Ivanaj (2009)	It is important to integrate the intangible aspect of productive resources into the concept of sustainable development and its requirements. Therefore we consider sustainable development in a wider sense to include all resource conservation and creation, both tangible and intangible [...] sustainable development as interface management, since this concept more readily allows the intangible aspects of resources to be introduced.
Grudzewski (2010)	Sustainability as the company's ability to continuously learn, adapt and develop, revitalize, reconstruct, and reorient to maintain a lasting and distinctive position in the market by offering buyers above-average value today and in the future (consistent with the paradigm of innovative growth) through organic variation constituting business models, and arising from the creation of new opportunities, objectives and responses to them, while balancing the interests of different groups.
G. Ciemleja (2010)	The sustainability of the enterprise depends on its management system and all the processes supporting sustainability of the enterprise are mutually connected, interact, and functional process of each management level is being implemented through dimensions of sustainability
The Network for Business Sustainability	Business sustainability is the inclusion of financial, environmental and social concerns in business decisions. Sustainable companies: 1) create a long-term financial value, 2) know how their actions affect the environment and actively work to reduce their impacts, 3) care about their employees, customers, and communities and work to make a positive social change, and 4) understand that these three elements are interconnected.
Subramaniam, Youndt (2005) and Ciasullo, Troisi (2011)	The ability of an organisation to create sustainable value is directly related to the intellectual (human, structural, and relational) capital, and it makes it possible to analyse such factors as reliability, credibility, satisfaction, honesty, and relationships with stakeholders.
Líliá Dvořáková, Jitka Zborková (2013)	The corporate success and performance evaluation must therefore include - in addition to standard financial indicators - relevant non-financial aspects, which actually represents the ability to link economic, environmental and social profiles and express the performance in these areas.
Szczepańska-Woszczyzna et al., (2015)	The long-term positive influence on the environment translates not only into image benefits for the company but also into financial ones. Companies are obliged to fulfil formal and legal requirements as well as to make an increased investment in human resources, environment, and relationships with stakeholders who can have a real impact on the efficiency of economic activities of these organisations and their innovation (expenditure of this kind should be regarded as an investment and a source of innovation rather than as an expense).
J. Grabara, P. Bajdor, L. Mihaescu (2015)	the definition of sustainable development is usually a set of rules for which compliance, will ensure the continued development of future generations to respect the environment. It should be emphasized that the concept of sustainable development focuses not only on the present generation, but puts a strong emphasis on future generations and their unidentified needs.
J. Elkington	The success of the company consists of just these three components. He was also the first person to propose the parallel their consideration and balancing - the so-called. Triple Bottom Line. In this perspective, the concept of sustainable development, from the point of view of enterprises, it is not only action to protect the environment by, for example reducing the level of emissions and ensure an appropriate level of security for their employees.
Schaltegger et al. (2016)	A business model for sustainability helps describing, analysing, managing, and communicating a company's sustainable value proposition to its customers, and all other stakeholders, how it creates and delivers this value, and how it captures economic value while maintaining or regenerating natural, social, and economic capital beyond its organizational boundaries
D. Oželenė (2017)	Sustainable business is a holistic approach of thinking of business which seeks to integrate consideration of the three aspects of sustainability – social, environmental and economic – in a manner that balances value created for all stakeholders including the environment and society at all levels and through all activities of the business.

Source: Porter, M. E., & Kramer, M. R. 2007; Schaltegger, S., Hansen, E., Ludeke-Freund, F. 2016; Grudzewski, W., Hejduk, I., Sankowska, A., & Wańtuchowicz, M. (2010); Szczepańska-Woszczyzna, K. 2015; Szczepańska-Woszczyzna K., Dacko-Pikiewicz, Z., & Lis, M. 2015; Szczepańska-Woszczyzna K., Kurowska-Pysz J. (2015); McIntyre J., R., Silvester Ivana S., Vera Ivanaj V. 2009; Ciemleja G. 2010; Subramaniam, M., & Youndt, M. A. 2005; Grabara J., Bajdor P., Mihaescu L. 2015. Staib 2009.

The main objective of the study is to assess the sustainable development of transport companies in 2009-2015 and its comparison against the corporate sector in Poland. The study was carried out in the following stages:

- assessment of indicators of economic, social and environmental development of transport enterprises,
- synthetic indicators of sustainable development of enterprises were determined based on the following research methodology:
 - the synthetic index of sustainable development was determined in accordance with the method of standardized sums based on the formula:

$$S_i = I_{ec} + I_{so} + I_{env}$$

- the economic indicator (I_{ec}) was created based on the following variables:
 - stimulants: x_1 - net income from total activity (PLN thousand), x_2 - gross financial result (PLN thousand), x_3 - gross turnover profitability rate (%), x_4 - production value (PLN thousand), x_5 - value added (thousand PLN)
 - destimulants: x_6 - cost level indicator from total activity (%)
- the social indicator (I_{so}) was created based on the following variables:
 - stimulants: x_7 - the average number of employees based on a contract of employment converted into full-time work (full-time), x_8 - average monthly salary (PLN),
 - destimulants: x_9 - injured in accidents at work,
- the environmental indicator (I_{env}) was created based on the following variables:
 - destimulants: x_{10} - CO2 emissions, x_{11} - emission of nitrous oxide, x_{12} - methane emission, x_{13} - hydrofluorocarbon emission, x_{14} - emission of nitric oxide, x_{15} - sulphur dioxide emission, x_{16} - ammonia emission, x_{17} - dust emission.
 - normalization of indicators was made based on the following formulas:
 - stimulants:

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

where:

x_{ij} - the value of the i -th measure for the year j ,
 $\max x_{ij}$ - the maximum value of the i -th measure for the year j

- destimulants:

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

where: $\min x_{ij}$ - the minimum value of the i -th measure for the j -th year.

- aggregated synthetic indicators were determined based on the formula:

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

where:

S_j - aggregated meter for j th year,
 n - number of indicators used in the model

The sustainable development index is based on the economic, social and environmental indicator (it is the average sum of indicators).

4. THE RESULT OF RESEARCH

There were almost 132 thousands transport enterprises active in Poland in 2009. The number of transport enterprises in 2009 was 131,959 and in 2015 – 145,955. The number of enterprises increased by almost 14 thousands between 2009 and 2015 (Graph 1).



Graph 1. Number of transport employees in Poland in 2009-2015

Source: <http://stat.gov.pl/obszary-tematyczne/podmioty-gospodarcze-wyniki-finansowe/>.

The financial and material situation of transport enterprises improved in the analysed period. Revenues from total activity increased by almost 32 million, net profit increased by 2,3 million. The cost level indicator dropped from 98.5 level to 95.7. The profitability of sales and financial liquidity of enterprises increased between 2009-2015 (Table 1).

The average number of employees based on a contract of employment as a full-time job increased by 12,411 between 2009-2015. Average salaries in transport companies also increased. The average remuneration in 2015 amounted to 3,613 PLN. Victim of accidents at work increased from 5,817 to 6,262 (Table 2).

Table 1. The financial and material situation of transport enterprises in Poland in 2009-2015.

	2009	2011	2013	2015
Revenues from total activity	73,771,855	88,450,539	96,172,139	105,669,566
Net profit	2,484,330	3,528,423	3,730,330	4,796,518
Current assets	21,841,839	25,995,317	30,555,949	35,452,392
Short-term investments	9,034,705	10,844,963	13,886,006	15,705,368
Long-term liabilities	16,126,310	22,292,138	27,399,382	36,931,841
Short-term liabilities	17,557,069	20,624,616	25,208,997	24,950,578
Cost level indicator	98.5	97.6	97	95.7
ROS	1.1	2.3	1.4	3.3
Liquidity ratio	51.5	52.6	55.1	62.9

Source: <http://stat.gov.pl/obszary-tematyczne/podmioty-gospodarcze-wyniki-finansowe/>

Table 2. The social situation of transport enterprises in Poland in 2009-2015.

	2009	2011	2013	2015
The average number of employees based on a contract of employment as a full-time job	545,319	547,574	542,388	557,730
Average monthly salary	3,003	3,224	3,452	3,613
Victims of accidents at work	5,817	6,827	6,125	6,262

Source: <http://stat.gov.pl/obszary-tematyczne/podmioty-gospodarcze-wyniki-finansowe/>

The emission of harmful substances to the environment produced by Polish transport companies in 2009-2015 generally decreased. The emission of such substances as carbon dioxide, methane, hydrofluorocarbons increased. However, it reduced the emission of such substances as nitrous oxide, methane, nitrogen oxides, sulphur dioxides and Ammonia. Taxes on transportation, energy and pollution taxes increased, while taxes on the use of raw materials decreased (Table 3).

The synthetic index of economic development in the analysed period increased from 0.66 to 1. There was also an increase in the social index from 0.94 to 0.98 and the environmental indicator from 0.91 to 0.94. The determined synthetic indicators in the transport sector are higher than average indicators for the entire enterprise sector (Table 4)

The indicator of the sustainable development of Polish transport companies in the analysed period increased from 0.827 in 2009 to 0.969 in 2015. This ratio was higher compared to the average sustainability indicator for the enterprise sector. The average level of the indicator of sustainable development of transport enterprises in the whole analysed period amounted to 0.89 (Graph 2).

Table 3. The emission of harmful substances to the environment produced by transport companies in Poland in 2009-2015 .

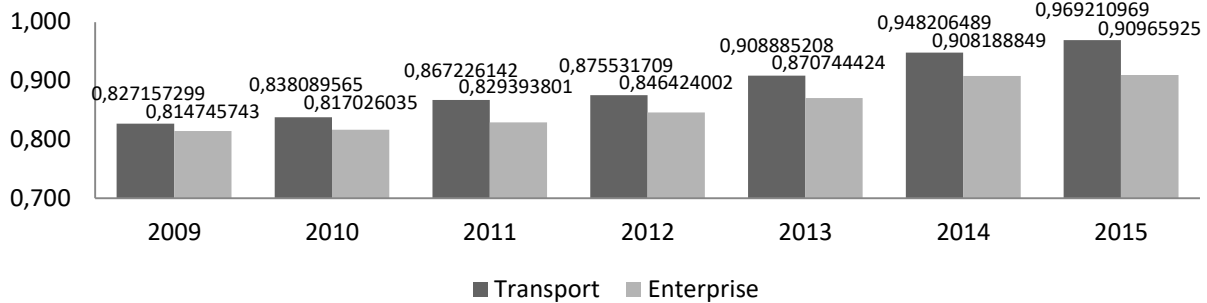
Emissions	2009	2011	2013	2015
Carbon dioxide	14,611,146	15,895,934	15,453,680	16,524,856
Nitrous oxide	680,365	711,522	654,860	631,452
Methane	5,032,423	5,502,816	5,429,103	5,787,033
Hydrofluorocarbons	323,772,283	368,099,955	352,375,508	346,810,323
Nitrogen oxides	84,617,719	82,596,974	75,989,346	76,229,613
Sulphur dioxides	1,805,382	2,005,243	1,757,012	1,543,153
Ammonia	2,783,403	2,643,731	2,370,467	2,310,967
PM10	5,475,667	5,408,583	4,811,456	4,912,355
Energy taxes	7,578.85	8,469.30	9,024.02	10,190.14
Transport taxes	353.11	436.31	477.90	467.71
Pollution taxes	324.30	370.31	151.38	337.27
Resources taxes	44.93	34.90	24.31	21.18

Source: <http://stat.gov.pl/obszary-tematyczne/srodowisko-energia/srodowisko/rachunki-ekonomiczne-srodowiska,7,2.html>

Table 4. Indicators of economic, social and environmental transport enterprise development in Poland in 2009-2015.

	Indicator	2009	2010	2011	2012	2013	2014	2015
Transport	I _{ec}	0.66	0.77	0.84	0.82	0.85	0.91	1.00
	I _{so}	0.94	0.91	0.91	0.94	0.96	0.97	0.98
	I _{env}	0.91	0.86	0.87	0.89	0.94	0.97	0.94
Enterprise	I _{ec}	0.71	0.76	0.79	0.78	0.78	0.82	0.84
	I _{so}	0.87	0.85	0.87	0.90	0.92	0.94	0.95
	I _{env}	0.84	0.81	0.81	0.84	0.89	0.93	0.90

Source: own calculations based on stat.gov.pl



Graph 2. The indicator of sustainable development of transport enterprises in Poland in 2009-2015.

Source: own calculations based on stat.gov.pl.

5. SUMMARY

Sustainable development is based on economic, social and environmental aspects. The goal of an enterprise is to create value together with society. Every enterprise should take decisions considering the common value and perspective for the natural environment. All the processes supporting sustainability of the company are connected and interact. It should be noted that sustainability at the enterprise's level is an ability to continuously learn, revitalize, reconstruct, develop and maintain position in the market. When concluding the results of the study, it should be noted that the financial and material situation of transport enterprises is improving. Enterprises have financial liquidity at 62.9, sales profitability at 3.3. The social situation in enterprises is also improving: the number of people employed and the average monthly salary increases. Although the number of people subject to accidents at work increases, it may be caused by an increase in the number of employees. The situation related to the protection of the natural environment is also improving. The emission of the majority of harmful substances emitted by transport companies is decreasing.

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