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Impact of Market-Oriented Business Environment and ICT on Sustainable Development: Panel Evidence from the New EU Member States

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Abstract: Sustainable development has become a key factor in decreasing economic and social inequalities and environmental problems in the world. This problem aligns with the crusade of the United Nations Sustainable Development Goals (UNSDGs-8 and 10). To this end, the present study seeks to identify factors underlying sustainable development for vital and optimal policymaking. The primary objective of the present study is to investigate the influence of a market-oriented business environment together with information and communication technologies (ICT) on overall sustainable development in new EU members who experienced a transition to a market economy for annual frequency period ranging from 2000–2020 via novel cointegration and causality tests adequate to the dataset size and characteristics. The study aimed to make a contribution to the related empirical literature, as there is a paucity of documentation in the extant literature on the nexus between the business environment and overall sustainable development. Furthermore, the use of cointegration and causality tests considering heterogeneity and cross-sectional dependence increased the robustness of the empirical results. The consequences of causality and cointegration analyses uncovered that the market-oriented business environment and ICT were short- and long-run drivers of sustainable development. However, the impact of ICT on sustainable development was relatively stronger than the impact of the market-oriented business environment in the long run. As a result, policies to improve market-oriented business environments, ICT infrastructure, ICT adoption, and digital literacy can be useful to make progress in overall sustainable development.

Keywords: market-oriented business environment; ICT; sustainable development; panel cointegration analysis; panel causality analysis

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Citation: Aydıntuğ Myrvang, N.; Sart, G.; Danilina, M.; Ta'Amnha, M.A. Impact of Market-Oriented Business Environment and ICT on Sustainable Development: Panel Evidence from the New EU Member States. *Sustainability* **2023**, *15*, 14096. https://doi.org/10.3390/su151914096

Academic Editor: Sajid Anwar

Received: 29 August 2023
Revised: 13 September 2023
Accepted: 20 September 2023
Published: 23 September 2023

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1. Introduction

Environmental impairment and remarkable increases in hunger, poverty, and inequalities on a global scale have raised concerns about the future of our world as of the 1940s. All these problems are global and interconnected. For this reason, the United Nations (UN) has led efforts to tackle problems such as air and water pollution, climate change, and biodiversity loss resulting from environmental impairment and to decrease poverty and inequalities. However, sustainable development began to be popularized with the "Our Common Future" report in 1982 by the World Commission on Environment and Development (see UN [1] and Asian Development Bank [2] for detailed information about the sustainable development timeline.

Sustainable development is a multifaceted word that highlights interconnected environmental, economic, and social issues. In this context, UN members agreed to achieve the

Millennium Development Goals (MDGs), including to combat poverty, hunger, environmental degradation, disease, illiteracy, and gender discrimination by 2015. Then, seventeen Sustainable Development Goals (SDGs) accepted by UN members took the place of the MDGs to increase prosperity and peace in the world [1]. The SDGs can be classified as social sustainability (SDG-1,2,3,4,5,7,11,16), environmental sustainability (SDG-6,13,14,15), and economic sustainability (SDG-8,9,10,12), although all SDGs are interrelated, and SDG 17 is in partnership with all SDGs (see UN [1] for detailed information about the SDGs and their subtargets) [3].

In the extant empirical literature, scholars have shown relatively more interest in environmental issues, and issues about economic and social sustainability have been relatively little researched until today [4]. Furthermore, relatively few scholars have concentrated on the determining factors behind overall sustainable development, as seen in the literature review section of the paper. Therefore, this article studies the influence of a market-oriented business environment and the development of information and communication technologies (ICTs) on overall sustainable development.

The role of firms in an economy is crucial because they employ production factors and produce goods and services that individuals need to survive. Therefore, firms are critical for sustainable development because they interact with SDGs during their operations and delivery of goods and services, and many issues of sustainable development are related to business activities. In this regard, sustainable development should be one of the main goals of corporate sustainability [5]. This study investigated the effect of a market-oriented business environment level on sustainable development. A market-oriented business environment can lead to a competitive market and, in turn, a healthy economy, including affordable goods and services and job creation. Thus, a market-oriented business environment can make a direct and indirect contribution to the multiple SDGs (SDG 8 (decent work and economic growth), SDG 9 (industry, innovation, and infrastructure), SDG 1 (no poverty), SDG 2 (zero hunger), SDG 3 (good health and well-being), SDG 5 (gender equality), SDG 7 (affordable and clean energy), SDG 11 (sustainable cities and communities), and SDG 12 (responsible production and consumption)). However, economic growth resulting from a market-oriented business environment can negatively impact economic sustainability if the required environmental measures are not taken. Consequently, the net effect of the market-oriented business environment on overall sustainable development is inconclusive from a theoretical perspective.

ICT has the ability to impact sustainable development through different channels. First of all, ICT can impact economic growth through improvements in productivity, competition, efficiency, and entrepreneurship, easy and fast access to information, and rapid dissemination of information [6–8]. Secondly, ICT has two contrasting effects on environmental sustainability. On the one hand, ICT can negatively impact the environment through ICT production, energy use, boosting economic growth, and electronic waste recycling. On the other side, ICT can positively impact the environment through improvements in productivity and control of environmental degradation, development of energy-saving/efficient technologies, enhancement of e-services, smart cities, and smart production and transportation systems [9–11]. Thirdly, ICT can impact social sustainability through improvements in education, health care, life quality, and economic and social development, but negative impacts of ICT on social sustainability are also feasible through unemployment, dissemination of offensive videos and images, hacking, and e-fraud [12–15]. As a result, the net impression of ICT on sustainable development is inconclusive in theoretical considerations.

The primary objective of the study was to investigate the influence of a business environment together with ICT penetration on sustainable development. Countries with a higher market-oriented business environment have had relatively higher sustainable development levels [16,17]. Therefore, we explored the role of a business environment in which firms operate on sustainable development, considering the positive correlation between the business environment and sustainable development. The second objective of the study was to investigate the influence of ICT, which has become an inevitable part of

business and social life, on sustainable development, considering the remarkable increases in ICT penetration.

This study analyzed the effect of a market-oriented business environment and ICT on sustainable development in new EU members. In this context, the Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Slovakia, and Slovenia became an EU member in 2004; Romania and Bulgaria became an EU member in 2007; and lastly, Croatia became an EU member in 2013 [18]. The motivation behind the selection of these countries is that these countries made a transition to a market economy from a command economy and achieved remarkable progress in ICT development with the support of the EU membership process. This research set out to contribute to the empirical literature in three aspects: Sustainable development is a multidimensional concept. Therefore, a variable can positively influence some dimensions of sustainable development, such as economic and social sustainability, but negatively impact other dimensions, such as environmental sustainability. For this reason, the first contribution of this research enabled us to see the net influence of both the market-oriented business environment and ICT on overall sustainable development. The second contribution of the study was to analyze the interplay among the business environment, ICT, and sustainable development in a sample of new EU members experiencing a full transition process in terms of market structure. Last, we used the second-generation Lagrange multiplier (LM) cointegration test of Westerlund and Edgerton [19], the augmented mean group (AMG) estimator, and the novel causality test of JKS (Juodis, Karavias, and Sarafidis) [20] in harmony with the dataset's size and characteristics, which led us to obtain more robust results.

The remainder of this study proceeds with empirical literature on the interaction among market-oriented business environments, ICT, and sustainable development. Section 3 introduces the variables and methods. Section 4 applies the econometric tests, introduces and discusses their results, and the research is concluded with the Conclusion.

2. Literature Review

Sustainable development has become one of the most widely researched topics, together with the declaration of the 17 SDGs to end poverty and hunger, decrease inequalities, and tackle environmental degradation (see Ali et al. [21] for the related extensive empirical literature review about sustainable development). However, the researchers have generally concentrated on environmental sustainability, but the issues of overall sustainable development and economic and social sustainability have been relatively little studied until the present. The empirical studies on factors behind overall sustainable development have suggested that socioeconomic factors, corruption, governance, educational attainment, entrepreneurship, innovation, e-commerce, digitalization, and ICT penetration are the determining factors of sustainable development [22–30]. Therefore, this study investigates the impact of a market-oriented business environment and ICT over sustainable development in deference to the sparse literature.

In the empirical literature, a couple of researchers have explored the impact of variables representing the business environment, such as economic freedom and its subcomponents, including business freedom and trade freedom, bureaucratic quality, democratic accountability, the rule of law on environmental sustainability, and overall sustainable development. However, most of these studies have investigated the impact of economic freedom and its subcomponents on environmental sustainability and uncovered different findings in line with the theoretical considerations [31–34]. Only Mushtaq and Ali Khan [35] and Dong and Zhang [36] have discovered a positive effect of proxies representing the business environment on sustainable development. But, Sofrankova et al. [37] discovered a negative impact of the business environment on sustainable development. Furthermore, the majority of the empirical studies have usually analyzed the influence of economic freedom indicators on environmental sustainability in panels with different numbers of countries through a regression approach. Therefore, the impact of country-specific characteristics

such as current education level, human development level, income level, and economic development level in the analyses cannot be discerned.

Mushtaq and Ali Khan [35] researched the influence of economic freedom and its main dimensions on sustainable development in 58 states for the 2000–2015 period via regression approach and unveiled a positive impact of economic freedom, bureaucratic quality, democratic accountability, and law on sustainable development. Dong and Zhang [36] also investigated the impact of the business environment on the sustainable development of A-share enlisted firms in China for the 2010–2020 period through regression, and their findings denoted a positive interplay between the business environment and the sustainable development of the firms. But, Sofrankova et al. [37] unveiled a negative impact of the business environment on sustainable development from the research on the drivers of sustainable development in 28 EU members for the 2011–2018 period via regression.

Hartwell and Coursey [31], Amjad et al. [32], and Alola et al. [33,34] investigated the impact of economic freedom and its subcomponents on environmental sustainability through a regression approach. On the one hand, Hartwell and Coursey [31] and Amjad et al. [32], respectively, found a positive effect of economic freedom and business freedom on the environment for a panel of 194 countries and 110 developing countries. However, Alola et al. [33,34], respectively, revealed a positive impact of economic freedom and its subcomponents on environmental impairment in G-20 members and G-7 economies.

Based on the theoretical and empirical literature review, the first hypothesis of the research article is

Hypothesis 1. *There is a significant relationship between a market-oriented business environment and sustainable development.*

ICT can impact sustainable development through various aspects in theoretical terms, but scholars have usually concentrated on the environmental effects of ICT development. Karabetyan [26], Nchofoung and Asongu [38], and Jayaprakash and Pillai [39] have only investigated the impact of ICT on sustainable development, and these studies respectively found a positive influence of ICT on sustainable development for different panels with 15 high-income countries, 140 countries, and 80 countries. Karabetyan [26] employed cointegration analysis, but Nchofoung and Asongu [38] and Jayaprakash and Pillai [39] performed the regression analysis. For this reason, our study will also be one of the first studies investigating the nexus between ICT and sustainable development in a sample of new EU members.

On the other hand, the studies analyzing the influence of ICT on environmental sustainability have uncovered different findings in keeping with the related theoretical considerations. In this context, Higón et al. [10] examined the relationship between ICT and CO_2 emissions in 142 countries from 1995 to 2010 and unveiled an inverted U-shaped relationship between ICT and CO_2 emissions.

However, Nguyen et al. [40] and Chatti [41] uncovered a positive influence of ICT on CO_2 emissions in 13 G-20 countries and 43 countries, respectively. But, Khan and Ximei [42] discovered a positive impact of ICT export on the ecological footprint but a negative effect of ICT import on the ecological footprint. Ulucak and Khan [43] also disclosed a negative interaction between ICT and CO_2 emissions. Last, Villanthenkodath et al. [44] found that mobile subscriptions raised CO_2 emissions, but internet access decreased the CO_2 emissions.

Some empirical studies have concentrated on the interplay between ICT and economic growth and discovered a positive interaction between different ICT indicators and economic growth [45–50] for different panels of countries. In this context, Farhadi et al. [45] and Hodrab et al. [46], respectively, unveiled a positive interplay between economic growth and ICT in 159 countries and 18 Arab economies. Similarly, Fernández-Portillo et al. [47], Hussain et al. [48], and Kurniawati [49] discovered a positive effect of ICT on economic growth in EU members, 4 South Asian economies, and 25 Asian economies, respectively.

Stanley et al. [50] performed a meta-regression of 466 estimates from 59 studies analyzing the interplay between economic growth and ICT and reached the conclusion that ICT fostered economic growth, considering potential biases of publication selection and econometric misspecification. Furthermore, their analyses indicated that developing and developed economies experienced positive growth effects from landline and cell technologies. But, developed economies attained remarkably more gain from computing than that of developing economies. Last, they discovered little evidence of the positive impact of the Internet on economic growth.

Some empirical studies have explored the influence of ICT on various aspects of sustainable development, such as education and public health. In this context, Nisar et al. [51], Aristovnik [52], and Sezgin et al. [53] indicated a positive effect of ICT on education attainment, efficiency, and output. On the other hand, ICT has the potential to foster good health and well-being. Hence, Shao et al. [54] uncovered a positive impact of ICT on health outcomes in 141 states. Megbowon and David [55] discovered a positive interplay between ICT and the health gap in 38 African states.

Some studies have concentrated on the effect of ICT on social sustainability proxied by human development and mainly unveiled a positive effect of ICT on social sustainability. Within this scope, Bhattacharya [56] and Mothafar et al. [57] disclosed a positive interplay between ICT and human development and its subcomponents through a regression approach. Similarly, Bayar et al. [58] and Verma et al. [59] respectively uncovered a positive influence of ICT on human development in the new EU members and South Asian Association for Regional Cooperation (SAARC) states. However, some researchers such as Aksentijevic et al. [60], Hettiarachchi [61], and Ejemeyovwi and Osabuohien [62] have revealed different results on the interaction between human development and ICT.

Based on the theoretical and empirical literature review, the second hypothesis of the research article is:

Hypothesis 2. *There is a significant relationship between ICT development and sustainable development.*

3. Data and Methods

This article analyzes the effect of market-oriented business environment and ICT development on sustainable development in the new EU members. In the empirical analyses, sustainable development (SUSDEV) is symbolized by the sustainable development index calculated by Sachs et al. [16]. The sustainable development index obtains a point out of 100, and this score indicates the overall progress in the accomplishment of the 17 SDGs. For instance, a score of 85 means that a country has achieved the 85% of the 17 SDGs. On the other hand, the market-oriented business environment (BUSINESS) is proxied by the business regulations index of the Fraser Institute [17]. The index is figured as a combination of six sub-indices, including administrative requirements, bureaucracy costs, starting a business, extra payments/bribes/favoritism, licensing restrictions, and cost of tax compliance, and obtains a point between 0 and 10. The countries should follow market-oriented policies, restrain from "playing favorites", and the regulatory activities which can decrease the competition in the markets to get a higher score [17]. Last, ICT development (ICT) is represented with the ICT index by UNCTADSTAT [63], and the index is figured upon fixed-line users, internet accessibility, mobile phones, and server security and obtains a point between 0 and 100 (higher values indicate relatively higher levels of ICT development).

The new EU member states include 11 EU countries (Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia), which also experienced a transition process from a command economy to a free market economic system. Furthermore, the dataset covers the 2000–2020 period because the sustainable development index is present as of 2000, and the business regulations index ends in 2020.

The econometric tests are performed through statistical software programs Eviews 12.0, Gauss 12.0, and Stata 17.0.

The summary statistics and the panel-level charts of SUSDEV, BUSINESS, and ICT are respectively introduced in Table 1 and Figures 1–3. The mean values of indices of sustainable development, business regulations, and ICT are 75.027, 6.838, and 54.553, respectively. However, the ICT index indicates a remarkable variation among countries, the sustainable development index denotes a moderate variation among the countries, but the business regulations index is relatively more stable, as seen in Figures 1–3.

Table 1. Main characteristics of the SUSDEV, BUSINESS, and ICT.

Descriptive Characteristics	SUSDEV	BUSINESS	ICT
Mean	75.027	6.838	54.553
Median	75.100	6.710	57.962
Maximum	80.600	8.970	76.619
Minimum	66.800	4.960	22.513
Std. Dev.	3.034	0.797	12.365
Skewness	−0.256	0.369	−0.705
Kurtosis	2.568	3.245	2.547

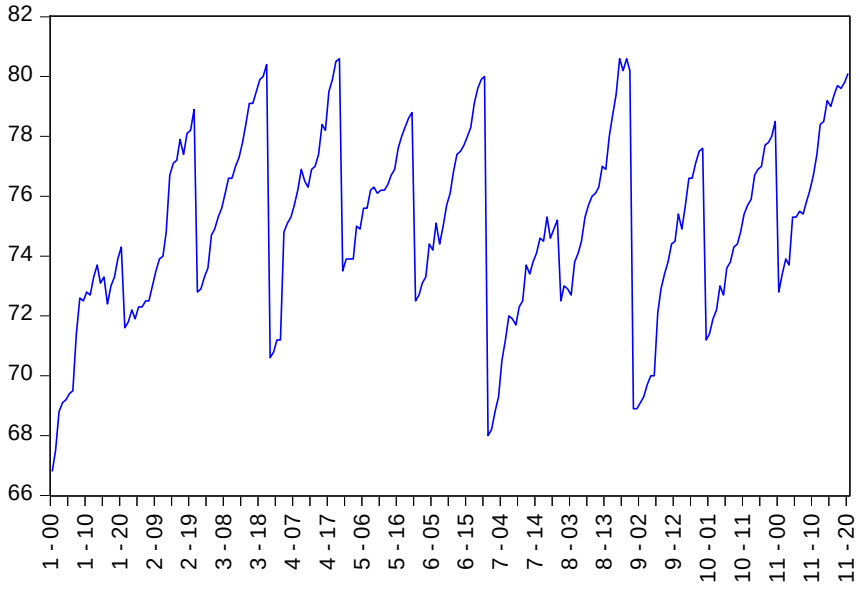

Figure 1. Panel level SUSDEV variable.

The impact of a market-oriented business environment and ICT on overall sustainable development is analyzed by using the model in Equation (1) through the second-generation Westerlund and Edgerton [19] LM cointegration test, AMG estimator, and the JKS [20] causality test. The dependent variable is the sustainable development index (SUSDEV), and the independent variables are the business regulations index (BUSINESS) and ICT index (ICT). The application of causality and cointegration tests enables us to see the short and long-run relationships among business environment, ICT, and sustainable development, unlike the regression approach. Furthermore, Westerlund and Edgerton [19] LM cointegration test, AMG estimator, and the JKS [20] causality test, which take heterogeneity and cross-sectional dependence into consideration, cause us to attain more robust results in the highly globalized world. Last, the AMG estimator gives us an opportunity to perform a country-level analysis, unlike the regression approach commonly used in the related empirical literature.

$$SUSDEV_{it} = \alpha_i + \beta_1 BUSINESS_{it} + \beta_2 ICT_{it} + \varepsilon_{it} \quad (1)$$

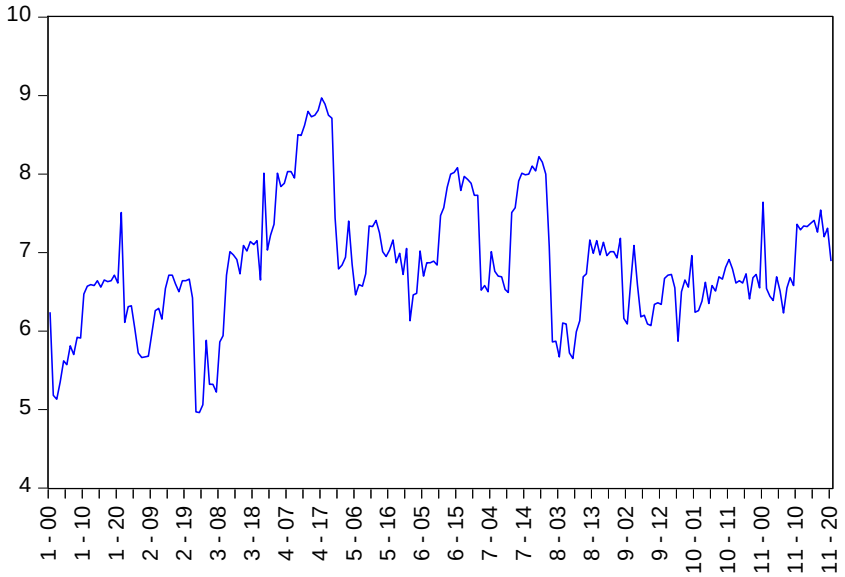

Figure 2. Panel level BUSINESS variable.

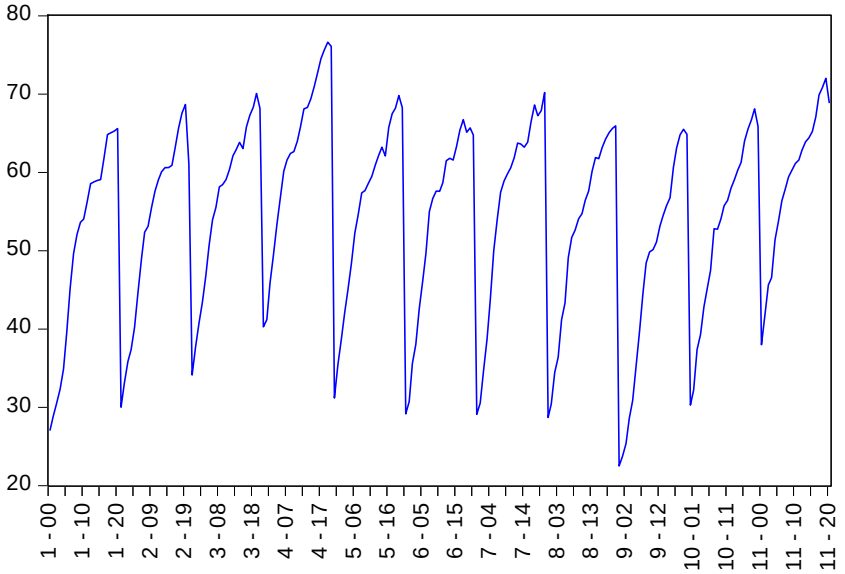

Figure 3. Panel level ICT variable.

In the econometric analyses, tests of cross-section dependence and homogeneity are performed at first. Then, the unit root test, cointegration test, and causality test are specified pursuant to the results of cross-section dependency and heterogeneity tests. In this context, the cointegration interplay among sustainable development, market-oriented business environment, and ICT is tested by the Westerlund and Edgerton [19] panel cointegration test, which can be utilized under the subsistence of cross-sectional dependency. This cointegration test is based upon the Lagrange multiplier (LM) by McCoskey and Kao [64], and its test statistic is calculated as suggested by Equation (2).

$$LM_N^+ = \frac{1}{NT^2}\sum_{i=1}^{N}\sum_{t=1}^{T}\hat{w}_i^{-2}s_{it}^2 \quad (2)$$

In Equation (2), the partial sum of error terms (s_{it}^2) and long-run variances ($\hat{w}_i^{-2}$) are derived from the cointegration model through fully modified ordinary least squares. The subsistence of cointegration interplay among the variables is tested through test statistic of LM_N^+. However, critical values obtained from bootstrapping are used to verify the

validity of the H_0 hypothesis in favor of significant cointegration interplay if there exists cross-sectional dependency. Furthermore, the use of Monte Carlo simulation increases the robustness of the cointegration test for small sample sizes.

The causality among market-oriented business environment, ICT development, and sustainable development is investigated through the JKS [20] causality test, which can be used in the case of heterogeneous or homogenous panels. The causality test is based upon the Equation (3) [20]:

$$y_{it} = \pi_{0i} + \sum_{k=1}^{k} \delta_{pi} y_{i,t-k} + \sum_{q=1}^{Q} \varphi_{qi} X_{i,t-k} + \varepsilon_{it} \quad (3)$$

In Equation (3), $X_{i,t}$ is a scalar, $\delta_{p,i}$ corresponds to heterogeneous autoregressive effects and $\varphi_{q,i}$ heterogeneous Granger causality effects. Judois et al. [20] accepts that $y_{i,t-k}$ indicates an autoregressive distributed lag process under the null hypothesis, $\varphi_{qi} = 0$ for all I and q. This approach applies the HPJ estimator to treat the bias problem of the pooled estimator. t. The variance of the HPJ estimator can be obtained through bootstrapping if there exists cross-sectional dependency. The HPJ estimations are bias-corrected and give Wald statistics for the Granger non-causality test.

4. Results

In the application part of the article, tests of cross-sectional dependency and homogeneity are performed at first. The cross-sectional independence assumes that no countries in the panel dataset are impacted by an economic shock happening in another country from the panel dataset. On the other hand, homogeneity tests investigate whether constant and slope coefficients change among the cross-sections. The availability of cross-sectional dependency is analyzed through LM, LM CD, and $LM_{adj.}$ tests, and the results of these cross-sectional dependency tests are recorded in Table 2. The H0 (cross-section independence) is refused, and cross-sectional dependency among market-oriented business environment, ICT, and sustainable development is uncovered.

Table 2. Tests of cross-sectional dependency and their results.

Test	Test Statistics	Probability
LM	50.023	0.009
LM CD	55.774	0.014
$LM_{adj.}$	59.562	0.000

The homogeneity is analyzed through delta tilde tests, and the results of delta tilde tests are denoted in Table 3. The H0 (subsistence of homogeneity) is refused, and the presence of heterogeneity is uncovered. In conclusion, econometric tests of unit root, causality, and cointegration, which can produce strong results under the subsistence of heterogeneity and cross-sectional dependency, should be chosen to attain relatively more robust findings.

Table 3. Tests of heterogeneity and their results.

Test	Test Statistic	Probability
$\tilde{\Delta}$	38.461	0.000
$\tilde{\Delta}_{adj.}$	40.895	0.002

The availability of unit root in the variables of SUSDEV, BUSINESS, and ICT is analyzed through Pesaran [65] CIPS (Cross-sectionally augmented IPS (Im-Pesaran-Shin [66])

unit root test and test statistics of the tests are denoted in Table 4. SUSDEV, BUSINESS, and ICT are uncovered to be non-stationary at level values, but the first-differenced values of SUSDEV, BUSINESS, and ICT have been found to be stationary.

Table 4. Unit root test results.

Variables	Level		First Differences of the Seris	
	Constant	Constant + Trend	Constant	Constant + Trend
SUSDEV	−0.945	−1.016	−5.673 ***	−6.902 ***
BUSINESS	−1.149	−1.211	−8.238 ***	−8.776 ***
ICT	−0.817	−0.980	−4.221 ***	−5.231 ***

Note: Lag length is taken as 1, considering Schwarz information criterion. *** significant at 1% significance level.

The cointegration relationship among market-oriented business environment, ICT development, and sustainable development is investigated by Westerlund and Edgerton [19]. LM cointegration test owing to the sample size, cross-sectional dependency, and heterogeneity, and the findings of the cointegration test are denoted in Table 5. The null hypothesis (significant cointegration among market-oriented business environment, ICT, and sustainable development is effective) is accepted because the bootstrap probability values of the test are unveiled to be higher than the 10% significance level.

Table 5. Cointegration test results.

Constant			Constant and Trend		
Test Statistic	Asymptotic *p* Value	Bootstrap *p* Value	Test Statistic	Asymptotic *p* Value	Bootstrap *p* Value
4.815	0.321	0.390	5.202	0.413	0.457

The cointegration coefficients are forecast through the augmented mean group (AMG) estimator suggested by Eberhardt and Bond [67]. The AMG estimator counts on both cross-sectional dependency and heterogeneity and produces both panel and county-level cointegration coefficients [67]. The panel cointegration coefficients in Table 6 indicate that ICT and market-oriented business environments have a positive effect on sustainable development. 1% increase in ICT and BUSINESS, respectively, causes an 11.5% and 9.4% increase in sustainable development. Accordingly, the positive influence of ICT on sustainable development is slightly higher than that of the market-oriented business environment. Furthermore, the countries' cointegration coefficients indicate that a market-oriented business environment has a positive effect on sustainable development in all countries except Romania and the Slovak Republic. However, the positive impact of a market-oriented business environment on sustainable development is relatively stronger in Poland, Croatia, Bulgaria, the Czech Republic, and Slovenia. On the other hand, ICT also has a positive effect on sustainable development in all countries, and the positive influence of ICT on sustainable development is relatively higher in Poland, Romania, the Czech Republic, and Bulgaria. The effect of ICT on sustainable development is also much stronger than the effect of a market-oriented business environment for all countries under consideration when the countries' cointegration coefficients are taken into account.

The causal relationship among market-oriented business environment, ICT, and sustainable development is analyzed through the JKS [20] causality test, and test results are recorded in Table 7. The results of causality JKS [20] causality test uncover that BUSINESS and ICT have a significant effect on sustainable development. In addition, univariate causality analysis unveils a significant causality from the market-oriented business environment and ICT to sustainable development in line with the theoretical considerations.

Table 6. Panel and countries' cointegration coefficients.

Countries	BUSINESS	ICT
Bulgaria	0.082 **	0.112 ***
Croatia	0.094 ***	0.115 ***
Czech Republic	0.077 **	0.119 ***
Estonia	0.049 ***	0.108 ***
Hungary	0.056 ***	0.095 **
Latvia	0.040 ***	0.073 ***
Lithuania	0.059 **	0.082 ***
Poland	0.103 ***	0.125 ***
Romania	0.108	0.120 ***
Slovak Republic	0.061	0.094 ***
Slovenia	0.072 ***	0.103 **
Panel	0.094 ***	0.115 ***

***, ** denote that they are, respectively, significant at 1% and 5% levels.

Table 7. Causality test results.

Null Hypothesis	HPJ Wald Test	*p* Values
Selected covariates ↛ SUSDEV	13.5798	0.0011
BUSINESS ↛ SUSDEV	1.1884	0.0757
SUSDEV ↛ BUSINESS	33.4572	0.2340
ICT ↛ SUSDEV	1.0744	0.0400
SUSDEV↛ ICT	43.4969	0.140

5. Discussion

A market-oriented business environment is expected to theoretically foster multiple SDGs, including SDG-8(decent work and economic growth), SDG-9(industry, innovation, and infrastructure), SDG-1(no poverty), SDG-2(zero hunger), SDG-3(good health and well-being), SDG-5(gender equality), SDG-7(affordable and clean energy), SDG-11(sustainable cities and communities), SDG-12(responsible production and consumption) through promoting efficiency and directing the firms towards innovation, entrepreneurial activities, and technological progress as a result of increasing competition among the firms as long as the required environmental measures are taken. Therefore, a positive effect of the market-oriented business environment on sustainable development in the new EU members is expected a priori when the stringent EU environmental policies are taken into consideration. The cointegration coefficients of the panel and country level indicate a positive impact of a market-oriented business environment on sustainable development, but the positive impact of a market-oriented business environment on sustainable development is relatively stronger in Poland, Croatia, Bulgaria, Czech Republic, and Slovenia, because these countries have relatively higher market-oriented business environment. As a consequence, our results are in accord with the theoretical expectations.

In the related empirical literature, Mushtaq and Ali Khan [35], Dong and Zhang [36], and Sofrankova et al. [37] investigated the influence of economic freedom and its subcomponents on sustainable development for the panels with different countries through regression analysis and discovered different findings. On the one hand, Mushtaq and Ali Khan [35] and Dong and Zhang [36] revealed a positive effect of the business environment on sustainable development, while Sofrankova et al. [37] discovered a negative impact of the business environment on sustainable development. However, the use of regression analysis in these studies hinders us from making a country-level analysis. Consequently, our findings are consistent with the results of Mushtaq and Ali Khan [35] and Dong and Zhang [36].

ICT can also impact economic, social, and environmental dimensions of sustainable development via positive and negative channels, as stated in the Introduction. However, a positive influence of ICT on sustainable development is expected a priori, considering the stringent EU environmental and social policies. Therefore, the positive impact of ICT

on sustainable development at the panel and country level lines up with the theoretical expectations. Furthermore, the positive influence of ICT on sustainable development is relatively higher in Poland, Romania, the Czech Republic, and Bulgaria, although all countries have experienced remarkable increases in ICT development. The aforementioned country-level differences can probably be a result of country-specific characteristics such as ICT adoption infrastructure and human capital.

In the related empirical literature, many studies have analyzed the impact of ICT on economic growth and environment, but only Karabetyan [26], Nchofoung and Asongu [38], and Jayaprakash and Pillai [39] analyzed the influence of ICT on overall sustainable development. Therefore, our findings are also compatible with the results of Karabetyan [26], Nchofoung and Asongu [38], and Jayaprakash and Pillai [39].

The results of causality analysis also indicate a significant influence of market-oriented business environment and ICT on sustainable development in the short run. The findings of causality analysis are consistent with the theoretical considerations. However, a comparison with the related empirical literature cannot be made due to the non-availability of studies investigating the causality among market-oriented business environment, ICT, and overall sustainable development.

Consequently, market-oriented business environment and ICT are uncovered as short and long-run drivers of sustainable development. Therefore, governments can make progress in overall sustainable development by designing the business environment by regulations, improving the ICT infrastructure, and fostering digital literacy and ICT adoption through educational programs and institutional incentives. However, the negative environmental and social impacts of a market-oriented business environment and ICT should be overcome by legal or market-based environmental policies and social policies.

6. Conclusions

The remarkable environmental impairment globally significant increases in poverty and inequalities have led the countries and international institutions to combat aforementioned global problems, and in turn, sustainable development was suggested as a key to overcoming these problems. In this context, identification of the factors underlying sustainable development is vital to make the improvement in sustainable development. However, the researchers have generally concentrated on the drivers of environmental sustainability in the empirical literature. Therefore, this study investigates the influence of market-oriented business environment and ICT development on overall sustainable development in the new EU members to see the net impact of both variables on sustainable development because both market-oriented business environment and ICT development simultaneously can impact the economic, social, and environmental dimensions of sustainable development through positive and negative channels. The existence of the sustainable development index as of 2000 and the data of business regulations index to be available until 2020 limit the study period with the 2000–2020 period.

The results of the causality test indicate a causal relationship between a market-oriented business environment and ICT to sustainable development in the short run. The results of the cointegration test also uncover a positive impact of market-oriented business environment and ICT on sustainable development in the long run. Therefore, both the market-oriented business environment and ICT development are significant positive drivers of sustainable development in the short and long run. The results of both causality and cointegration tests are consistent with the theoretical considerations and the results of the limited empirical studies to a great extent. We evaluate that the EU environmental and social policies play a significant role in interaction among market-oriented business environment, ICT, and sustainable development.

Our results indicate that a market-oriented business environment and ICT development are significant instruments for making progress in overall sustainable development. However, the negative environmental and social effects of both market-oriented business environment and ICT development should be balanced by stringent environmental and

social policies to achieve progress in overall sustainable development. Future studies can study the role of environmental and social policies on the relationship between the business environment and overall sustainable development.

Author Contributions: Conceptualization, N.A.M., G.S., M.D. and M.A.T.; methodology, N.A.M., G.S., M.D. and M.A.T.; formal analysis, N.A.M., G.S., M.D. and M.A.T.; investigation, N.A.M., G.S., M.D. and M.A.T.; writing—original draft preparation, N.A.M., G.S., M.D. and M.A.T.; writing—review and editing, N.A.M., G.S., M.D. and M.A.T.; supervision, N.A.M. and G.S. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Data is acquired from open access databases of Sachs et al. [16], Fraser Institute [17], and UNCTADSTAT [63].

Conflicts of Interest: The authors declare no conflict of interest.

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