
Sustainable Development: Health and Well-Being in an Urbanizing World

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Abstract:

Purpose: This paper investigates how configurations of socio-economic, institutional and housing conditions are associated with self-rated health in Europe and how these macro-patterns align with metropolitan residents' priorities and perceived implementation barriers relevant to SDG-related agendas.

Design/Methodology/Approach: An integrated, multi-level empirical design is employed. A cross-sectional typology of 29 European countries is produced via hierarchical agglomerative clustering (Ward's method; squared Euclidean distance) using standardised Eurostat indicators capturing longevity, disability-free life years, deprivation by degree of urbanisation, self-reported unmet need for medical examination and care, healthcare expenditure by financing scheme, real GDP per capita, income inequality (Gini), and overcrowding by degree of urbanisation. In parallel, multiple linear regression (ordinary least squares) is estimated on a 10-year aggregated annual series to assess associations between the share of the population reporting "good/very good" health and key determinants, with model reduction guided by statistical adequacy and interpretability. The survey component uses country-level frequency distributions for six countries' metropolitan residents to describe SDG prioritisation, perceived barriers, preferred first actions, and perceived quality-of-life impacts of municipal sustainability efforts.

Findings: Clustering identifies three distinct country groupings, separating profiles with stronger longevity/disability-free life years and lower deprivation from profiles characterised by higher deprivation and weaker outcomes, while a small two-country grouping exhibits a specific multivariate pattern. The reduced regression specification is statistically significant overall and suggests that economic and distributional variables are statistically associated with self-rated health, while access-related constraints remain relevant but sensitive to specification under short time-series conditions. Survey evidence indicates that "good health

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and quality of life” is most frequently selected as the key SDG priority for local quality of life, yet national profiles differ markedly in whether cost constraints, regulatory ambiguity, or limited awareness/visibility dominate perceived implementation barriers and in how strongly municipal efforts are perceived to affect quality of life.

Practical Implications: *Metropolitan policy design should combine distribution-sensitive measures with access-oriented interventions and implementation instruments tailored to the dominant barrier profile (cost, regulation, or awareness/communication), strengthening the visibility and measurability of local outcomes.*

Originality/Value: *The paper links macro-level typologies and econometric associations with micro-level metropolitan perceptions, providing a coherent interpretation of objective conditions and implementation feasibility within an SDG localisation perspective.*

Keywords: *Social determinants of health, urban sustainability governance, healthcare accessibility, material and social deprivation, housing overcrowding, sustainable development goals localisation.*

JEL Classification: *C38, I18, R58.*

Paper type: *Research article.*

1. Introduction

Sustainable development in the twenty-first century is increasingly shaped by the quality of the urban environment, as urbanisation concentrates both opportunities and risks for health, social integration, and access to basic services.

In this context, SDG 3 “Good Health and Well-being” takes on an intersectoral meaning: health outcomes depend not only on the healthcare system but also on inequality, housing conditions, infrastructure accessibility, and the institutional capacity to implement sustainable practices across public, business, and social organisations.

At the same time, substantial heterogeneity persists even within Europe, both in objective health indicators and in societal priorities and assessments of local policy effectiveness, which complicates the adoption of unified managerial solutions for urbanised territories.

The study examines how socio-economic, institutional, and housing factors across European countries are associated with self-rated health and how metropolitan demand for SDG 3 aligns with barriers and the perceived effectiveness of local sustainable efforts. It asks whether stable country types emerge and which factors are statistically associated with the share of the population reporting health as “good/very good”, while accounting for urbanisation-sensitive conditions.

It also compares six countries in terms of SDG 3 prioritisation, perceived implementation barriers, and the impact of local sustainable efforts.

The objective is to build an integrated empirical framework explaining “health & well-being in an urbanizing world” by combining macro-level indicators with micro-level population assessments. The study develops a typology of countries, estimates the relationships between self-rated health and key determinants using aggregated time-series data, and compares cross-country differences in SDG priorities, barriers, implementation instruments, and the perceived impacts of urban efforts on quality of life (Kozłowska *et al.*, 2026).

Methodologically, the study combines hierarchical agglomerative clustering, multiple linear regression estimated by ordinary least squares, and country-level frequency analysis of survey responses. The empirical basis comprises Eurostat SDG 3-related data and a standardised survey of metropolitan residents in six countries.

The scientific novelty lies in integrating objective macro-indicators of health and socio-economic conditions with subjectively reported priorities and evaluations of local policy. This makes it possible to conceptualise SDG 3 as an outcome of the interaction between urban conditions and institutional implementation mechanisms rather than as a purely medical indicator. The study is relevant because it supports evidence-based urban policies aimed at improving well-being, reducing health inequalities, and strengthening the social acceptability of sustainable transformations.

The study is limited by its cross-sectional clustering design for a single year, the use of aggregated annual data in the regression analysis, and a survey dimension reflecting population perceptions rather than direct medical outcomes. The theoretical discussion draws on the social determinants of health approach and the urban co-benefits perspective, according to which health impacts are realised through inequality, service accessibility, housing conditions, and institutional capacity.

2. Literature Review

Urbanisation is one of the key structural processes shaping sustainable development and turning cities into a major implementation space for SDG 3 (“health and well-being”) and related goals (68% of the world population ..., 2018). Within this framework, health is increasingly understood not only as an outcome of healthcare performance, but as the result of interactions among social, economic, and environmental determinants formed in cities. The WHO likewise emphasises the cross-sectoral nature of urban health and the need for coordination beyond the medical domain (Urban health across sectors ...).

One major strand of the literature explains the “urbanisation–health–well-being” nexus through the social determinants of health and urban inequalities, treating the city as an environment that concentrates both advantages and risks. In this perspective, issues of equity and vulnerable groups are central, and progress on SDG 3 depends on poverty, inequality, housing quality, mobility, and a safe environment (Progress on the health-related ..., 2023; World Cities Report, 2022).

The second approach develops the concept of “healthy and sustainable urban design”, in which spatial planning and transport decisions are viewed as policies with measurable effects on health and subjective well-being. This line of research focuses on spatial indicators and comparative assessments of urban planning policies, especially in relation to active mobility, public transport accessibility, density and mixed land use, and access to public and green spaces (Herick de Sa, 2022; Montana, 2025; Lowe, 2022; Kadlubek *et al.*, 2022).

The third approach links urban health to the climate crisis and environmental risks, conceptualising SDG 3 through the need for integrated climate and urban policies. Studies show that cities are both hotspots of climate-related health impacts and important agents of mitigation and adaptation, which shifts attention to the health co-benefits of decarbonisation and healthy urban design (Nieuwenhuijsen, 2024; Romanello, 2021; R van Daalen, 2022).

Another body of research develops the governance dimension of health and well-being in an urbanizing world through SDG localisation, cross-sectoral governance, and the integration of health into urban decision-making. UN-Habitat materials stress the need to embed a health perspective in urban governance as a mechanism of synergy between SDG 3 and other goals, shifting attention from declarative support for the SDGs to the evaluation of implementation mechanisms, institutional capacities, and partnership practices (Grima *et al.*, 2025).

Methodologically, the literature develops along two complementary trajectories: comparative empirical designs using survey data to capture subjective assessments of well-being and priorities, and spatial-analytical tools that translate general statements into measurable targets for the urban environment. In this sense, urban sustainability assessment serves as an important methodological bridge between sustainability measurement and the analysis of health-related risks and benefits (Sharifi, 2021; Herick de Sa, 2022; Montana, 2025).

Reviews of the SDG literature provide an important interpretative frame for this field. Although SDG 3 is among the most widely researched goals, its high visibility does not ensure sufficient coverage of applied governance issues across urban systems and regions. In addition, differences in mapping publications onto the SDGs and the uneven global pattern of health-related knowledge production should be taken into account when interpreting results and formulating policy recommendations (Sweileh, 2020; Raman, 2023; Bueno, 2025; Yumnam, 2024).

It is also worth to mentioned, that SDG 3 (described as “good health and well-being”) is the most important goal among all 17 SDGs. International comparisons between Poland and Germany made in 2023-2024 presents SDG 3 as the most important one from the quality of life perspective in the city - in both individual and organizational perspective in metropolises (Budziński, Vitkovskiy *et al.*, 2025; Budziński, 2025).

Overall, “Health & Well-being in a Urbanizing World” can be conceptualised as an integrated problem area at the intersection of sustainable development, urban planning and governance, environmental risks, and social determinants. At the same time, questions remain about the alignment of population priorities, metropolitan implementation mechanisms, and systems for monitoring policy effectiveness (How to develop ..., 2022; Lowe, 2022; Grima *et al.*, 2025; Tyagi *et al.*, 2023).

3. Research Methodology

The methodology combines the typologisation of countries based on SDG 3 indicators with an assessment of statistical associations between self-rated health and key drivers, complemented by survey-based evaluations in the metropolitan areas of six countries. The evidence base comprises Eurostat macro-data and a standardised survey of metropolitan residents.

The clustering component is implemented as a cross-sectional hierarchical agglomerative cluster analysis for 29 European countries using Ward’s method in a standardised feature space. The outcome health indicator is defined as the share of the population reporting their health as “good/very good”.

The explanatory set (X1–X8) includes life expectancy at birth, healthy life years, material and social deprivation by degree of urbanisation, self-reported unmet need for medical care, healthcare expenditure by financing scheme, real GDP per capita, the Gini coefficient, and housing overcrowding by degree of urbanisation. Variable standardisation is applied to remove the effects of different measurement units; proximity is assessed using squared Euclidean distance, which is methodologically consistent with the minimisation of within-cluster variance in Ward’s procedure.

The number of clusters is determined through a combined assessment of the dendrogram and the agglomeration schedule, followed by interpretation via cluster profiles and their differentiation in terms of the “health core” and socio-urban conditions.

The regression component aims to estimate the relationships between self-rated health and its determinants using aggregated annual data over a ten-year period. Multiple linear regression is estimated by ordinary least squares with the initial specification ($Y \sim X1-X7$), where (Y) represents self-rated health and the predictors capture longevity, healthy life years, deprivation, unmet need for medical care,

healthcare expenditure, GDP per capita, and inequality. The working specification is selected via sequential model reduction, accounting for coefficient significance and consistency with the substantive SDG 3 framework.

Model adequacy is assessed using (R^2) and adjusted (R^2), the F-test, the standard error of the estimate, the Durbin–Watson statistic, and correlations among coefficient estimates as an indicator of multicollinearity; coefficient interpretation is treated as associative given the limited time-series length.

The survey component operationalises the “societal demand” for SDG 3 and implementation conditions in metropolitan settings. Country-level frequency distributions are analysed for Croatia, Greece, Hungary, Poland, Romania, and Slovakia across four indicators: SDG priorities, implementation barriers, priority actions, and the perceived impact of city/community efforts on quality of life. These results are compared with the macro-level country profiles derived from the clustering and regression estimates.

Together, these three methodological components connect the structural typology of countries and the statistical associations of health determinants with the social acceptability and practical feasibility of policies.

Empirical data were also collected from the Ariadna panel in 2024–2025 and all respondents were adults who were 18-years-old or older. The study followed the ethical requirements of anonymity and voluntary participation. Written informed consent was obtained from each participant before inclusion.

The costs of conducting this research were co-financed by three sources. Firstly the project “Urbancity and health in the context of sustainable development”, which is funded from the state budget, granted by the Minister of Education and Science under the “Science for Society II” Program.

The project is being carried out in 2024–2026 by the research team of the Academy of Silesia. Additionally it was also funded by The Metropolis GZM, under the Metropolitan Science and Education Support Fund program, the project “International metropolitan benchmark related to the selected Sustainable Development Goals” (2025), and the Academy of Silesia own funds.

4. Research Results and Discussion

Empirical results are presented across two complementary analytical planes, consistent with the logic of SDG 3 “Good Health and Well-being” in an urbanizing world. The first plane captures the spatial–structural dimension, within which countries are typologised using a set of health indicators and socio-economic and housing conditions that are sensitive to urbanisation-related differences. The second plane reflects the temporal dimension of determinants, where statistical relationships

between self-rated health and key drivers of well-being, access to healthcare, and inequality are estimated using aggregated annual data. Combining these two perspectives enables a shift from static classification to an interpretation of the mechanisms that facilitate or constrain progress in health and well-being under the increasing influence of the urban environment.

5. Country Clustering as a Typology of “Health – Well-Being – Housing Conditions” in the Context of Urbanisation

The cluster analysis was conducted on a cross-sectional sample of 29 European countries, as documented in the membership table (Table 1) obtained through hierarchical agglomeration using Ward’s method in a standardised feature space.

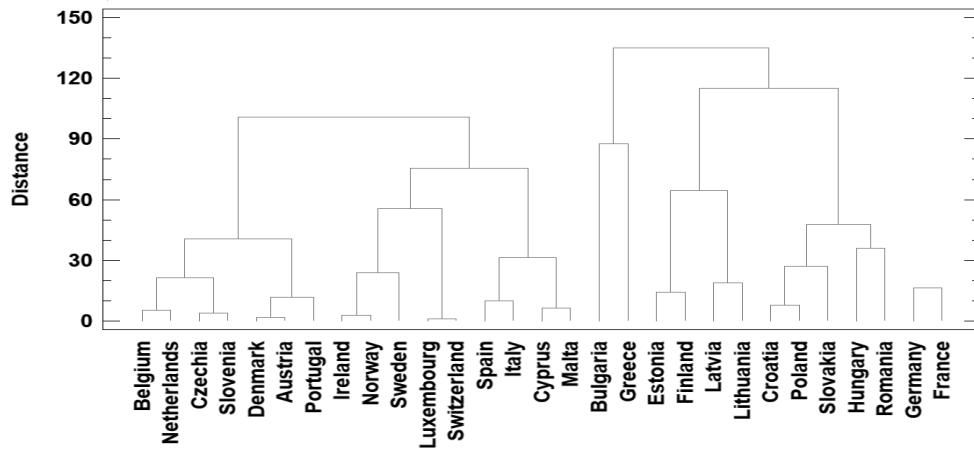
The interpretation centres on the outcome indicator, which serves as a direct proxy for perceived well-being in the health domain: the share of the population reporting their health as “good/very good”.

The explanatory block comprises eight variables (X1–X8), which combine the “health core” (life expectancy at birth and healthy life years) with conditions shaping the socio-economic and urban context of health: deprivation by degree of urbanisation, unmet need for medical care, healthcare expenditure, the level of economic development, income inequality, and housing overcrowding by degree of urbanisation. All indicators were obtained from Eurostat (2025), ensuring reproducibility of dataset construction and cross-country comparability.

Ward’s method with squared Euclidean distance supports the validity of the classification. After standardisation, each indicator contributes comparably to distance measures, while the squared Euclidean metric gives greater weight to larger cross-country deviations. Ward’s method minimises the increase in within-cluster variance at each agglomeration step and thus helps form internally homogeneous groups.

The number of clusters was justified using two interrelated information sources that are treated as the principal criteria in hierarchical clustering: the dendrogram and the agglomeration schedule. In the dendrogram (Figure 1), the “upper” merges are characterised by a sharp rise in height, indicating forced combinations of previously formed groups that are statistically distant in the multidimensional space defined by X1–X8.

This conclusion is supported by the numerical pattern of agglomeration. The transition from three clusters to two occurs at a distance of 114.977, following the previous merge at 100.702; therefore, the increment equals $114.977 - 100.702 = 14.275$. The final merge into a single cluster occurs at 135.268, yielding an additional increment of $135.268 - 114.977 = 20.291$.

Figure 1. Dendrogram (Clustering Method: Ward's; Distance Metric: Squared Euclidean)

Source: Authors' calculations.

The largest jump at the final step is a typical signal that two macro-groups remain the most dissimilar, and that merging them substantially reduces interpretability. For this reason, the choice of $k = 3$ is methodologically consistent: it eliminates the “costliest” consolidation step and preserves meaningful contrasts between country types, which is essential for interpreting SDG 3 under different socio-economic and housing conditions.

Three clusters with asymmetric sizes were identified, which itself carries important information about the structure of heterogeneity (Table 1).

Table 1. Membership Table (Clustering Method: Ward's; Distance Metric: Squared Euclidean)

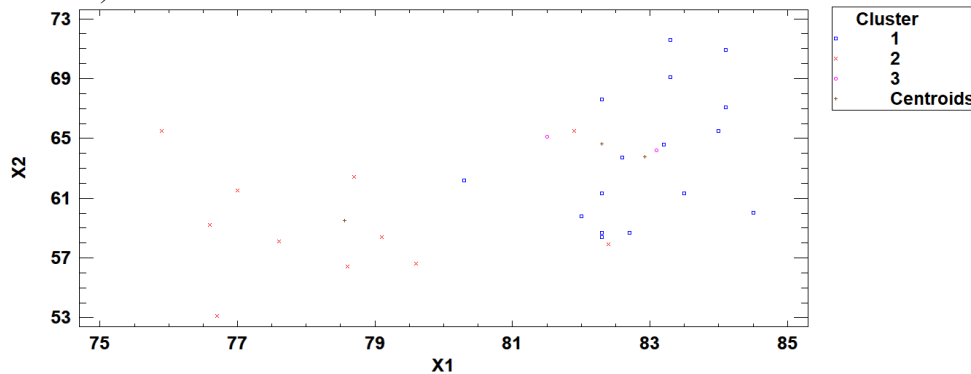
Cluster	Countries included in the cluster	Characterisation
Cluster 1 (n = 16)	Belgium, Czechia, Denmark, Ireland, Spain, Italy, Cyprus, Luxembourg, Malta, Netherlands, Austria, Portugal, Slovenia, Sweden, Norway, Switzerland	Cluster 1 is dominated by a profile of relatively higher values of the “health core” (life expectancy, X_1 , and healthy life years, X_2) combined with lower material and social deprivation by degree of urbanisation (X_3), which is consistent with more favourable conditions for SDG 3 in the urban environment.
Cluster 2 (n = 11)	Bulgaria, Estonia, Greece, Croatia, Latvia, Lithuania, Hungary, Poland, Romania, Slovakia, Finland	Cluster 2 is characterised by a shift towards lower values of X_1 – X_2 and higher values of X_3 , i.e., a configuration of “worse health outcomes under higher deprivation”, corresponding to a less favourable socio-urban context for sustaining health and well-being.
Cluster 3	Germany, France	Cluster 3 emerges as a stable two-country group:

(n = 2)		in projections associated with X_1 , these countries tend towards high longevity values, yet they do not integrate into Cluster 1, indicating a specific multidimensional combination of factors beyond the “health core”.
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Source: Authors' calculations.

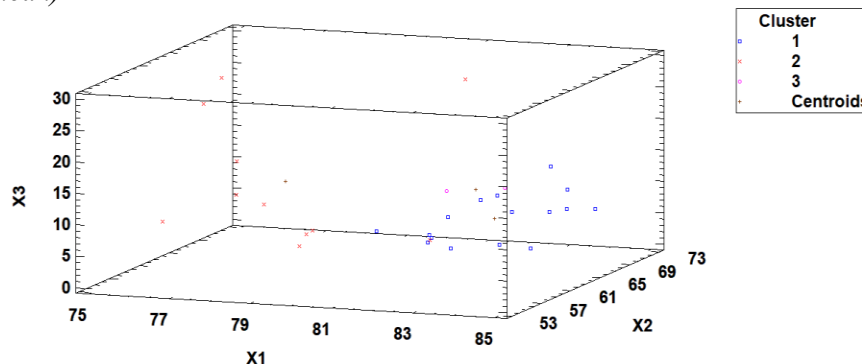
Graphical validation through 2D and 3D scatterplots confirms the plausibility of the statistical partition. In the X_1 – X_2 plane, Cluster 1 is concentrated at higher life expectancy and healthy life years, whereas Cluster 2 is shifted towards lower values, which is consistent with more favourable welfare and housing conditions in the former group.

Figure 2. 2D Scatterplot (Clustering Method: Ward's; Distance Metric: Squared Euclidean)



Source: Authors' calculations.

Figure 3. 3D Scatterplot (Clustering Method: Ward's; Distance Metric: Squared Euclidean)



Source: Authors' calculations.

The 3D visualisation in the X_1 – X_2 – X_3 space adds the deprivation dimension. Cluster 1 combines higher X_1 and X_2 with lower X_3 , while Cluster 2 combines weaker health parameters with higher deprivation. Cluster 3 remains distinct,

suggesting the influence of additional dimensions related to healthcare accessibility, financing, inequality, and housing density.

From the perspective of sustainable development and quality of life, the resulting typology has two key interpretative anchors. First, clustering demonstrates that “health and well-being” in Europe do not form a single continuum, but rather several stable combinations of factors, in which the same high life expectancy may be associated with different profiles of inequality, unmet need for medical care, and housing overcrowding.

This is important in the urbanisation context, as housing conditions and service accessibility in cities largely determine whether economic concentration translates into better health for most of the population or reproduces an “urban paradox”, in which a high average level of development coexists with vulnerable groups and local pockets of social deprivation.

Second, the asymmetry of cluster sizes, in particular the emergence of a small cluster, signals that even within a relatively homogeneous region with broadly similar institutional frameworks, specific models of welfare, inequality, and health financing may exist and require distinct managerial approaches when localising SDG 3.

6. Regression-Based Estimation of the Determinants of Self-Rated Health and Testing Statistical Adequacy

Unlike clustering, which captures the cross-sectional structure of heterogeneity, the regression component is designed to estimate the temporal interrelationships between self-rated health and key explanatory variables. For this purpose, ten consecutive annual observations were used based on aggregated European Union data, where the dependent variable is the share of the population reporting “good/very good” health (Y), and the predictors include X1–X7: life expectancy, healthy life years, deprivation, unmet need for medical care, healthcare expenditure, real GDP per capita, and the Gini coefficient.

Estimation was performed using ordinary least squares within a multiple linear regression framework, consistent with the standard econometric set-up for aggregated indicators, where the aim is to parameterise average associations while controlling for other factors.

The initial specification with seven predictors demonstrates a high share of explained variation in Y ($R^2 = 96.8517\%$, adjusted $R^2 = 85.8328\%$), but the model as a whole is not statistically significant at the 0.05 level ($F = 8.79$, $p = 0.1059$). This reflects the constraints of a very small sample and excessive parameterisation: with $n = 10$ and seven explanatory variables, the estimates become unstable and highly sensitive to individual observations.

Thus, the baseline model does not provide sufficient reliability for interpreting causal mechanisms or forecasting without further simplification and robustness checks.

At the coefficient level, the initial specification also shows weak individual significance. The largest p-value is observed for X2 (healthy life years; $p = 0.7159$), while X3 ($p = 0.6342$), X7 ($p = 0.3515$), and X5 ($p = 0.2894$) also remain statistically insignificant. This suggests that the initial model is overparameterised relative to the available number of observations and that several predictors do not provide independent explanatory value within this specification.

This does not contradict the substantive importance of healthy life years; rather, it suggests co-movement with other predictors and insufficient degrees of freedom in a short time series. Sequential removal of X2, X3, and X5 produced a reduced four-predictor model, $Y \sim X_1 + X_4 + X_6 + X_7$, which is statistically significant overall ($F = 12.68$; $p = 0.0079$) and explains 91.0283% of the variation in Y (adjusted $R^2 = 83.851\%$). The estimated equation is:

$$Y = 5846.6 - 0.844038 \times X_1 - 1.04453 \times X_4 - 0.000459146 \times X_6 - 2.20737 \times X_7$$

Interpreting the coefficients requires combining economic reasoning with caution given the statistical constraints. In the reduced model, the coefficients for X6 (real GDP per capita; $p = 0.0158$) and X7 (Gini coefficient; $p = 0.0217$) are statistically significant at the 0.05 level, whereas X1 (life expectancy; $p = 0.0569$) and X4 (unmet need for medical care; $p = 0.0536$) are marginally significant.

The negative sign on X7 is consistent with the social determinants of health framework: rising inequality is associated with a lower share of the population reporting good health, as inequality reflects unequal opportunities to access adequate housing, prevention, medical services, and working conditions, while in urbanised systems it is additionally linked to spatial segregation and differences in the quality of the built environment.

The negative sign on X4 is also theoretically expected: a higher proportion of unmet medical care need indicates access barriers that directly undermine perceived well-being and self-rated health, particularly for groups living in areas with limited service availability or high treatment costs.

Table 2. Final model parameters

Parameter	Estimate	Standard Error	T Statistic	P-Value
CONSTANT	5846.6	898.703	6.50561	0.0013
X ₁	-0.844038	0.342429	-2.46485	0.0569
X ₄	-1.04453	0.415474	-2.51408	0.0536
X ₆	-0.000459146	0.000128	-3.58708	0.0158

X ₇	-2.20737	0.670612	-3.29157	0.0217	
Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Model	6873.35	4	1718.34	12.68	0.0079
Residual	677.431	5	135.486		
Total (Corr.)	7550.78	9			

Source: Authors' calculations.

The negative signs on X₆ and X₁ appear to contradict standard expectations, but this may reflect short-series effects, multicollinearity, the subjective nature of self-rated health, and omitted-variable bias. In urban contexts, rising incomes may coexist with higher expectations and more critical self-assessment of health.

Assessing the validity of the reduced model requires examining multicollinearity and residual behaviour. The correlation matrix of coefficient estimates shows three predictor pairs with absolute values above 0.5, indicating moderate multicollinearity. Specifically, correlations are observed between X₁ and X₄ (-0.5527), X₁ and X₆ (-0.5243), and X₆ and X₇ (0.6669).

Table 3. Correlation matrix for coefficient estimates

	CONSTANT	X ₁	X ₄	X ₆	X ₇
CONSTANT	1.0000	-0.6909	0.2923	-0.1192	-0.5965
X ₁	-0.6909	1.0000	-0.5527	-0.5243	-0.1597
X ₄	0.2923	-0.5527	1.0000	0.4513	0.1541
X ₆	-0.1192	-0.5243	0.4513	1.0000	0.6669
X ₇	-0.5965	-0.1597	0.1541	0.6669	1.0000

Source: Authors' calculations.

In practical terms, this implies inflated standard errors and reduced statistical power for individual coefficients, which helps explain the borderline p-values for X₁ and X₄. At the same time, the observed correlations do not indicate complete linear dependence, so the model remains interpretable.

7. Survey Results: SDG 3 Priorities and Implementation Barriers in Metropolitan Areas (Comparison of Six Countries)

The survey across six countries extends the analysis from aggregated frequencies to a comparative assessment of national profiles of sustainable development perceptions in an urbanised environment. It distinguishes between objective macro-level conditions and the subjectively recorded demand for sustainable development priorities among metropolitan residents. The response distributions reveal both shared patterns and substantial cross-country differences in barriers, priorities, and the perceived effectiveness of local sustainability efforts.

Regarding SDG priorities for quality of life in the respondent's community/city, "good health and quality of life" ranks first across all six countries, although the

intensity of this priority varies. Greece records the highest share of SDG 3 selections, at 22.3% of respondents, followed by Slovakia (19.3%), Croatia (18.3%), Poland (17.5%), Romania (17.1%), and Hungary (16.6%). The 5.7 percentage-point gap between Greece and Hungary indicates that SDG 3 competes to different degrees with other goals across countries, and that metropolitan well-being initiatives may attract different levels of political support.

Table 4. *UN SDG priorities for quality of life in a community/city*

Which UN Sustainable Development Goal do you consider most important for the quality of life in your municipality/city?					
	Frequency	%		Frequency	%
clean and available energy	169	4.8	economic growth and decent work	442	12.7
clean water and sanitation	161	4.6	good health and quality of life	643	18.5
climate action	200	5.7	innovation, industry, infrastructure	223	6.4
end to poverty	296	8.5	peace, justice and strong institutions	302	8.7
gender equality	70	2.0	responsible consumption and production	154	4.4
good quality of education	214	6.1	sustainable cities and communities	268	7.7
less inequality	104	3.0	partnerships for goals	58	1.7
life on land	36	1.0	zero hunger	128	3.7
life under water	17	0.5			
General				3,485	100.0

Source: Authors' calculations.

Comparison with the second-most-salient group of priorities further clarifies this competition. Across all countries, one of the main “competitors” to SDG 3 is “economic growth and decent work”, although its relative weight varies markedly: it reaches 14.7% in Romania, 14.2% in Greece, 13.6% in Poland, and 13.3% in Croatia, but only 9.2% in Hungary and 10.8% in Slovakia. The gap between SDG 3 and economic growth is therefore wider in Hungary and Slovakia, indicating a clearer dominance of health as an urban priority, whereas in Romania the smaller difference points to a more economically competitive priority environment.

The structure of barriers to implementing sustainable practices by organisational leaders/managers in metropolitan areas reveals a different line of cross-country differentiation, moving the analysis from “priorities” to “feasibility”. The most frequently cited barrier is high implementation costs, but the range is wide: 30.5% in Romania, 23.8% in Slovakia, 23.6% in Greece, 20.7% in Hungary, 17.9% in Croatia, and 15.7% in Poland.

This substantial gap suggests fundamentally different perceptions of the cost barrier and indicates that, even where societal demand for well-being is present, implementation may remain limited by financial constraints.

Table 5. Main barriers to implementing sustainable practices in metropolitan organizations

The biggest challenge in successfully implementing sustainable practices among leaders/managers in organizations in the metropolitan area where you live concerns:	Frequency	Percentage
I don't know / I have no opinion / it's hard to say	751	21.5
ambiguities in legal regulations regarding the implementation of sustainable practices	537	15.4
formal and/or organizational difficulties within the organization	417	12.0
high costs of implementing sustainable practices	755	21.7
low awareness of the importance of sustainable development for organizations	647	18.6
other	9	0.3
other, what?	6	0.2
potentially small measurable and direct benefits for the organization	363	10.4
General	3,485	100.0

Source: Authors' calculations.

Equally informative is the share of “I don't know / I have no opinion / it's hard to say” responses, which reflects uncertainty or limited awareness of how organisations implement sustainable practices. Poland stands out with 42.3%, compared with 17.0% in Croatia, 17.1% in Greece, 20.4% in Slovakia, 12.8% in Hungary, and 11.1% in Romania. This pattern points to a distinct institutional-communication problem: where implementation mechanisms are insufficiently visible, perceptions of barriers may shift from actual constraints to informational effects, and support for sustainable policies may become less stable.

Comparison with the response category “low awareness of the importance of sustainable development for organisations” shows that communication challenges take different forms across countries. Hungary reports the highest share of this barrier, at 26.8%, followed by Croatia (22.8%), Slovakia (18.8%), Greece (17.7%), Romania (15.1%), and Poland (12.6%).

Thus, in Poland, low awareness is not the dominant explicitly stated barrier, but this is consistent with the broader pattern because uncertainty responses are markedly higher. Overall, countries differ not only in the scale of perceived barriers but also in respondents' ability to articulate them, which is important for SDG 3 policy design.

Response patterns regarding priority actions to strengthen sustainability in metropolitan areas extend the barrier structure by adding a practical dimension of manageability. In Croatia, the most frequently selected priority action is eliminating ambiguities in legal regulation, at 24.7%, the highest across the six countries. Romania shows a similar profile at 22.5%, while the corresponding shares are lower in Greece (17.5%), Slovakia (16.9%), Poland (13.8%), and Hungary (13.9%). This suggests that, in Croatia and Romania, institutional clarity is viewed as a key

prerequisite for launching sustainable practices and related urban well-being interventions.

Table 6. *Priority actions to improve sustainability efforts in metropolitan areas*

What should be done first to improve sustainability efforts in the metropolis where you live?	Frequency	Percentage
I don't know / I have no opinion / it's hard to say	402	11.5
communicate/promote tangible benefits for the organization	584	16.8
eliminate ambiguities in legal regulations regarding the implementation of sustainable practices	624	17.9
eliminate formal and/or organizational difficulties within the organization	437	12.5
other	14	0.4
other, what?	9	0.3
raise awareness of the importance of sustainable development for organizations	739	21.2
reduce the costs of implementing sustainable practices	676	19.4
General	3,485	100.0

Source: *Authors' calculations.*

By contrast, in Greece the top priority is increasing awareness of the importance of sustainable development for organisations, at 27.9%, the highest share across countries; Romania also records a high value of 24.0%. The corresponding shares are 22.8% in Croatia, 21.7% in Slovakia, 21.3% in Hungary, and 13.0% in Poland.

These differences are conceptually important, because where awareness-raising is seen as the main lever, implementation barriers are likely to be associated with managerial culture, competence deficits, and the weak integration of SDGs into organisational strategy. Hungary stands out for the high priority assigned to communication and the promotion of tangible benefits for organisations, at 23.6%, the largest share among the six countries. Slovakia also records a relatively high value of 19.7%, followed by Poland (17.0%), Romania (14.2%), Croatia (13.8%), and Greece (11.9%).

In such contexts, successful well-being programmes need to be economically legible, demonstrating effects on productivity, cost reduction, workforce retention, and reputational gains. Poland again presents a distinctive profile, with a high share of uncertainty responses regarding priority actions at 27.9%, compared with 4.7% in Romania, 6.0% in Greece, 6.4% in Croatia, 8.3% in Hungary, and 9.1% in Slovakia.

This pattern suggests that, despite relatively strong prioritisation of SDG 3, the mechanisms through which this priority translates into support for concrete instruments remain insufficiently articulated.

Perceived impacts of city/community sustainability efforts on quality of life constitute the indicator most directly linked to health and well-being as a visible

outcome of urban policies. The combined share of positive assessments is highest in Greece (56.2%), followed by Slovakia (52.4%) and Romania (50.2%), and lower in Hungary (42.9%), Poland (42.2%), and especially Croatia (35.3%). The 20.9 percentage-point gap between Greece and Croatia indicates substantial differences in how tangible sustainability policies are in everyday metropolitan life.

Table 7. Perceived impact of city/community sustainable development efforts on quality of life

To what extent do the city/municipality's sustainable development efforts impact the quality of life in your area?	Frequency	Percentage
I don't know / I have no opinion / it's hard to say	451	12.9
rather, they improve the quality of life	1,050	30.1
rather, they worsen the quality of life (e.g. limitations, mismatch to needs)	363	10.4
significantly improve the quality of life (e.g. cleaner air, more greenery, better mobility)	562	16.1
they don't have much influence	961	27.6
they significantly worsen the quality of life	98	2.8
General	3,485	100.0

Source: Authors' calculations.

Negative assessments also differ across countries and help define the boundaries of policy acceptability. The combined negative share is highest in Romania (17.4%) and Croatia (17.2%), moderate in Slovakia (13.4%), Hungary (12.4%), and Greece (11.7%), and lowest in Poland (8.9%). At the same time, the category "they do not have much influence" is especially important for interpreting perceived effectiveness: Croatia records the highest share at 38.3%, followed by Hungary at 35.1%, while the corresponding values are lower in Greece (24.8%), Romania (24.4%), Slovakia (24.2%), and Poland (21.3%).

This indicates that weaker policy visibility, rather than overt rejection alone, may constrain the perceived effectiveness of urban efforts. High "don't know" shares in Poland for this question, at 27.5%, reinforce the previously observed pattern: the country combines relatively high prioritisation of SDG 3 with substantial uncertainty regarding barriers, priority actions, and the impact of urban efforts. This suggests that value-based support for health as a priority is not always matched by a clear understanding of the mechanisms through which urban policies improve quality of life and well-being.

8. Conclusions, Proposals, Recommendations

The results show that achieving SDG 3 "Good Health and Well-being" in an urbanised environment depends not on isolated medical and demographic parameters, but on stable configurations of socio-economic, institutional, and housing conditions. The clustering of European countries identified three types that differ primarily in the relationship between the "health core" and social

vulnerability. The first cluster combines more favourable longevity and healthy life years with lower deprivation, whereas the second is characterised by weaker health conditions and higher deprivation. A small separate cluster of two major economies suggests that even countries with high longevity may form a distinct multidimensional profile requiring targeted analysis of financing, inequality, healthcare accessibility, and housing conditions.

The econometric component indicates that socio-institutional variables remain important for self-rated health. The reduced regression model shows a statistically significant association between the share of the population reporting “good/very good” health and indicators of economic well-being, inequality, and barriers to healthcare access. At the same time, the short time series, possible serial dependence, and moderate multicollinearity require caution in causal interpretation and extrapolation.

The survey across six countries shows that “good health and quality of life” is the most frequently selected SDG priority for quality of life in the community or city, although its strength varies across countries. The main perceived barriers to implementing sustainable practices in metropolitan areas are the high cost of change and deficits in awareness and transparency.

In some countries financial constraints dominate, while in others regulatory or informational uncertainty is more important, indicating that the urban effect on health depends not only on resources but also on institutional governability and communication.

Assessments of the impact of city and community sustainable development efforts on quality of life are predominantly positive, but also reveal substantial shares of responses indicating either limited tangible effect or uncertainty. This suggests that for urban well-being policies not only objective effectiveness matters, but also the visibility of co-benefits to the population.

Overall, the integration of macro-level indicators, cluster typologies, and survey evidence provides a coherent framework for interpreting health and well-being in an urbanizing world as the outcome of interactions among environmental conditions, inequality, healthcare accessibility, and institutional capacity.

Practical recommendations follow from the identified country types and the observed profiles of implementation barriers. Where deprivation in the urbanisation dimension is higher, priority should be given to interventions that reduce social vulnerability and improve access to healthcare.

Where the high cost of implementation dominates, financial and organisational mechanisms are needed to scale sustainable practices across urban organisations. Where uncertainty or low awareness prevails, the main priority is to strengthen

transparency and communication regarding the outcomes of sustainable policies and practices.

The study's limitations are mainly related to data availability and structure. The cluster analysis is cross-sectional and covers a single year, while the regression analysis relies on a short-aggregated time series, which limits statistical power and weakens the reliability of extrapolation. The survey component captures population perceptions and priorities, but does not fully reveal within-country inter-metropolitan differences and may be sensitive to sampling structure and cultural variation in interpretation.

Therefore, the findings should be treated as an integrated empirical framework for comparative analysis and hypothesis generation rather than as definitive causal estimates.

Future research should focus on expanding the time base and moving towards panel or dynamic models, strengthening the urban dimension through regional or city-level indicators, and integrating survey data into causally oriented models using informational, trust-related, participatory, and institutional factors as explanatory variables.

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