



# The Impact of Economic Equilibrium, Globalization, Human Development, and Market Competitiveness on the Sustainable Development of Manufacturing Enterprises – the Case of France, Germany, Italy and Poland

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## Abstract

The paper presents the results of an analysis of the impact of economic equilibrium, the Human Development Index, the KOF Globalization Index and the Global Competitiveness Index on the sustainable development of manufacturing enterprises and their components in France, Germany, Italy and Poland from 2008 to 2021. We use the Ordinary Least Squares (OLS) and the Seemingly Unrelated Regression methods (SUR). The results show that these external factors significantly impact an enterprise's sustainable development. Our models also show a different strength and direction of relationships between the explained and explanatory variables. Our models confirm the need to coordinate macroeconomics and environmental policy. It is important to use effective tools of economic support, and greater pressure from European Union institutions on countries that emit harmful substances is essential.

**Keywords:** sustainable development, manufacturing enterprises, macroeconomic stabilization, globalization, market competitiveness

**JEL:** E01, F18, F61, Q01



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## Introduction

Sustainable development is one of the most important trends in modern economics and politics. It presupposes the deliberate use of resources in such a way that they will be enough to build the prosperity of the current generation but also meet the needs of the future. Limiting the consumption of non-renewable resources, eliminating the processing of toxic or non-recyclable materials and, taking care of local communities' development, improving the quality of life, contribute to sustainable development.

Sustainable development requires active and effective efforts by enterprises whose role, due to their high share in pollution and impact on society, is essential to counteract climate change. Several factors impact enterprises' practical implementation of sustainable development, including social pressure (Kristjanson et al. 2014), changes in environmental protection policy (Fiorini and Hoekman 2018, pp. 1–12), the increasing level of competitiveness and customer requirements (Shiel, do Paço, and Alves 2020), macro-economic conditions (Pieloch-Babiarz, Misztal, and Kowalska 2021), and the financial situation (Zhang and Chen 2017).

The article's main aim is to assess the strength and direction of the impact of economic equilibrium (MSP), globalization (KOF), human development (HDI) and the global competitiveness index (GCI) on the sustainable development of manufacturing enterprises (SD) and their components (economic: E, social: S, environment: Env) in France, Germany, Italy and Poland. We focus on the countries with the most enterprises in this sector.

The issues discussed in the paper are important in the era of climate change and social and geopolitical transformations. Identifying the factors that are fundamental to enterprises' sustainable development is crucial in terms of economic practice and the development of scientific theory.

Previous research shows that the strength and directions of the influence of the socio-economic factors on sustainable development are different. Analyses indicate a positive relationship between economic equilibrium and the sustainable development of enterprises (Pieloch-Babiarz, Misztal, and Kowalska 2021; Comporek, Kowalska, and Misztal 2022). Global competitiveness may contribute to implementing ecological innovations or impede such activity (Hermundsdottir and Aspelund 2021). The impact of globalization may be positive or negative, depending on the research assumptions (Jickling and Wals 2008; Stofkova and Sukalova 2020).

The article's novelty and contribution to the literature on the subject lie in the presentation of the research results devoted to the sustainable development of manufacturing enterprises using the developed synthetic indicators and modern econometric methods, including the Ordinary Least Square (OLS) and the Seemingly Unrelated Regres-

sion (SUR). We use tests to assess linearity, normality of distribution, homoscedasticity and autocorrelation.

The presented model can support economic decisions that respect the climate aspect. It will also help identify which type of socio-economic factors are essential for the sustainable development of manufacturing enterprises.

The article contains the following components: an introduction, a literature review, research methodology, research results, and a discussion. We use annual data from Eurostat, the World Bank, and KOF Swiss Economic Institute.

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## Literature review

Sustainable development is essential for improving the quality of life of current and future generations. In business practice, it means taking constant and effective actions toward the company's economic, social and environmental goals. It means generating profits on an ongoing basis, pursuing its goals and aspirations, and ensuring its implementation in the future (Gupta and Vegelin 2016, pp. 433–448; Mehmet and Soytas 2019, pp. 545–572; Comporek, Kowalska, and Misztal 2022).

According to the sustainable development philosophy, enterprises strive to maximize profits that will feed their owners' portfolios (short-termism) and check how, in the long term, a given activity affects the local community, the local labor market or the natural environment (Bilan et al. 2019; Umar et al. 2020; Pieloch-Babiarz, Misztal, and Kowalska 2021). The growth of natural, social and human capital should positively impact the enterprise's development. It is widely discussed that this approach will also benefit the financial and property situation of companies in the long run because it allows management boards to increase their investment of financial surpluses in innovation and R&D projects rather than allocating them to paying increasingly higher dividends (Hunt 2012, pp. 404–411; Levytska et al. 2018, pp. 122–127; Teng, Chang, and Wu 2021).

In the literature, sustainable enterprise development appears alongside corporate social or ecological business responsibility (Liczmańska-Kopcewicz, Mizera, and Pypłacz 2019; ElAlfy, Darwish, and Weber 2020). At the same time, sustainable development has a wider scope and is largely focused on ex-ante analyses. It should also be noted that enterprises' sustainable development is defined in several manners. Researchers indicate that it is development based on economic, social and environmental pillars, and the business owner's task is to maintain a balance between them (Elkington 1997). Sustainable development of enterprises is about achieving success today without compromising future needs, encompassing economic, social and environmental development (Boudreau and Ramstad 2005).

According to stakeholder theory, sustainable development is about meeting the present and future needs of a company's direct and indirect stakeholders (Dyllick and Hockerts 2002, pp. 130–141). It is an economic (financial factors), environmental (risk/requirement factors) and social (human factors) problem that is solved through the company's collaboration with its stakeholders (Lozano 2008, pp. 499–509). Sustainable enterprise development develops shareholders' worth through economic, social, and environmental perfection (Bansal, Garg, and Sharma 2019).

In the financial approach, sustainable enterprise development can mean “the capability of a corporation to last in time, both in terms of profitability, productivity and financial performance, as well as in terms of managing environmental and social assets that compose its capital” (Giovannoni and Fabietti 2013, p. 22).

The resource approach emphasizes the importance of sustainable resources, including people, infrastructure, durable and non-durable assets, and outgoing goods. Sustainable development means combining a balanced strategy in production, finance, logistics, marketing, sales, HR and other functional areas (Pabian 2017, pp. 11–16). Sustainable development is an innovative development in which favorable conditions are created (organizational and economic mechanisms, scientific and technical base, motivational and stimulating mechanisms) to generate and implement innovative activities, introduce scientific and technological developments in production, and promote high-technology products on the market (Tolstykh, Gamidullaeva, and Shmeleva 2020). It is the basis for developing future generations, and it constitutes opportunities and challenges for managers in terms of building socio-economic value (Stawicka 2021).

Some internal and external factors determine the sustainable development of enterprises, and researchers do not agree on the meaning or direction of the influence of these factors on sustainable development. Some analyses emphasize the significance of external factors, including macroeconomic conditions related to environmental protection policy, the level of globalization, and the economic or geopolitical situation (Finnveden et al. 2013; Kurniawan and Managi 2018, pp. 339–361). Others focus on the internal conditions of enterprise development, including business strategies and models, financial situation, intellectual capital, and managers' approaches to social and environmental issues (Zollo, Cennamo, and Neumann 2013, pp. 241–259; Teng, Chang, and Wu 2021).

Most research underlines that implementing sustainable development goals combines external and internal factors (Chen 2016; Koirala and Pradhan 2020). It is necessary to have a holistic approach to managing the development of enterprises that will skillfully respond to emerging opportunities and threats, both internal and external. Economic equilibrium (macroeconomic stabilization) should positively impact the sustainable development of enterprises (e.g., in the transport and manufacturing sector) in selected countries of Central and Eastern Europe (Pieloch-Babiarz, Misztal,

and Kowalska 2021; Comporek, Kowalska, and Misztal 2022). Macroeconomic stabilization refers to the overall improvement of a country's economic conditions, which encompasses various factors such as political stability, social well-being, and demographic trends. The country's position in the international arena is also important, especially in foreign trade. Therefore, the economic stabilization policy means restoring the economy to an internal and external state of equilibrium (Ćwikliński 2012; Agliardi and Xepapadeas 2019, pp. 1–14). There is also a positive relationship between the human development index and sustainable development because the more educated and aware society is, the greater the pressure of customers on the social and environmental responsibility of business (Boudreau and Ramstad 2005).

In turn, the impact of globalization on sustainable development may be twofold. Most researchers believe that globalization hurts the natural environment and that sustainable development is a response to the negative effects of globalization (Jickling and Wals 2008, pp. 1–21; Stofkova and Sukalova 2020; Adebayo and Kirikkaleli 2021). The increase in competitiveness may make it necessary to focus on the enterprise's economic performance. On the other hand, according to competition theory, companies that want to survive in the market must look for new ways to reach customers, including creating a friendly brand for society and the natural environment (Kuchinka et al. 2018; Shiel, do Paço, and Alves 2020; Kim and Hwang 2021, pp. 847–859).

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## Research methodology

The article's main aim is to assess the strength and direction of the impact of economic equilibrium (MSP), the Human Development Index (HDI), the KOF Globalization Index (KOF), and the Global Competitiveness Index (GCI) on the sustainable development of manufacturing enterprises and its components (economic: ECO, social: SOC, and environmental: ENV) in France, Germany, Italy and Poland from 2008 to 2021. The research covers the period from the beginning of the economic crisis and economic slowdown to the gradual recovery from it.

We chose countries with different levels of socio-economic development, including the three most developed economies in the European Union, France, Germany, and Italy, and the developing country Poland. These countries have the most manufacturing enterprises in the European Union. We focus on the manufacturing sector because of its enormous importance for the socio-economic development of these countries and its significant negative impact on the natural environment (high emissions of substances harmful to the climate).

The main hypothesis of the research is as follows: “In the studied countries, there is a significant variation in the directions and strength of the impact of individual so-

cio-economic factors on the sustainable development of manufacturing enterprises from 2008 to 2020.” This hypothesis extends existing research (Pieloch-Babiarz, Misztal, and Kowalska 2021; Comporek, Kowalska, and Misztal 2022). Moreover, it endeavors to take a more comprehensive approach to the determinants of sustainable development. The research presupposes that the analyzed countries are diversified in economic development, structure, and environmental protection policies, even though they are obliged to comply with the regulations in the European Union.

We also formulate the following research questions:

- Does sustainable development have greater dynamism in higher-developed countries?
- Does economic development have higher dynamics than social and environmental development?
- Is economic equilibrium from previous periods crucial for the sustainable development of enterprises?
- Is there a relationship between the impact of socio-economic factors on the pillars of sustainable development of enterprises in the studied countries?

We conducted the research in four stages:

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## **We created indicators of sustainable development of manufacturing enterprises and its three pillars**

### **We standardize the method based on the following formula**

for the stimulants:

$$Z_{ij} = \frac{x_{ij}}{\max x_{ij}}, Z_{ij} \in [0;1], \quad (1)$$

for the destimulants:

$$Z_{ij} = \frac{\min x_{ij}}{x_{ij}}, Z_{ij} \in [0;1], \quad (2)$$

where  $Z_{ij}$  – the normalized value of the  $j$ -th variable in the  $i$ -th year;  $x_{ij}$  – the value of the  $j$ -th variable in the  $i$ -th year.

To calculate the indicator of sustainable development (*SD*) and its economic (*ECO*), social (*SOC*), and environmental (*ENV*) components, we use the following formula:

$$SD = \frac{\sum_{j=1}^n (ECO_{ij} + SOC_{ij} + ENV_{ij})}{n}, Sus_{ij} \in [0;1]. \quad (3)$$

The *ECO* indicator was developed based on the indicators of stimulants, including turnover, production value, added value, gross operating surplus, total purchases of goods and services, gross investment, and investment rate.

The *SOC* indicator is calculated based on stimulants, including the number of employees, wages, social security costs, turnover per employee, labor productivity, investment per employee, employment growth rate, gross value added per employee, and destimulants, including personnel costs, and the share of personnel costs in the production.

The *ENV* indicator is based on destimulants, including carbon, methane, nitrous oxide emissions, sulfur oxides, carbon monoxide, nitrogen oxides, and ammonia emissions.

1. We collected indicators of socio-economic development using the following:
  - the macroeconomic stabilization pentagon (Kołodko 1993):

$$MSP = [(\Delta GDP \cdot U) + (U \cdot CPI) + (CPI \cdot G) + (G \cdot CA) + (CA \cdot \Delta GDP)] \cdot k, \quad (4)$$

where  $a = \Delta GDP \cdot U \cdot k$  – presents a triangle area called the real sphere triangle and characterizes the relation between the rate of economic growth and unemployment rate;  $b = U \cdot CPI \cdot k$  – stands for the stagflation triangle, which depends on the unemployment rate and inflation rate;  $c = CPI \cdot G \cdot k$  – defined as the budget and inflation triangle;  $d = G \cdot CA \cdot k$  – the financial equilibrium triangle, which depends on the budget and the current account balance;  $e = CA \cdot \Delta GDP \cdot k$  – the external sector triangle, which shows the variability

- the Human Development Index (HDI). This indicator assesses countries on three levels: “long and healthy life,” “knowledge,” and “decent standard of living”;
- the KOF index. It has three dimensions: economic globalization, social globalization and political globalization. As a result, in addition to the general index of globalization, three sub-indices were created. Each is calculated based on several indicators and was assigned a specific weight;
- the GCI. This was done by including a weighted average of many different components, each measuring a different aspect of competitiveness. The components

are grouped into 12 categories, the pillars of competitiveness: Institutions, Infrastructure, Macroeconomic environment, Health and primary education, Higher education and training, Goods market efficiency, Labor market efficiency, Financial market development, Technological readiness, Market size, Business sophistication, and Innovation (the World Bank).

2. We created models using the classical method of least squares estimation. Our structural equation takes the following form:

$$SD = \alpha_0 + \alpha_1 GCI_t + \alpha_2 HDI_t + \alpha_3 KOF_t + \alpha_4 MSP_t + \alpha_5 GCI_{t-1} + \alpha_6 HDI_{t-1} + \alpha_7 KOF_{t-1} + \alpha_8 MSP_{t-1} + \varepsilon_i \quad (5)$$

3. We created seemingly unrelated regression (SUR) models. The structural equations are as follows:

$$\begin{cases} EKO = \alpha_0 + \alpha_1 SOC_t + \alpha_2 ENV_t + \alpha_3 GCI_t + \alpha_4 HDI_t + \alpha_5 KOF_t + \alpha_6 MSP_t + \varepsilon_i \\ SOC = \alpha_0 + \alpha_1 ECO_t + \alpha_2 ENV_t + \alpha_3 GCI_t + \alpha_4 HDI_t + \alpha_5 KOF_t + \alpha_6 MSP_t + \varepsilon_i \\ ENV = \alpha_0 + \alpha_1 ECO_t + \alpha_2 DOC_t + \alpha_3 GCI_t + \alpha_4 HDI_t + \alpha_5 KOF_t + \alpha_6 MSP_t + \varepsilon_i \end{cases}$$

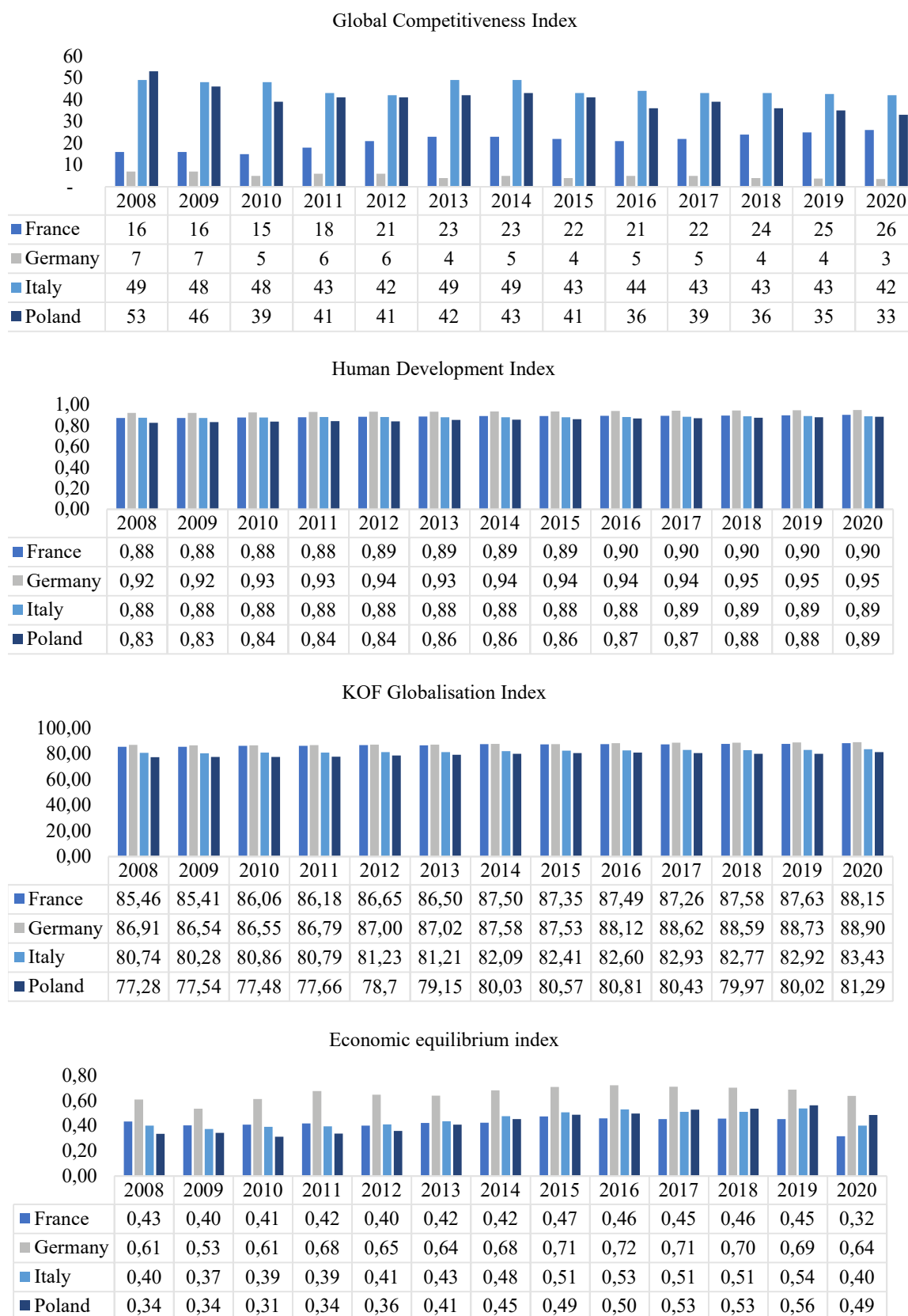
## The results of the analysis

Graph 1 presents selected indexes describing the socio-economic situation (i.e., GCI, HDI, KOF, and Economic Equilibrium) in France, Germany, Italy, and Poland, from 2008 to 2020.

In all countries, HDI, KOF, and the Macroeconomic Stabilization Index have an increasing trend. In Germany, Italy and Poland, the GCI has a decreasing trend, which may be due to the forecast from 2018 to 2020. In France, the GCI has an increasing trend.

Selected indexes describing the socio-economic situation indicate stable development and improved conditions, and quality of life in all four countries are presented below.

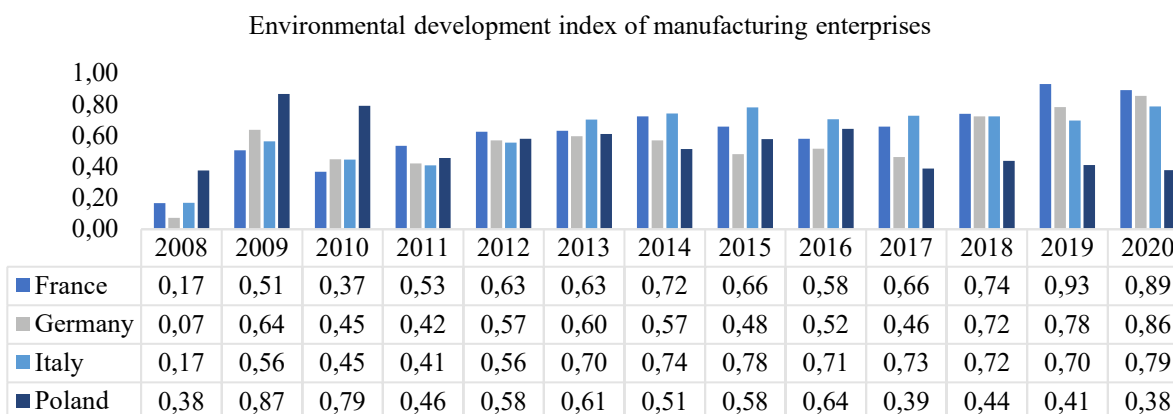
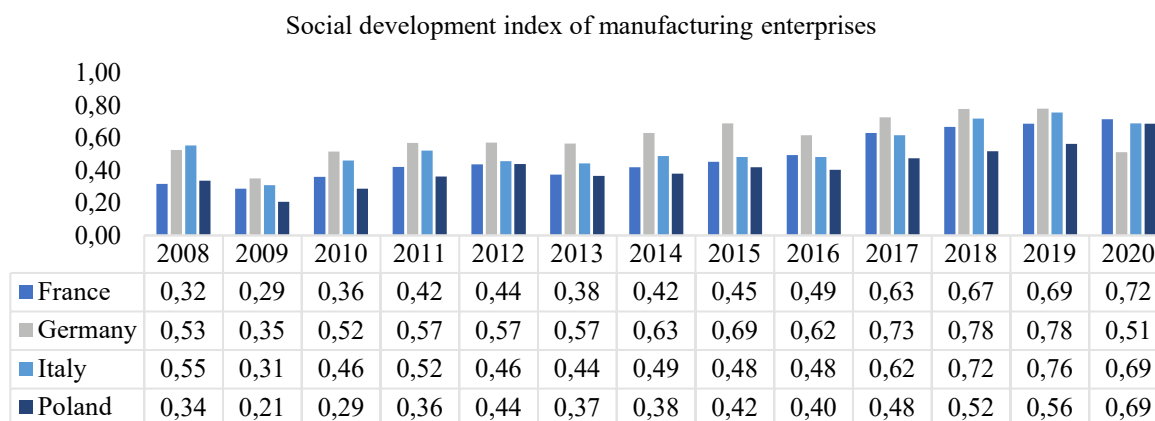
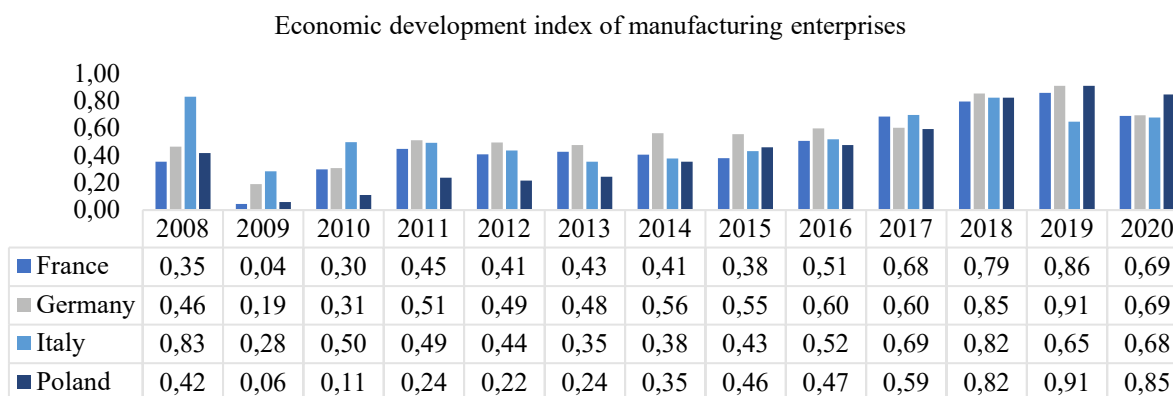




**Graph 1. Socio-economic indexes – France, Germany, Italy, Poland (2008–2020)**

Source: own elaboration based on: Eurostat database n.d., *GDP and main components...*; Eurostat database n.d., *HICP*; Eurostat database n.d., *International trade...*; Eurostat database n.d., *Unemployment by sex...*; Human Development Research n.d.; KOF Swiss Economic Institute n.d.; The World Bank database n.d.

Graph 2 shows the sustainable development index of manufacturing enterprises (with the economic, social and environmental components) in all four countries from 2008 to 2020. The highest average value is in Germany, while the lowest is in Poland. In all countries, the index (with components) has an increasing trend (except for environmental development in Poland), which should be assessed positively. It means that between 2008 and 2020, manufacturing enterprises in France, Germany, Italy and Poland implemented programs and activities that are essential for sustainable development.



**Graph 2.** Sustainable development index of manufacturing enterprises (with components) – France, Germany, Italy, Poland (2008–2020)

Source: own elaboration on the basis Eurostat database n.d., *Enterprise statistics...*; Eurostat database n.d., *Net greenhouse gas emissions...*

Table 1 shows the results of the OLS estimation from 2008 to 2020. The models show different strengths and directions of the relationships between the explained and explanatory variables. In the analyzed countries, the sustainable development of manufacturing enterprises is most often influenced by the HDI (or the previous period's HDI) and KOF (or the previous period's KOF). The influence of the previous period's KOF on the sustainable development of manufacturing enterprises in Poland is negative. The negative impact may result from globalization increasing enterprises' competitiveness and focusing intensely on maximizing profits in the short term, which affects the social and environmental dimensions of their development. HDI has the highest positive impact on the sustainable development of manufacturing enterprises in France, while in Italy, it is KOF.

Table 1. Results of OLS regressions from 2008 to 2020:

$$SD = \alpha_0 + \alpha_1 GCI_t + \alpha_2 HDI_t + \alpha_3 KOF_t + \alpha_4 MSP_t + \alpha_5 GCI_{t-1} + \alpha_6 HDI_{t-1} + \alpha_7 KOF_{t-1} + \alpha_8 MSP_{t-1} + \varepsilon_i$$

Country	Dependent variable	Independent variable	Coefficient	Std. error	p-value	R <sup>2</sup>
France	SD	Const	-24.570	4.526	0.001	0.904
		HDI	28.980	5.383	0.001	
		GCI(-1)	0.034	0.014	0.039	
Germany	SD	Const	-12.906	2.053	0.001	0.830
		HDI(-1)	11.338	5.666	0.077	
		KOF(-1)	0.033	0.055	0.566	
Italy	SD	Const	-12.118	2.699	0.001	0.871
		HDI	8.692	4.722	0.096	
		KOF	0.061	0.024	0.028	
Poland	SD	Const	2.988	0.870	0.007	0.960
		KOF(-1)	-0.040	0.012	0.008	
		MSP(-1)	1.588	0.176	<0.001	

Source: own elaboration.

Table 2 presents the results of the SUR estimation from 2008 to 2020. The models show a different strength and direction of relationships between the explained and explanatory variables. The estimation indicates a strong differentiation of the impact of individual variables of the socio-economic situation on the economic, social, and environmental development of manufacturing enterprises in France, Germany, Italy and Poland.

The economic development of manufacturing enterprises in all countries is most often influenced by the social development of manufacturing enterprises, while the social development of manufacturing enterprises is most often influenced by the economic development of manufacturing enterprises. In France, Italy and Poland, the environmental development of manufacturing enterprises is most often influenced by the social development of manufacturing enterprises.

Table 2. Results of SUR regressions in the period from 2008 to 2020:

$$\begin{cases} EKO = \alpha_0 + \alpha_1 SOC_t + \alpha_2 ENV_t + \alpha_3 GCI_t + \alpha_4 HDI_t + \alpha_5 KOF_t + \alpha_6 MSP_t + \varepsilon_i \\ SOC = \alpha_0 + \alpha_1 ECO_t + \alpha_2 ENV_t + \alpha_3 GCI_t + \alpha_4 HDI_t + \alpha_5 KOF_t + \alpha_6 MSP_t + \varepsilon_i \\ ENV = \alpha_0 + \alpha_1 ECO_t + \alpha_2 DOC_t + \alpha_3 GCI_t + \alpha_4 HDI_t + \alpha_5 KOF_t + \alpha_6 MSP_t + \varepsilon_i \end{cases}$$

Country	Dependent variable	Independent variable	Coefficient	Std. error	p-value	R <sup>2</sup>	
France	ECO	Const	-0.230	0.071	0.009	0.876	
		SOC	1.757	0.182	0.001		
		ENV	-0.217	0.116	0.092		
	SOC	Const	-2.791	1.298	0.057	0.906	
		ECO	0.513	0.066	0.001		
		HDI	3.340	1.483	0.045		
	ENV	Const	-0.530	0.135	0.004	0.878	
		ECO	-0.600	0.236	0.032		
		SOC	1.025	0.381	0.025		
		GCI	0.045	0.006	0.001		
	Germany	EKO	Const	-11.121	2.730	0.002	0.876
			SOC	0.774	0.214	0.005	
HDI			11.964	3.978	0.003		
SOC		Const	-0.309	0.195	0.144	0.848	
		ECO	0.319	0.095	0.007		
		MSP	1.116	0.347	0.009		
ENV		Const	-24.531	3.420	0.001	0.791	
		HDI	45.464	8.706	0.001		
		KOF	-0.177	0.078	0.049		
		MSP	-3.084	0.644	0.001		

Country	Dependent variable	Independent variable	Coefficient	Std. error	p-value	R <sup>2</sup>
Italy	ECO	Const	- 10.181	3.071	0.009	0.869
		SOC	0.672	0.238	0.020	
		ENV	- 0.921	0.158	0.001	
		KOF	0.134	0.040	0.008	
	SOC	Const	- 11.918	1.395	0.001	0.948
		ECO	0.419	0.045	0.001	
		HDI	13.841	1.590	0.001	
	ENV	Const	- 39.648	5.329	0.001	0.874
		SOC	1.761	0.251	0.001	
		HDI	32.938	7.150	0.001	
		KOF	0.148	0.027	0.001	
	Poland	ECO	Const	8.354	2.183	0.004
SOC			1.736	0.219	0.001	
KOF			- 0.124	0.030	0.003	
MSP			2.745	0.460	0.001	
SOC		Const	- 2.529	0.773	0.014	0.950
		ECO	0.346	0.050	0.001	
		ENV	- 0.232	0.050	0.002	
		GCI	- 0.006	0.002	0.007	
		KOF	0.045	0.010	0.003	
		MSP	- 0.998	0.207	0.002	
ENV		Const	2.131	0.314	0.001	0.746
		SOC	1.613	0.239	0.001	
		GCI	- 0.023	0.006	0.003	

Source: own elaboration.

HDI has the highest positive impact on the economic, social, and environmental development of manufacturing enterprises (economic development in Germany, social development in Italy, and environmental development in Germany). The environmental development of manufacturing enterprises has the highest negative impact on the economic development of those enterprises (Italy); environmental development requires costs and therefore reduces the financial result. The economic equilibrium index has the highest negative impact on the social and environmental development of manufacturing enterprises (social development in Poland, and environmental development in Germany).

The negative impact of the economic equilibrium index on the social and environmental development of manufacturing enterprises means that maintaining macroeconomic stability does not go hand in hand with social and environmental development.

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## Discussion

The sustainable development of enterprises means stable development in the three pillars: economic, social, and environmental. The sustainable development of manufacturing enterprises depends on several factors, including socio-economic conditions, as confirmed by our research (Kurniawan and Managi 2018; Bilan et al. 2019; Umar et al. 2020; Koirala and Pradhan 2020).

We positively verified the main research hypothesis, i.e., “In the studied countries, there is a significant variation in the directions and strength of the impact of individual socio-economic factors on the sustainable development of manufacturing enterprises from 2008 to 2020.” At the same time, it should be noted that the economic equilibrium from the previous period has a statistically significant impact ( $p < 0.05$ ) on the sustainable development of manufacturing enterprises in Poland. Thus, we confirm the research results which show the impact of stabilization or macroeconomic condition on sustainable development in developing countries (Kirikkaleli and Ozun 2019, pp. 351–367; Pieloch-Babiarz, Misztal, and Kowalska 2021; Comporek, Kowalska, and Misztal 2022).

In addition, we noted that the previous period’s globalization impacted sustainable development in Poland’s enterprises (Agliardi and Xepapadeas 2019). In Italy, the sustainability of manufacturing enterprises is influenced by globalization and social development. Similarly, in Germany, the influence of these factors from previous periods on the level of development was also noted (Kirikkaleli and Ozun 2019). In France, manufacturing enterprises’ sustainable development is negatively influenced by the social development and competitiveness of the previous period, which may mean that these entities are primarily focused on market competition. We agree that education and globalization influence sustainable development (Jickling and Wals 2008; Stofkova and Sukalova 2020).

Answering the first research question, *Does sustainable development have greater dynamism in higher developed countries?*, we cannot state unequivocally that sustainable development has greater dynamics in developed countries than in Poland. The highest rate of growth of the index occurs in France, while in Poland, it is similar to the German level. We agree with researchers that sustainable development is a complex phenomenon (Mehmet and Soytas 2019; Shiel, do Paço, and Alves 2020; Adebayo and Kirikkaleli 2021). The country’s level and dynamics may differ depending on the economic sector

(Chen 2016; Liczmańska-Kopcewicz, Mizera, and Pypłacz 2019; Pieloch-Babiarz, Misztal, and Kowalska 2021).

It cannot be said that economic development is more dynamic or at a higher level than social or environmental development in the analyzed countries. Moreover, increasingly higher environmental and social development results have been observed in developed countries in recent years. Although all the pillars of sustainable development have positive dynamics in Poland, economic development still seems essential. We agree that economically stable countries are more willing to make environmental and social investments (Kurniawan and Managi 2018; Bilan et al. 2019; Umar et al. 2020).

When answering the third research question, it should be noted that only economic equilibrium from the previous period had a statistically significant impact in Poland; this may be because, after joining the European Union, Poland had to introduce several changes in its fiscal and monetary policy (Misztal 2020, pp. 32–40).

The answer to the last research question can be found in the estimation results of the structural model with three equations. The SUR models indicate a high level of differentiation of factors that influence economic, social and environmental development in the studied countries. These results indicate that there is differentiation in terms of the impact of socio-economic factors, which may be the result of a different structure of economic entities, different development conditions, differences in size, structure, and different socio-economic conditions affecting the sustainable development of industrial enterprises (Bilan et al. 2019; Wang, Jiang, and Zhan 2019).

Our results indicate that sustainable development and its individual economic, social and environmental dimensions have positive dynamics in the studied countries. This phenomenon is positive as it indicates that actions taken by enterprises, external support for development, and more restrictive legal regulations are starting to bring positive results. However, it is necessary to introduce further changes, which are crucial for stable development in the era of socio-economic changes and geopolitical threats.

We confirm that socio-economic conditions have a statistically significant impact on the sustainable development of manufacturing enterprises. Their directions are different, meaning that the planet's future depends on actions taken in all socio-economic areas (Geels et al. 2019; Comporek, Kowalska, and Misztal 2022). Moreover, it is necessary to change the European Union's energy and environmental policy approach (Litavcová and Chovancová 2021).

Our research has limitations related to the selection of analytical indicators, the estimation method, and limited access to important statistical data. Of course, it should also be noted that the study omits some indicators, which may also affect the sustainable development of enterprises.

In further research, we will attempt to evaluate the sustainable development of enterprises from other sectors of the economy and assess external and internal determinants for sustainable development.

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## Conclusions

The sustainable development of enterprises is part of the idea of global sustainable development, as it provides opportunities for the development of the present and future generations. It means stable and sustainable development in three key economic, social and environmental areas.

The research results indicate that the sustainable development of industrial enterprises in France, Germany, Italy and Poland has positive growth dynamics and depends on various socio-economic factors. These factors have a diversified impact in terms of the strength and direction of their impact, which means that there is a large variation among the determinants of sustainable development in those countries.

In France, the sustainable development of enterprises is influenced by social development and competitiveness (negative), while in Germany, it is influenced by social development from the previous period and globalization from the previous period (positive impact). In Italy, it is influenced by social development and globalization (positive influence). Finally, in Poland, globalization from the previous period and the positive economic equilibrium from the previous period have a negative effect. The influence of factors on the pillars of sustainable development is much more diversified, and there was a correlation between the development of individual pillars.

The paper's contribution to knowledge is that it introduced linear and structural equation models, which describe the impact of socio-economic indicators on sustainable manufacturing development. The research has important theoretical implications, as it presents the author's innovative approach to defining and measuring sustainable development and explores how external factors affect the level. The empirical implications include that the results of the analyses can support company managers when making operational and strategic decisions.

State authorities that want to create the foundations for the sustainable development of enterprises must coordinate social, economic and environmental policies. Further activities should reduce the negative impact on the natural environment. It is necessary to change the approach, especially in the provision of energy sources for economic entities and further support from environmental protection funds.



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## Wpływ równowagi ekonomicznej, globalizacji, rozwoju społecznego i konkurencyjności rynkowej na zrównoważony rozwój przedsiębiorstw produkcyjnych – przypadek Francji, Niemiec, Włoch i Polski

W artykule przedstawiono wyniki analiz wpływu równowagi ekonomicznej, Wskaźnika Rozwoju Społecznego, Wskaźnika Globalizacji KOF oraz Wskaźnika Globalnej Konkurencyjności na zrównoważony rozwój przedsiębiorstw produkcyjnych i ich komponentów we Francji, Niemczech, Włoszech i Polsce w latach 2008–2021. W naszych badaniach wykorzystaliśmy Klasyczną Metodę Najmniejszych Kwadratów (OLS) oraz Metodę Pozornie Niepowiązanych Równań (SUR). Wyniki analiz pokazują, że badane czynniki zewnętrzne znacząco wpływają na zrównoważony rozwój przedsiębiorstw. Ponadto nasze modele wykazują różną siłę i kierunek zależności między zmiennymi objaśnianymi i objaśniającymi. Nasze modele potwierdzają konieczność skoordynowania polityki makroekonomicznej i środowiskowej. Ważne jest stosowanie skutecznych narzędzi wsparcia gospodarczego, a także zwiększenie presji ze strony instytucji Unii Europejskiej na kraje emitujące szkodliwe substancje.

**Słowa kluczowe:** zrównoważony rozwój, przedsiębiorstwa produkcyjne, stabilizacja makroekonomiczna, globalizacja, konkurencyjność rynkowa