

Urbanisation and Social Development among EU Countries within Attaining SDGs

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Abstract

Urban areas frequently provide improved access to resources and services; however, the presence of disparities (distribution of resources, opportunities, and services) within and among cities impedes the equitable achievement of global development objectives across EU member states. In the context of EU member states, these disparities can manifest in various ways and have significant implications for sustainable development and social equality. It is necessary to address these urban-related challenges and disparities to ensure the comprehensive implementation of sustainable development goals (SDGs) in EU countries. This paper explores the complex interplay between urbanisation, social development, and the realisation of SDGs in EU countries during the period from 2004 to 2021. Employing the system generalised method of moments (GMM) analysis, this study seeks to empirically validate the hypothesis suggesting that increasing urbanisation is associated with enhanced social equity, which in turn positively influences the achievement of Sustainable Development Goals (SDGs). The research findings reveal a compelling pattern: as urbanisation experiences growth, it stimulates a simultaneous reduction in social inequities within EU member states. Moreover, this diminishing trend in social inequalities exerts a favourable impact on the attainment of SDGs. This research contributes to the understanding of the multifaceted challenges and opportunities associated with promoting sustainable development across the diverse urban landscapes of the EU. These findings could lead policymakers to design targeted interventions and strategies aimed at fostering greater equity and inclusivity in the pursuit of the SDGs within the EU context.

Key words

social gap, no poverty, green development, sustainable development, urban area.

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Introduction

Urbanisation continues to be a dominant global trend, with an increasing proportion of the population residing in urban areas. This rapid urban growth is driven by factors such as rural-to-urban migration, industrialization, and economic opportunities concentrated in cities. The migration of individuals from rural to urban environments often corresponds with expectations of improved living standards, better access to education, and enhanced healthcare services. However, this approach also brings to the forefront the challenge of addressing social disparities within urban settings. Access to essential services, social infrastructure, and opportunities must be equitable to ensure that the benefits of urbanisation contribute to overall social development. Cities, as epicentres

of economic activity, offer unparalleled opportunities for education (Kosova et al., 2021) and employment. The concentration of educational institutions and job markets in urban areas attracts a diverse pool of talent, fostering an environment conducive to innovation and intellectual exchange (Fila et al., 2020; Marchesani, 2023; Trzeciak et al., 2022; Dźwigoł & Trzeciak, 2023). This connection between urbanisation and educational and employment opportunities directly aligns with Sustainable Development Goal (SDG) 4 (Quality Education) and SDG 8 (Decent Work and Economic Growth). Scholars (Jiang et al., 2021; Kuddus et al., 2020; Kwilinski, 2023a; 2023b) have shown that urbanisation's impact on public health underscores the intersection between urban development and social well-being. While cities provide advanced healthcare facilities and services, the density and pace of urban life also pose health challenges. Sustainable urban planning that prioritizes green spaces (Benton-Short et al., 2021), healthcare accessibility (Antosova et al., 2019; Jarvis et al., 2020; Mouratidis, 2021; Letunovska et al., 2022), and sanitation contributes directly to SDG 3 (good health and well-being). Achieving social development goals necessitates the creation of inclusive urban spaces (Benton-Short et al., 2021). Urbanisation offers an opportunity to build communities that embrace diversity, foster social cohesion, and promote inclusivity. Efforts to reduce inequalities within urban settings directly contribute to SDG 10 (reduced inequalities) (Sotnyk et al., 2018; Cojocararu et al., 2022; Kwilinski et al., 2023; Kuhn, 2020). Understanding the dynamic relationship between urbanisation and environmental sustainability is pivotal in the context of the SDGs. Unplanned urban growth can lead to environmental degradation, emphasizing the need for eco-friendly practices and sustainable urban planning. A striking balance between urban expansion and environmental preservation is crucial for achieving SDG 11 (sustainable cities and communities). Furthermore, Benton-Short et al., (2021) have suggested that strong social ties and community engagement contribute to the ability of urban areas to adapt to change and withstand challenges. This finding resonates with the essence of SDG 11, emphasizing the importance of resilient, inclusive, and sustainable cities.

The background of EU cities under urbanisation and social development is a broad and complex topic, encompassing historical, economic, social, and environmental dimensions. A lot of EU cities have the common roots which contributes to the diverse cultural and architectural heritage seen in these cities today. Understanding the background of EU cities under urbanisation and social development involves recognizing the interplay of historical legacies, economic transformations, social policies, and future challenges. Each city has its unique trajectory, but collectively they illustrate the broader trends and dynamics of urban life in the European context.

Achieving sustainable urbanisation requires a holistic approach that addresses social inequalities, prioritizes environmental sustainability, and aligns with the broader framework of the SDGs. By recognizing and harnessing these connections, policymakers and urban planners pave the way for countries that not only burgeon economically but also contribute substantively to social development and the realisation of sustainable development objectives (Li & Piachaud, 2006; Li et al., 2022; Jiang et al., 2022; Stan, 2022; Grodzicki & Jankiewicz, 2022). Thus, this paper aims to evaluate the interplay between urbanisation and social development in attaining the SDGs. This paper introduces a novel theoretical framework for achieving Sustainable Development Goals (SDGs) by enhancing urbanisation and social development policies, utilizing composite indices of SDGs, a comprehensive social development index, and advanced econometric techniques to address multifaceted challenges within the unique context of EU member states.

The paper has the following structure: Literature Review – analysis of the theoretical framework linking urbanisation, social development and attaining SDGs; Materials and Methods – exploring the selected instruments and methods to check the outlined hypothesis, databases and sources; Results – explaining the empirical results on checking the research hypothesis; Discussion – comparison analysis of the obtained findings with the past related studies; Conclusions – summarizing the results of investigations, policy implications considering the findings, limitations and further directions for investigations.

1. Literature review

The intricate interplay between urbanisation and social development constitutes a nuanced discourse within the broader paradigm of pursuing Sustainable Development Goals (SDGs) (Li & Piachaud, 2006; Li et al., 2022; Jiang et al., 2022; Stan, 2022; Grodzicki & Jankiewicz, 2022; Wang et al., 2022; Zhong & Chen 2022). Advocates posit that judiciously planned urban development is integral to economic growth (Addai et al., 2022; Gierałtowska et al., 2022) and the creation of employment opportunities (Stan, 2022; Faragó et al., 2022), aligning with SDGs pertaining to decent work and economic prosperity (Panina, 2022; Agozie et al., 2022). According to Chen et al. (2022), the interrelations between urbanisation and the 17 SDGs reveal synergies in 151 targets, 40% of which display pronounced synergies, and trade-offs are discernible in 66 targets, 18% of which manifest notable trade-offs. Through a comprehensive analysis of these dynamics within four pivotal interaction domains, Chen et al. (2022) proposed recommendations for sustainable urbanisation, prioritizing considerations such as shared well-being, environmentally conscious and low-carbon urban development, the establishment of resilient cities, and the cultivation of multilateral cooperation in urban settings. Kalfas et al. (2023) confirmed the positive correlation between indicators of urbanisation quality and the pursuit of sustainable development through a survey of 384 government leaders.

Xu et al. (2022), Abdulqadir (2023), Goel and Vishnoi (2022) outline that urbanisation catalyze the achieving SDGs. This viewpoint emphasizes the positive impact of urbanisation on achieving SDGs, particularly in the context of China's societal transformation and sub-Saharan African countries. Urbanisation, when coupled with an understanding of its dynamics and thresholds, is seen as a direct contributor to sustainable development. Moreover, the role of digitalization in this context is highlighted, suggesting that it plays a crucial role in attaining SDGs and reducing social inequalities, provided there is adequate knowledge, competence, and infrastructure. Proponents Hariram et al. (2023) and Beck and Fresco (2023) argue that urbanisation creates diverse and interconnected environments. These settings are seen as fertile grounds for cultural exchange, collaboration, and social integration, thereby contributing positively to the social fabric of urban areas. The scholars (Trushkina et al., 2020; Szczepańska-Woszczyna & Gatnar, 2022; Melnychenko, 2019; Lagodiienko & Yakushko, 2021) outline the conditional benefits of urbanisation and digitalization. This viewpoint recognizes the potential benefits of urbanisation and digitalization but also notes that their efficiency and positive impact depend on several factors. Specifically, the effects of digitalization on income share, labour force participation rate, and unemployment rate are acknowledged, but the realisation of these benefits is contingent upon the availability of knowledge, competence, and infrastructure readiness. The past studies (Chancel, 2020; Whelan et al., 2023) contend that the precipitous and unregulated expansion of urban areas may disproportionately affect marginalized communities, potentially exacerbating extant social inequalities. The scholars (Rusca et al., 2023; Zhanibek et al., 2022; Miśkiewicz, 2019; Kwilinski et al., 2023; Zhong et al., 2023; Abera et al., 2022) indicated the potential negative consequences of urbanisation, especially when it is unregulated or unplanned. The concern here is that rapid and unchecked urban expansion can disproportionately affect marginalized communities, leading to an exacerbation of existing social inequalities. The studies (Almulhim & Cobbinah, 2023; Tiutiunyk et al., 2021; Van den Buuse et al., 2022; Xue, 2022) underscore the complexities and inherent challenges in aligning urban development with the imperative of social inclusivity. It recognizes the potential benefits of urbanisation but also the need for careful and inclusive planning to ensure that these benefits are equitably distributed and do not come at the cost of widening social gaps.

Scholars (Mahtta et al., 2022; Sasmita et al., 2023) have shown that in the context of urbanisation and social development, a higher GDP per capita often correlates with improved living standards and increased access to essential services in urban areas. Sustainable development goals, such as those related to quality education; good health (Letunovska et al., 2022; Mouratidis, 2021); and reduced inequalities, benefit from a higher GDP per capita as it provides the financial resources needed to

invest in infrastructure, education (Szostek, 2021; Mihalcova et al., 2020; Lipkova, & Braga, 2016; Dzwigol, 2021a; 2021b), and healthcare (Letunovska et al., 2022; Mouratidis, 2021). However, ensuring that economic benefits are distributed equally is crucial to preventing social disparities within urban populations. Furthermore, economic growth rates are indicative of a nation's overall economic prosperity and development. In the urban context, sustained economic growth fuel infrastructure development (Levchenko et al., 2019; Trushkina, 2019), job creation (Dacko-Pikiewicz, 2019; Brun & Gnangnon, 2017; Arif et al., 2022; Roy et al., 2021), and improve social services. However, the challenge lies in ensuring that economic growth is inclusive and benefits all segments of the population, preventing the concentration of wealth in urban centers. This approach is crucial for addressing SDGs related to reducing inequality (SDG 10) and ensuring sustainable cities and communities (SDG 11). Studies (Rasoolimanesh et al., 2019; Meyer & Auriacombe, 2019; Aina et al., 2019) outline that effective governance is fundamental for addressing challenges related to urbanisation, such as slum formation, inadequate infrastructure, and disparities in service delivery. Policies supporting affordable housing, social protection, and community engagement contribute to achieving SDGs related to no poverty (SDG 1), reduced inequalities, and sustainable cities and communities (Rassanjani et al., 2019; Raiden & King, 2021; Christley et al., 2021). The regulatory environment, as indicated by global governance metrics, significantly influences economic activities, the investment climate, and social well-being within urban areas. A conducive regulatory environment fosters economic growth, job creation, and social stability, directly impacting the SDGs associated with decent work and economic growth (SDG 8) and good health and well-being (SDG 3). Conversely, inadequate regulations may lead to social disparities, economic instability, and challenges in achieving SDGs.

The correlation between urbanisation and social development is characterized by a complex set of viewpoints and scholarly content. Navigating these intricacies is imperative for policymakers, urban planners, and stakeholders, necessitating a nuanced understanding to formulate strategies that not only foster urban growth but also contribute positively to social well-being and the overarching objectives of the SDGs. Considering the above, the following hypothesis is highlighted:

Hypothesis: Increasing urbanisation is associated with enhanced social equity, which in turn positively influences the achievement of Sustainable Development Goals (SDGs).

2. Methodology

2.1. Model specification and Methodology

To investigate the interplay among urbanisation, social development, and the achievement of sustainable development goals (SDGs), the study employs the following model:

$$SDG_{it} = \alpha_0 + \beta_1 Urban_{it} + \beta_2 Social_{it} + \beta_3 Control_{it} + \varepsilon_{it} \quad (1)$$

where SDG_{it} represents the level of attainment of Sustainable Development Goals; $Urban_{it}$ signifies the degree of urbanisation; $Social_{it}$ denotes the state of social development; $Control_{it}$ is the set of control variables; and ε_{it} is the error term capturing unobserved factors affecting SDG attainment not accounted for by the included variables. The coefficients β_1 and β_2 , respectively reflect the intercept, the impact of urbanisation, and the influence of social development on SDG attainment.

To address issues related to data volatility and heteroscedasticity, all the data in Model (1) undergo natural logarithm processing. In the initial step, multicollinearity and correlation tests were performed to identify potential issues from significant correlations among independent variables. Next, to address econometric challenges such as multicollinearity, heteroscedasticity, serial correlation, and endogeneity, the study employed a series of panel data techniques: the random effects model, feasible generalized least squares (FGLS), and system generalised method of moments (Sys-GMM). Finally, a robustness check was conducted by substituting the social development variable

(Social) in Equation (1) with gross national income per capita and re-estimating the econometric model to assess the reliability of the empirical results.

2.2. Data

The dataset for the study comprises annual secondary data for EU countries spanning from 2008 to 2020. To determine the SDG level, this study utilized the indicator calculated based on The Sustainable Development Report's methodology, following the approach proposed in Diaz-Sarachaga et al. (2018), Lafortune et al. (2018), Korobets et al. (2020) and Kubiszewski et al. (2022). This methodology involves data normalization, removal of extreme values, and equal weighting of all 17 Sustainable Development Goals, ensuring a comprehensive assessment of a country's progress in sustainable development while identifying areas that require improvement.

Following the methodology of Zhao et al. (2022) and Geng et al. (2022), the degree of urbanisation in the country (*Urban*) is measured by the proportion of the population residing in urban areas. A higher proportion of the urban population often correlates with economic growth, industrialization, and improvements in living standards. However, it also brings challenges such as increased pollution, urban congestion, and inequality.

To evaluate social development (*Social*), this study employs a composite social development index, constructed using the entropy method. This method objectively assesses the diversity or spread of values across multiple indicators, ensuring that the weights assigned to each indicator are based on their relative information content. Additionally, the entropy method minimizes subjectivity in the process, providing a more reliable and accurate measure of social development (Li et al., 2022; Jiang et al., 2022). The steps involved in the entropy method for constructing a complex index include the following steps:

1. Normalization of Indicators. Indicators of the Social Development Index are on different scales, so they need to be normalized to bring them onto a common scale:

$$X_{i,norm} = \begin{cases} \frac{X_i - \min(X)}{\max(X) - \min(X)}, & \text{positive contributors} \\ \frac{\max(X) - X_i}{\max(X) - \min(X)}, & \text{negative contributors} \end{cases} \quad (2)$$

where $X_{i,norm}$ is the normalized value of indicator X_i and $\max(X)$, $\min(X)$ are the maximum and minimum values of indicator X_i , respectively.

This step helps to ensure that each indicator contributes proportionately to the overall assessment.

2. Calculation of Indicator Entropy: For each normalized indicator, the entropy is calculated. This involves determining the probability distribution of the values and computing the entropy as a measure of their diversity.

$$E_i = -\frac{1}{\ln(n)} \sum_{j=1}^k p_{ij} \ln(p_{ij}) \quad (3)$$

$$p_{ij} = \frac{1 + X_{i,norm}}{\sum_{i=1}^n (1 + X_{i,norm})} \quad (4)$$

where p_{ij} is the normalized probability of the j th value of indicator X_i and k is the number of distinct values for X_i .

3. Weight Assignment. The weights (W_i) for each indicator are subsequently determined based on their entropy values:

$$W_i = \frac{1 - E_i}{\sum_{i=1}^n (1 - E_i)} \quad (5)$$

Higher entropy values result in lower weights, signifying that indicators with greater variability contribute less to the overall index.

4. Construction of the composite social development index (*Social*). The complex index is constructed by aggregating the normalized indicators with their assigned weights:

$$Social = \sum_{i=1}^n W_i X_{i,norm} \quad (6)$$

The composite social development index incorporates key dimensions of societal well-being and development, providing a thorough and systematic assessment of social processes. The selected indicators capture critical aspects of social well-being, including demographic, economic, health, and educational factors: demographic and health indicators (The fertility rate and life expectancy are fundamental indicators of population dynamics and public health. The fertility rate reflects demographic trends and planning requirements, while life expectancy serves as a comprehensive measure of healthcare quality and living conditions. Additionally, the under-five mortality rate and access to safely managed sanitation services serve as indicators of the effectiveness of healthcare systems and public health infrastructure, which are essential for sustainable social development); economic and labour market indicators (The Gini index, government expenditure on education, and income share of the lowest 20% measure income inequality, social equity, and economic inclusivity. The labour force participation and unemployment rates reflect the health of the labour market, economic stability, and employment opportunities within society); education and welfare indicators (School enrolment rates provide insight into societal investment in human capital, while the proportion of the population aged 65 and above highlights the challenges posed by an aging population, particularly in relation to social support and welfare). The details of the output indicators are outlined in Table 1.

Table 1. Descriptive statistics for the output variables of the composite social development index.

Variable	Mean	Std. Dev	Min	Max	Variable	Mean	Std. Dev	Min	Max
Fertility rate	1.548	0.194	1.130	2.060	Mortality rate, under 5	4.540	1.898	2.100	13.900
Gini index	31.400	3.673	23.200	42.252	People using safely managed sanitation service	83.939	11.649	42.531	99.653
Government expenditure on education	11.330	2.209	7.157	18.905	Population ages 65 and above	17.893	2.633	10.758	23.372
Income share held by lowest 20%	7.753	1.221	4.900	10.200	School enrollment	101.410	5.450	84.133	128.644
Labor force participation rate	72.044	4.934	59.250	83.842	Unemployment	8.798	4.559	2.010	27.470
Life expectancy at birth	79.255	2.953	71.812	83.832					

Source: developed by authors.

Figure 1 illustrates the results of the social development index derived using the entropy method. The analysis of social development across European Union countries highlights significant variations in societal progress.

The control variables in the model (1) were selected based on the literature (Jamel, 2020) and data availability. These include economic development, trade openness, and political stability. Economic development is a key driver of social progress and SDG achievement (Senyah, 2023). GDP per capita growth (*GDP*) is included to capture economic context and available resources for sustainable initiatives. Political stability is essential for effective policy implementation and SDG progress (Szczepańska-Woszczyzna et al., 2022). Political stability (*Political*) is assessed using the World Government Indicators, reflecting perceptions of political instability and violence. Trade openness (*TO*) measures a country's participation in international trade (Jamel, 2020). It is linked to economic integration and access to global markets and can influence urbanisation and social development by impacting economic activities and employment opportunities.



Fig. 1. The social development of EU countries, 2008-2020. Vertical axis represents the level of social development. Horizontal axis shows the progression over years.

Source: developed by authors.

3. Research results

The results of the descriptive statistics are shown in Table 2.

Table 2. The descriptive statistics of the data.

Variable	Source	Symbols	Mean	Std. Dev	Min	Max
Sustainable development goals	Sustainable Development Reports	SDG	78.186	3.476	70.800	86.400
Social development	Composite index	Social	0.139	0.018	0.097	0.188
Urbanisation	Eurostat	Urban	72.688	13.208	52.209	98.079
GDP per capita	World Bank	GDP	16.450	3.906	0.996	38.661
Trade openness	World Bank	TO	129.802	67.942	45.419	380.104
Political stability	World Bank	Political	0.769	0.345	-0.474	1.512

Source: developed by authors.

The VIF statistics in Table 3 indicate that the values for all variables are below 5, suggesting that there are no significant multicollinearity issues among the variables. Additionally, the correlation matrix reveals significant positive correlations between most variables.

Table 3. The VIF statistics and correlation matrix.

Symbols	VIF	1/VIF	SDG	Urban	Social	GDP	TO	Political
SDG	–	–	1.000					
Urban	1.58	0.632	0.2259* (0.0000)	1.000				
Social	1.49	0.671	0.5721* (0.0000)	0.5721* (0.0000)	1.000			
GDP	1.07	0.939	0.5039* (0.0000)	0.5423* (0.0000)	0.1161* (0.0000)	1.000		
TO	1.51	0.662	-0.3032* (0.0000)	0.1821* (0.0010)	0.1158** (0.0370)	0.1385** (0.0125)	1.000	
Political	1.6	0.625	0.2209* (0.0001)	0.1117** (0.0443)	0.2896* (0.0000)	0.3588* (0.0000)	0.4266* (0.0000)	1.000

Source: developed by authors.

The outputs of the benchmark regression analysis are presented in Table 4. According to all three models (random effects, FGLS, and Sys-GMM), urban status has a positive and statistically significant

impact on SDG achievement, with coefficients of 0.098, 0.006 and 0.088, respectively. This implies that an increase in urbanisation corresponds to an increase in SDG scores. For instance, over the past decade, Germany has undergone substantial urbanisation marked by the growth of its metropolitan areas, increased industrialization, and a surge in urban infrastructure development (Reicher, 2022; Asadzadeh et al., 2022). Notably, Germany has invested significantly in eco-friendly urban planning, renewable energy projects, and public transportation systems, contributing to a more sustainable and environmentally conscious urban landscape. This positive relationship suggests that a country's urbanisation efforts are positively associated with its achievements in meeting its Sustainable Development Goals, reflecting the broader trend observed across EU countries. However, the example of Germany's urbanisation and its associated positive outcomes on SDG achievements is illustrative but should be viewed in the context of specific national policies and initiatives. Germany's focus on eco-friendly urban planning, renewable energy, and public transportation has likely contributed significantly to its SDG achievements. However, these results might not be universally replicable, as they are influenced by a unique combination of policy decisions, economic conditions, and societal factors. This insight may guide policymakers in recognizing the potential benefits of strategic urbanisation planning in contributing to sustainable development outcomes.

Table 4. The empirical results of benchmark regression.

Variable	Random effects	FGLS	Sys-GMM
	(1) SDG	(2) SDG	(3) SDG
$SDG_{i,t-1}$	–	–	0.719* (18.440)
Urban	0.098* (3.060)	0.006** (2.060)	0.088* (4.830)
Social	0.137* (7.820)	0.178* (70.400)	0.028** (2.230)
GDP	0.049* (5.610)	0.006* (4.730)	0.026* (5.380)
TO	-0.006** (-2.100)	-0.045* (-36.560)	-0.004* (-3.660)
Political	-0.001 (-0.680)	0.014* (20.600)	0.006 (2.820)*
Constant	3.993* (27.410)	4.890* (326.700)	0.801
R ²	0.447		
AR (1)			0.000
AR (2)			0.056
Sargan test			0.294
Number of obs	325	325	300

Note: *, and ** – statistically significant at 1% and 5%, respectively; z values in parentheses.

Source: developed by authors.

Social development has a highly significant positive relationship with the SDGs, as indicated by coefficients of 0.137, 0.178, and 0.028. An increase in social development is associated with a concurrent increase in SDG scores. This finding suggests that as a country makes progress in social development indicators, such as improving education, healthcare, and social welfare systems, there is a simultaneous and positive impact on its overall performance in meeting the targets outlined in the SDGs. For instance, Sweden reveals a correlation between its strong commitment to social development, marked by robust education and healthcare systems, and the observed improvement in SDG scores (Addabbo & Militello, 2023; Zheng et al., 2023). Similarly, Denmark's national policies emphasizing social inclusivity and equitable development align with the positive coefficients, demonstrating the broader applicability of these findings (Bibri et al., 2020). Even in Italy, despite regional variations, investments in education and healthcare positively contribute to SDG attainment (Ionescu et al., 2020). Conversely, GDP has a positive and statistically significant relationship with

SDGs according to the random effects model and Sys-GMM, with coefficients of 0.006 and 0.049, respectively. This suggests that higher GDP growth is linked to an increase in SDG scores. Political stability exhibits a positive and highly significant relationship with SDGs in the FGLS model, as indicated by a coefficient of 0.014. According to the other two models, political stability has a nonsignificant effect on SDGs. TO has a negative and highly significant impact on SDGs. This negative correlation may stem from increased economic inequality resulting from an uneven distribution of trade benefits, potential environmental degradation associated with intensive trade, shifts in the labour market impacting social and economic aspects, and vulnerability to global economic fluctuations. These findings underscore the intricate balance required in trade policies to align with and support the pursuit of sustainable development goals.

Given the potential endogeneity issue within the sample data, the Sys-GMM method is chosen as the fundamental estimation method for mitigating the endogeneity problem (Gunawan et al., 2023). Furthermore, the application of the Sys-GMM approach is advantageous for sample data characterized by a large N (25 countries) and a small T (13 years). The values of the AR(1), AR(2), and Sargan statistics indicate that the estimated results successfully meet the requirements of the Arellano-Bond (A-B) and Sargan tests. The Sys-GMM results reveal that a 1% increase in social development leads to a 0.028% enhancement in sustainable development goals (SDGs). Additionally, a 1% increase in urbanisation is associated with an SDG improvement of 0.088%.

Tables 5 and 6 display the results of the robustness checks.

Table 5. The empirical results of robustness tests (proxy variable).

Variable	Gross National Income per Capita		
	Random effects	FGLS	Sys-GMM
$SDG_{i,t-1}$	–	–	0.712* (17.390)
Social	0.050* (6.410)	0.043* (86.030)	0.003* (5.140)
Urban	0.070** (2.000)	0.011* (6.880)	0.096* (5.290)
Control variables			
Constant	3.292* (24.000)	4.098* (489.810)	0.701* (6.360)
R ²	0.452		
AR (1)			0.000
AR (2)			0.023
Sargan test			0.560
Number of obs	325	325	300

Note: *, **, and *** – statistically significant at 1%, 5%, and 10%, respectively; z values in parentheses.

Source: developed by authors.

Table 6 displays the results of the robustness test, involving the exclusion of specific values from the sample.

Table 6. The empirical results of robustness tests (removing values from the sample).

Variable	Gross National Income per Capita		
	Random effects	FGLS	Sys-GMM
$SDG_{i,t-1}$	–	–	0.751* (18.450)
Social	0.129* (6.790)	0.046* (18.750)	0.027*** (1.890)
Urban	0.080** (2.210)	0.066* (70.330)	0.062* (3.670)
Control variables			
Constant	4.031* (25.250)	4.299* (446.570)	0.815* (5.230)
R ²	0.459		
AR (1)			0.000

Variable	Gross National Income per Capita		
	Random effects	FGLS	Sys-GMM
AR (2)			0.041
Sargan test			0.762
Number of obs	273		252

Note: *, **, and *** – statistically significant at 1%, 5%, and 10%, respectively; z values in parentheses.

Source: developed by authors.

The results of a robustness check using an alternative measure of social development are presented. Importantly, irrespective of the method or indicator employed, the consistent positive impact of social development and urbanisation on SDGs remains robust and reliable.

In this instance, statistical data from Austria, Denmark, Sweden, and Germany were omitted due to their high position of SDG in the EU dataset.

The coefficients of Urban and Social for all three methods exhibit significantly positive values at the 1% and 5% significance levels, respectively. This output underscores that even after excluding particular values, the estimation outcomes consistently support the conclusion that both urbanisation and social development have a positive impact on achieving SDGs.

4. Discussion

The findings of this study provide robust empirical support for the hypothesis that urbanisation and social development contribute positively to SDG attainment in European Union countries. More importantly, the results extend previous research by demonstrating that urbanisation and social development should be considered complementary rather than independent drivers of sustainable development.

The positive relationship identified between urbanisation and SDG achievement is consistent with the findings of Xu et al. (2022), Goel and Vishnoi (2022), and Abdulqadir (2023), who argued that urbanisation serves as a catalyst for sustainable development by improving economic opportunities, infrastructure provision, and access to public services. Similarly, Chen et al. (2022) reported that urbanisation generates substantial synergies with the majority of SDG targets, suggesting that urban development can accelerate progress across multiple dimensions of sustainability. The positive coefficient of urbanisation obtained in this study confirms these conclusions within the specific context of EU countries. However, while previous studies mainly relied on conceptual analyses, case studies, or regional evidence, the present research provides panel-data evidence covering a broad set of EU member states over an extended period, thereby strengthening the empirical support for the urbanisation–SDG nexus. The obtained results also support the arguments of Hariram et al. (2023) and Beck and Ferasso (2023), who suggested that urban environments facilitate social integration, stakeholder engagement, and knowledge exchange, creating favourable conditions for sustainable development. The findings indicate that urbanisation in the EU is associated not only with economic transformation but also with improvements in social outcomes, which ultimately enhance SDG performance. At the same time, the results partially contrast with studies emphasizing the adverse consequences of rapid urban expansion. Chancel (2020), Rusca et al. (2023), and Zhanibek et al. (2022) warned that uncontrolled urbanisation may increase social inequalities and disproportionately affect vulnerable groups. Similarly, Almulhim and Cobbinah (2023) highlighted the risks associated with unsustainable urban growth. The present findings do not support these pessimistic perspectives in the context of EU countries. A possible explanation is that European urbanisation has been accompanied by stronger institutional frameworks, social protection systems, and regional cohesion policies than those typically observed in developing economies. Consequently, urbanisation in the EU appears to generate net positive effects on sustainable development outcomes.

The positive impact of social development on SDG attainment is strongly aligned with previous research emphasizing the importance of social inclusion, education, healthcare, and welfare systems for sustainable development. Studies by Mahtta et al. (2022) and Sasmita et al. (2023) demonstrated

that improvements in human development indicators contribute to higher living standards and broader socio-economic progress. Similarly, Letunovska et al. (2022) and Mouratidis (2021) emphasized the role of healthcare accessibility, whereas Szostek (2021), Mihalcova et al. (2020), and Lipkova and Braga (2016) highlighted the importance of educational investments. The positive coefficients obtained for the social development index confirm that investments in human capital and social infrastructure represent fundamental prerequisites for achieving sustainable development goals. Furthermore, the findings support the arguments of Cojocaru et al. (2022), Kuhn (2020), and Kwilinski et al. (2023), who stressed the importance of reducing inequalities as a central element of the SDG framework. The composite social development index used in this study incorporates dimensions directly related to inclusiveness and equality, suggesting that socially inclusive development pathways are associated with superior sustainability outcomes.

An important finding concerns the role of economic growth. The positive effect of GDP per capita growth on SDGs is consistent with the conclusions of Addai et al. (2022), who reported that economic prosperity provides financial resources necessary for investments in infrastructure, healthcare, and education. However, the comparatively smaller magnitude of GDP coefficients relative to urbanisation and social development suggests that economic growth alone is insufficient for sustainable development. This observation supports the arguments of Hariram et al. (2023), who advocated for an integrated socio-economic-environmental perspective rather than purely growth-oriented development strategies. The negative relationship between trade openness and SDG attainment deserves particular attention. While Brun and Gnangnon (2017), Arif et al. (2022), and Jamel (2020) highlighted the potential benefits of international trade through increased economic integration and access to global markets, the present findings indicate that greater trade openness may also generate sustainability challenges. This result is consistent with studies emphasizing that globalization can exacerbate inequalities or environmental pressures if not supported by adequate regulatory frameworks. Therefore, the relationship between trade openness and sustainable development appears more complex than generally assumed and depends on the institutional capacity of countries to manage the associated social and environmental externalities.

Regarding political stability, the findings partially confirm previous studies by Rasoolimanesh et al. (2019), Meyer and Auriacombe (2019), and Aina et al. (2019), which emphasized the importance of governance quality for sustainable development. Although political stability was significant only in some model specifications, its positive coefficient suggests that stable institutional environments facilitate the implementation of long-term sustainability policies. The mixed significance levels across models indicate that governance may operate indirectly through other channels, including social development and economic performance.

This study contributes to the existing literature in three important ways. First, it empirically validates the complementary relationship between urbanisation and social development in promoting SDG achievement. Second, it provides evidence that the positive effects of urbanisation outweigh the potential negative consequences highlighted in part of the literature, at least within the EU context. Third, it demonstrates that social development represents one of the strongest determinants of sustainable development, suggesting that investments in education, healthcare, and social inclusion should remain central components of sustainability strategies. These findings support the growing consensus that achieving the SDGs requires an integrated approach combining economic, social, and urban development policies rather than focusing on any single dimension of development.

Conclusions

The empirical findings highlight the significance of urbanisation and social development in advancing Sustainable Development Goals (SDGs), aligning with prior research (Chancel, 2020; Panina, 2022; Agozie et al., 2022; Whelan et al., 2023). Urbanisation reflects a nation's developmental progress, while social development enhances quality of life, both crucial for achieving SDGs. However, economic indicators present mixed impacts. High GDP growth, while beneficial for

investments in sustainability, can also lead to environmental degradation and inequality if not managed responsibly. Similarly, trade openness fosters economic expansion and technological advancement but may exacerbate environmental and social disparities without proper policies (Brun & Gnanon, 2017; Roy et al., 2021; Arif et al., 2022).

Political stability emerges as a key determinant of SDG outcomes. Stable governance facilitates long-term planning, foreign investment, and policy continuity, essential for sustainable progress. Conversely, instability disrupts development efforts, deterring investments and creating uncertainty (Rasoolimanesh et al., 2019; Meyer & Auriacombe, 2019; Aina et al., 2019).

The study underscores the intricate interplay between urbanisation, social development, economic policies, and governance in shaping SDG performance. A balanced approach—where economic growth and trade openness are pursued alongside environmental and social safeguards, and political stability is prioritized—remains crucial. These insights call for integrated, multidimensional strategies to ensure sustainability. By acknowledging these complexities, policymakers can foster resilient development pathways, ensuring that urbanisation and economic growth contribute positively to long-term sustainability.

Policymakers should consider relationships between development indicators to effectively advance SDGs. EU countries should integrate sustainable urban planning strategies, as seen in Copenhagen, which prioritizes green infrastructure and cycling networks (Bibri et al., 2020). Investing in education (Gunawan et al., 2023), healthcare (Antosova et al., 2019; Jarvis et al., 2020; Mouratidis, 2021; Letunovska et al., 2022), and social services helps reduce inequalities, as demonstrated by Sweden (O'Brien & Dempsey, 2004). Germany's dual education system effectively addresses unemployment (Ganie, 2022). Civic participation models, such as neighbourhood councils in Germany, improve policymaking (Hoppe et al., 2015). Estonia's e-governance initiatives enhance civic engagement (Charles, 2009; Kalvet, 2012; Reshetnikova et al., 2019; Lagodienko & Yakushko, 2021; Lanamäki & Tuvikene, 2022). Social entrepreneurship, supported in Sweden, fosters economic growth (Defourny & Nyssens, 2008; 2010; Gawell, 2014). Family-friendly policies, similar to Sweden's, support work-life balance (Zheng et al., 2023; Addabbo & Militello, 2023). Reducing income inequality through progressive tax policies, as seen in Denmark and Finland, lowers the Gini index (Aaberge & Bengtsson, 2024; Onofrei et al., 2023). By adopting these best practices, EU countries can develop sustainable, inclusive, and resilient communities aligned with SDGs.

Despite valuable findings, this study has limitations that future research should address. Expanding the scope to countries with different socio-economic conditions, such as the USA, China, and India, could provide a broader perspective on urbanisation and social development. Additionally, factors like digital inclusion, e-business growth, and environmental sustainability should be integrated into future studies. An interdisciplinary approach examining governance, cultural dynamics, and technological innovation could enhance understanding of effective urban policies. Longitudinal studies would help identify trends and causal relationships over time. Ensuring data reliability and using robust statistical methods will further strengthen future research.

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