

# CULTURAL FACTORS FOR SUSTAINABLE URBAN DEVELOPMENT AT THE EUROPEAN UNION LEVEL

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**Abstract:** The cultural sector, a generator of creativity and innovation and a factor in enhancing community awareness and shared identity, contributes to more sustainable, connected and citizen-friendly urban environments. Sustainable development is a priority in EU policies, and exploring the cultural domain can add value by boosting cultural indicators as part of the development strategies. The paper's general objective is to analyze cultural indicators' influence on Sustainable Development Goals, especially in urban areas. The paper discusses the implications of the cultural domain in relation to Sustainable Development Goals (SDGs) with a focus on four of the goals: SDG 4 (Quality Education), SDG 8 (Decent Work and Economic Growth), SDG 11 (Sustainable Cities and Communities), SDG 13 (Climate Action). The analysis is based on national and city statistical datasets at the European Union level. The paper results are based on correlation and regression analysis, allowing us to make assessments on the role of the cultural domain in sustainable development. Using the XLSTAT software, a statistical analysis model was built based on the hypothesis that the SDGs' achievement level is influenced by the level of cultural development in the EU member states and cities. As a result, it was found that the achievement of the Sustainable Development Goals depends on the share of the cultural domain. In contrast, specific cultural infrastructures, activities and policies are closely linked to the notion of national and city development. Considering this, a policy approach including the cultural domain could support sustainable development.

**Keywords:** Sustainable Development Goals, Culture, urban sustainability, correlations

**JEL classification:** Q01, I28, I31, Z18

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## Introduction

The sustainability of human existence and activities has become a topic of central interest in academia and society, alongside fundamental economic and social issues. The concept of sustainable development has also gained considerable political influence. The relationship between nature, society, and the economy is at the heart of the issue. The concept itself was established worldwide with the report "Our Common Future" of the World Commission on Environment and Development (established in 1983 by the United Nations General Assembly), a document also known as the Brundtland Report (World Commission on Environment and Development, 1987). However, despite the achievements of recent decades, current concepts of sustainability and sustainable development are proving insufficient to lead the transitions needed to harmonise relations between people and the environment. The European Union (EU) is strongly committed to sustainable development and to being a leader in implementing the UN 2030 Agenda with its member countries. Sustainable development has been a fundamental

objective of the European Union since 1997, as it has been enshrined in Article 2 of the Treaty on the European Union (European Union, 1997). Sustainable urban development is significant for the overall sustainable development considering the high concentration of population, the need of resources efficiency as well as the complexity of challenges in addressing sustainability measures.

Lack of proper inclusion of culture is considered one of the factors that are responsible of the inefficiency of sustainable development policies failures in implementing well-intentioned programmes (UNESCO, 2012).

Culture is a multidimensional phenomenon affecting a country's economic activity as well as its social structure, beliefs and values. According to European Commission President Ursula Von der Leyen's narrative, "A Union striving for more: my agenda for Europe", the landscape, cultures and heritage are valuable characteristics for Europe reflecting its identity as well as its economic potential (European Commission, 2019). As "culture is a phenomenon that mostly 'happens' in urban areas" (Montalto, et al., 2019a), the paper approaches the cultural effects in the benefit of sustainable development from a dual perspective from national to cities level within the European Union. Cities are considered to be favorable units in terms of cultural transformations and catalysts for socio-economic development due to criteria such as the density of inhabitants, existing capital, increased accessibility and cultural dynamism, factors favorable to community development and measures to integrate culture into development strategies and governance processes. De facto, culture is a component of development (sustainable or not) influencing people and communities and creates conditions for balanced evolution.

The paper aims to analyze the level of influence of cultural indicators on the Sustainable Development Goals (SDGs), especially in urban areas. Based on the analysis of the relation between the cultural domain and SDGs, the article is based on a statistical analysis of the level of linkage between the SDGs and several cultural indicators at the level of the European Union as a way of identifying relevant cultural associations in the benefit of sustainable development.

## **1. Theoretical and policy foundations of Culture and Sustainable Development**

The 2030 Agenda for Sustainable Development, adopted by all United Nations member states in 2015, provides a common background for the well-being of society and environmental protection. At its core are the 17 SDGs put in practice by a global partnership urging all nations to take collective action (United Nations, 2015). However, since the publication of the Brundtland Report, it has been noticed that fundamental factors such as environmental balance, economic growth and social equity do not fully respond to the complexity of the needs in the developing society.

The EU is perceived as a contribute factor in the progressive approach to the process of sustainable development. Policies to facilitate cultural input to sustainable development are highlighted with a focus on strengthening capacities for collaboratively meeting challenges and seizing opportunities for the benefit of European citizens. In particular, sustainable development was seen as a community objective in the countries of Europe. As set out in the document A New Strategic Agenda 2019 – 2024, the EU is committed to fostering sustainable development and contributing to implementing the 2030 Agenda (European Council, 2019), a long-term commitment highlighted in the EU Strategy for Sustainable Development (European Union, 2001). In the report "A Decent Life for All: From Vision to Collective Action" the European Commission recognized the need to build the framework to follow a sustainable path "to ensure a decent life for all by 2030" (European Commission, 2014). The importance of contributing to the achievement of the 2030 Agenda is underlined by the Council of the European Union (Council of the European Union, 2019a) alongside strengthening international

cultural relations and envisaging the potential of culture for sustainable development (Council of the European Union, 2018). Although not explicitly stated, EU cultural policies do make reference to the SDGs through policies, projects and related actions (Vila, Miotto and Rodríguez, 2021). For example, the cultural contribution to sustainable development is indicated at the EU level within the Council resolution on the Cultural Dimension of Sustainable Development (Council of the European Union, 2019b). The European Parliament points out the relevance of the cultural field for sustainable development in its report on EU action for sustainability, stressing the need of alignment of the policies that state the cultural factors integration within sustainable development with other international commitments (European Parliament, 2017).

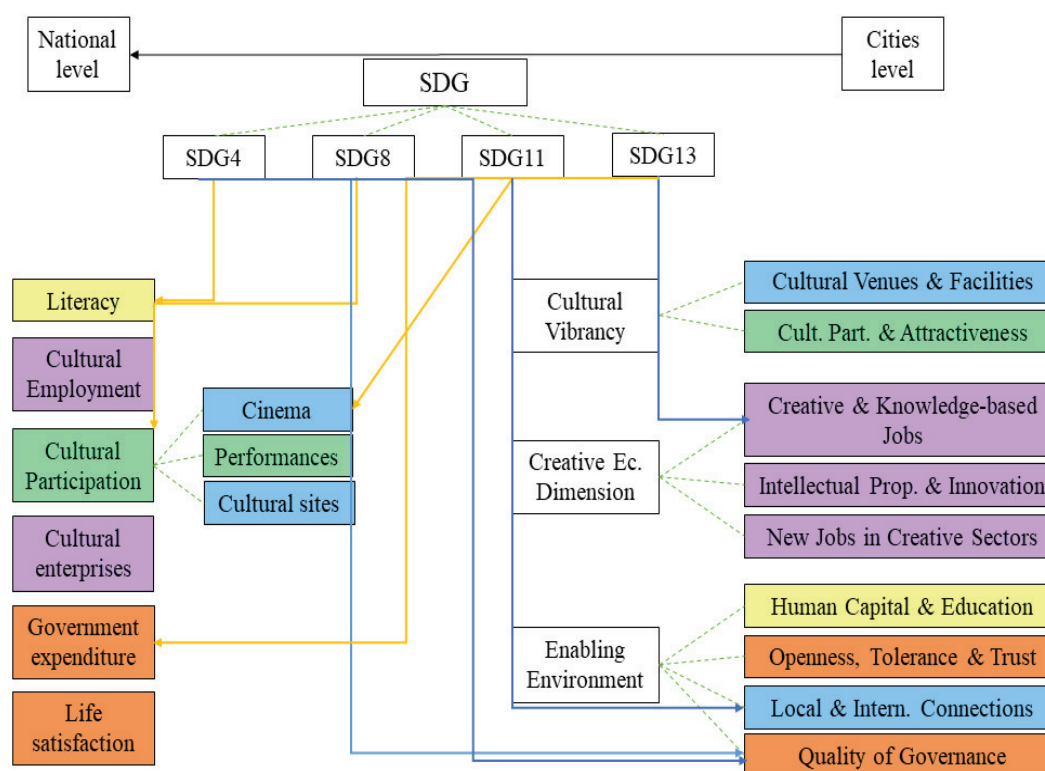
The EU's approach to sustainable development involves its demographic diversity, population dynamism as well as changes in population structure as a result of migration, with cultural influences playing an important role and cultural aspects being both solutions and challenges. Considering the population density, economic activity, social inclusivity and multicultural background, cities play a significant role in sustainable development. The interest in the role of culture for urban change have increased greatly over the past two decades (Montalto, et al., 2019a) enhancing the role of culture for well-being and generating development opportunities. Culture is not only a fundamental component but also a driver towards a more sustainable society (Soini and Dessein, 2016) based on its ability to sustain social cohesion, community identity and awareness raising by facilitating shared norms and values for the society.

Urban environments are mainly characterized by diversity, culture being a connective factor of practices, languages and customs as well as a generator of cultural events and participation. Sustainable urban development fosters innovation and creativity as cities are beneficial places for artists and creative people, favorable spaces for co-creation, cooperation and showcasing, serving as potential catalysts for urban revitalization (Hrysenko, Pryiatelchuk and Shvorak, 2022). This correspondence highlights the capacity of culture to contribute to sustainable urban development, envisaging the sustainable cities as a desideratum of future urban development (Basiri, Azim and Farrokhi, 2017). Urban areas facilitate the formation and growth of creative clusters in favor of enhancing cultural vitality and fostering innovation, pursuing that such clusters contribute to urban regeneration (Dronyuk and Moiseienko, 2019). Moreover, the "creative class", characteristic that make cities creative, can act as a driver for urban regeneration (Florida, 2003). However, challenges to Florida's notion of the creative class and the associated mechanisms he posits for urban regeneration and growth were pointed by Pratt being underlined the need for a "reconceptualization of the role of culture in urban growth and change" (Pratt, 2008).

In terms of governance, as a supportive factor of sustainable urban development, "culture and cultural policies are becoming increasingly important and policymakers are using both to increase homogeneity in all spheres of society" (Sacco, Blessi and Nuccio, 2009). Moreover, people' receptivity for the cultural city life is an incentive for participatory policies and transparency measures in the decision-making process in reference to urban development (Katrin, 2020).

## 2. Methodology

Our study is based on a quantitative methodology including a statistical analysis of the variables. We performed an analysis in two levels, including the national and cities extent, based on specific variables. The two levels of the analysis include cultural related variables, six in the national level analysis and nine in the city level analysis, the Total score for SDGs and four of the SDGs. The methodology comprises correlation and linear regression statistical techniques between the cultural indicators and the included SDGs exploring if there is a relationship between the variables and the associations' degree.



**Figure 1: Variables, indicators, indexes, sub-indexes and dimensions included in the analysis and correspondences**

*Source: Authors' representation*

Figure 1 indicates the variables, indicators, indexes, sub-indexes and dimensions included in the analysis at national and cities levels, the categorization and associations, as follows:

- Sustainable Development Goals, 2019 (indicated in blank):
  - SDG Index, SDG 4 (Quality Education), SDG 8 (Decent Work and Economic Growth), SDG 11 (Sustainable Cities and Communities), SDG 13 (Climate Action), 2019.
- Education and human capital (indicated in yellow):
  - Literacy (Underachievement in reading, math or science), 2018;
  - Human capital & education, 2019.
- Cultural infrastructure (indicated in blue):
  - Frequency of participation in cultural or sports activities in the last 12 months by sex, age, educational attainment level and activity type: cinema, 2015;
  - Frequency of participation in cultural or sports activities: cultural sites (historical monuments, museums, art galleries or archaeological sites), 2015;
  - Cultural Venues & Facilities, 2019;
  - Local & International Connections, 2019.
- Cultural participation (indicated in green):
  - Frequency of participation in cultural or sports activities – total, 2015;
  - Frequency of participation in cultural or sports activities: live performances (theatre, concert, ballet), 2015;
  - Cultural Participation & Attractiveness, 2019.
- Cultural labor and enterprise (indicated in purple):
  - Cultural employment, 2019;
  - Number and the average size of enterprises in the cultural sectors, 2018;
  - Creative & Knowledge-based Jobs, 2019;

- Intellectual Property & Innovation, 2019;
- New Jobs in Creative Sectors, 2019.
- Governance (indicated in orange):
  - General government expenditure by function - cultural services, 2019;
  - Life satisfaction, 2018;
  - Openness, Tolerance & Trust, 2019;
  - Quality of Governance, 2019.

Data sources:

- National level analysis
  - Sustainable Development Goals: SDSN & IEEP, 2019. The 2019 Europe Sustainable Development Report. Sustainable Development Solutions Network and Institute for European Environmental Policy: Paris and Brussels.
  - Cultural indicators: Eurostat.  
Note: The indicator Low level in reading, mathematics or science is reflected in the analysis as Literacy in reading, math or science based on its transformation from a negative to a positive indicator.
- Cities level analysis
  - Sustainable development and Sustainable Development Goals: SDG index and dashboards for European Cities, 2019. Sustainable Development Solutions Network (SDSN) and the Brabant Center for Sustainable Development (Telos).
  - Cultural indicators: The Cultural and Creative Cities Monitor (Montalto, et al., 2019b). European Commission, Joint Research Centre.

The variables were selected as being relevant components of sustainable development, as they are closely linked to the economic, social, and environmental dimensions of sustainable development.

In terms of the cases included the analysis at national level includes the European Union member countries (28 member states - including the UK, an EU member country at the time of the statistical data) and the analysis at cities level includes 45 capital cities and large metropolitan areas in the EU and the European Free Trade Association (EFTA) according to SDG Index Dashboard data base.

The results were extracted using the statistical analysis program XLSTAT. Values marked in bold are statistically significant at the 0.05 threshold.

### 3. Cultural influences to sustainable development - a national approach

An analysis at the national level of European Union member countries (including the UK) was undertaken, as a first step in bridging national and urban levels for identifying overarching and complementary cultural factors as well as particularities and contextual specificity.

The hypothesis of the analysis is that the level of achievement of the Sustainable Development Goals is influenced by the level of cultural development in EU member countries.

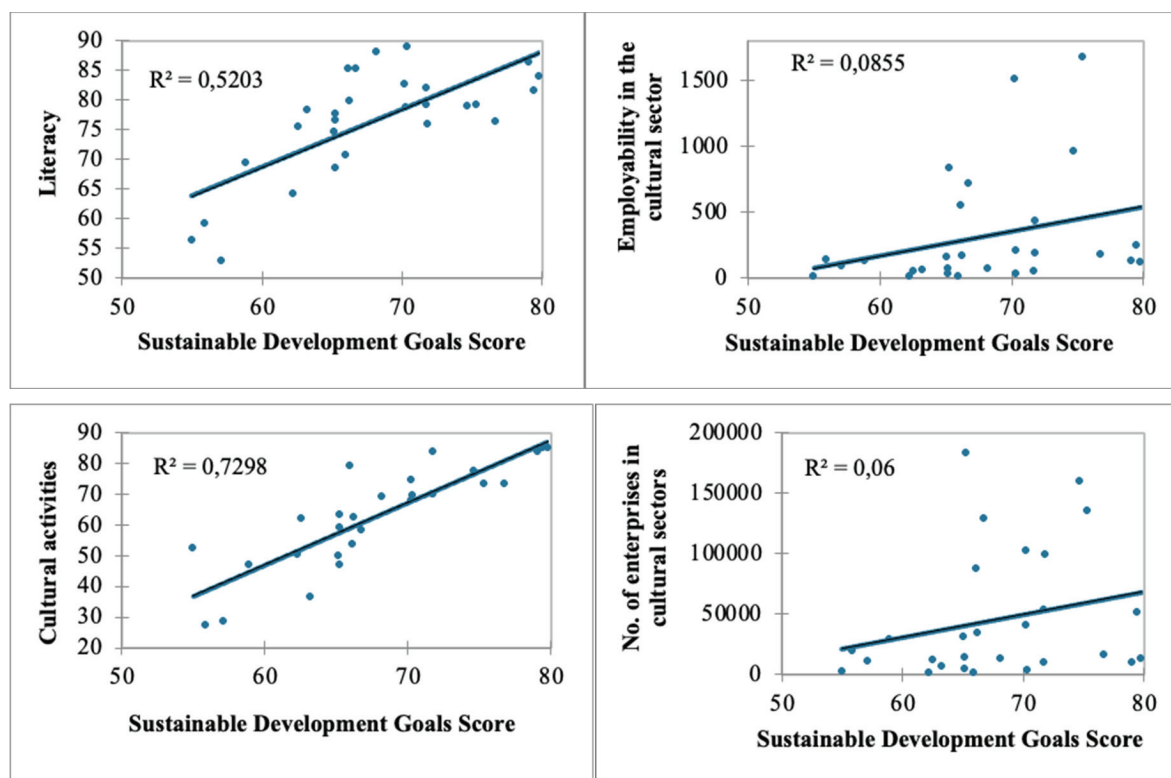
**Table 1. Correlation coefficients between the cultural indicators and the SDGs (national level)**

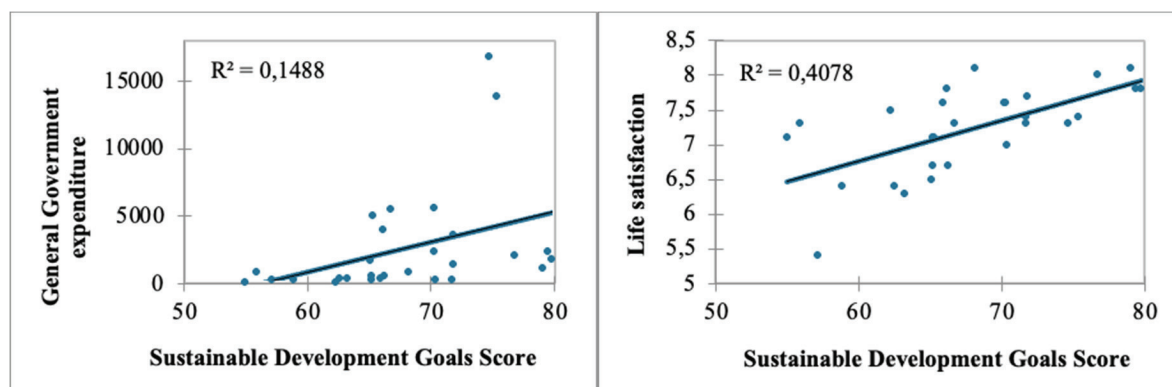
Variables	SDG Index	SDG4	SDG8	SDG11	SDG13
Literacy in reading, math or science	<b>0.721</b>	<b>0.813</b>	0.373	<b>0.541</b>	0.276
Employability in the cultural sector	0.292	0.144	0.156	0.309	<b>0.545</b>
Cultural activities	<b>0.854</b>	<b>0.817</b>	<b>0.729</b>	<b>0.826</b>	0.280

Variables	SDG Index	SDG4	SDG8	SDG11	SDG13
Cinema	<b>0.840</b>	<b>0.745</b>	<b>0.617</b>	<b>0.833</b>	0.353
Live performances	<b>0.705</b>	<b>0.782</b>	<b>0.651</b>	<b>0.723</b>	0.117
Cultural sites	<b>0.884</b>	<b>0.758</b>	<b>0.742</b>	<b>0.763</b>	0.391
Enterprises in cultural sectors	0.245	0.084	-0.041	0.177	0.497
Life satisfaction	<b>0.639</b>	<b>0.568</b>	<b>0.614</b>	<b>0.614</b>	0.221
General government expenditure - cultural services	0.386	0.108	0.158	0.328	<b>0.718</b>

Source: Authors' representation

As it can be noticed in Table 1, the cultural indicators of cultural activities (cinema, live performances, cultural sites), literacy in reading, math or science and life satisfaction show a strong link with the SDG Index. The level of association of SDG 4 presents the highest correlation value in relation to cultural activities, with a value of 0.817, but also literacy and life satisfaction have significant values. SDG 8 shows a strong correlation with the level of participation in cultural activities, with a value of 0.729. Also, the level of life satisfaction has a significant value. SDG 11 shows the strongest links with the cultural activities indicator with a value of 0.826, but a significant relationship is also identified with life satisfaction and literacy. As for SDG 13, it is associated with fewer indicators and shows weaker associations with the indicators, with a significant linkage with General government expenditure on cultural services with a value of 0.718 and with the level of employability in the cultural sector. Thus, with sufficiently high relevance, we can state that cultural indicators directly or indirectly, influence SDGs. Some cultures prohibit people from being open to new ideas and development (there are indigenous groups hampering the implementation of strategies) (Zheng, et al., 2021).



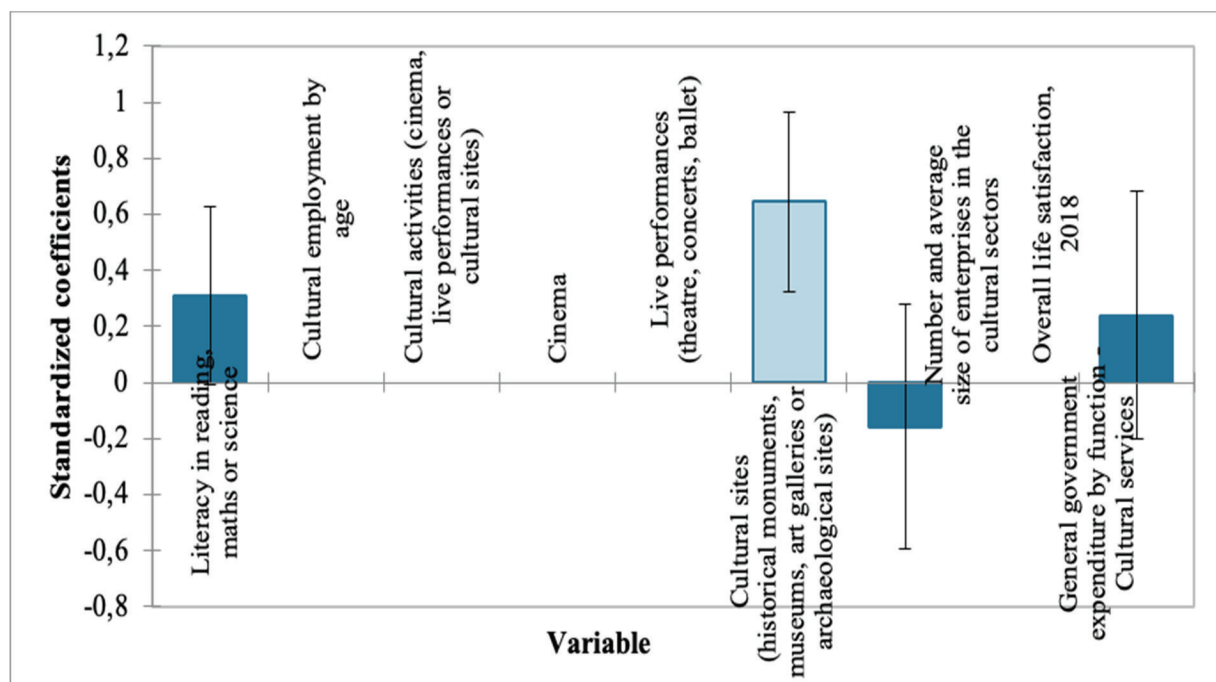


**Figure 2: Linear regressions SDGs and cultural indicators**

*Source: Authors' representation*

Figure 2 indicates that the total SDG score shows a positive linear relationship with cultural indicators. According to Figure 2, the cultural indicators of life satisfaction and the level of participation in cultural activities stand out with a correlation coefficient of 40.7% and respectively of 72.9% in relation to the SDGs, whereas the other indicators prove weaker correlation levels.

For an in-depth observation, a regression analysis was made, including the SDGs as dependent variables with the implication of the predictor variables, the cultural indicators.



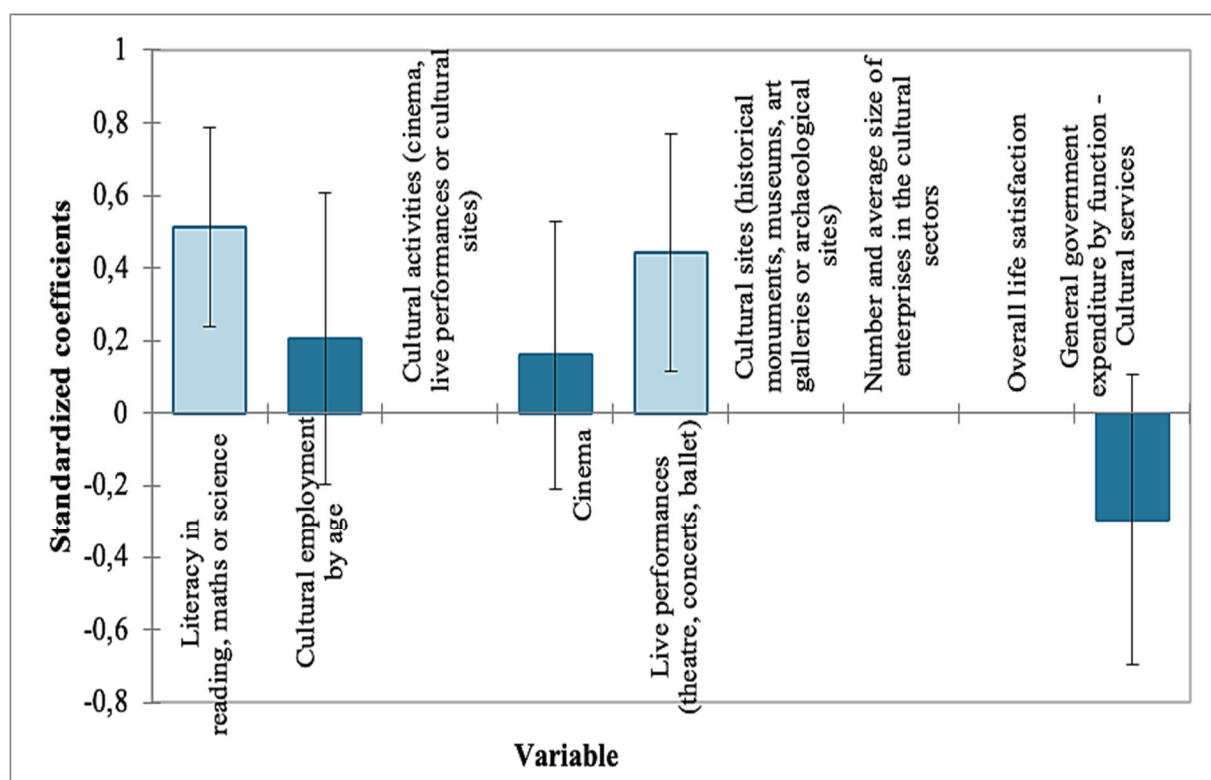
**Figure 3: Dependent variable: SDG Index Score (0-100) / Standardized coefficients (99% conf. interval)**

*Source: Authors' representation*

The best regression model includes four predictors: literacy in reading, math or science, frequency of participation in cultural or sports activities at cultural sites, enterprises in the cultural sectors and government expenditure on cultural services. The results of the regression analysis indicated that the cultural indicators explain 80.7% of the variance of the SDG achievement index ( $AdjR^2=0.807$ ), a statistically significant percentage ( $F(4,26)=28.148$ ;  $p<.0001$ ). As it can be seen in the graph, among the cultural indicators, the strongest predictor

of the total SDG index is the frequency of participation in cultural or sports activities in cultural sites with a value of  $\beta = 0.645$ ,  $p < .0001$ .

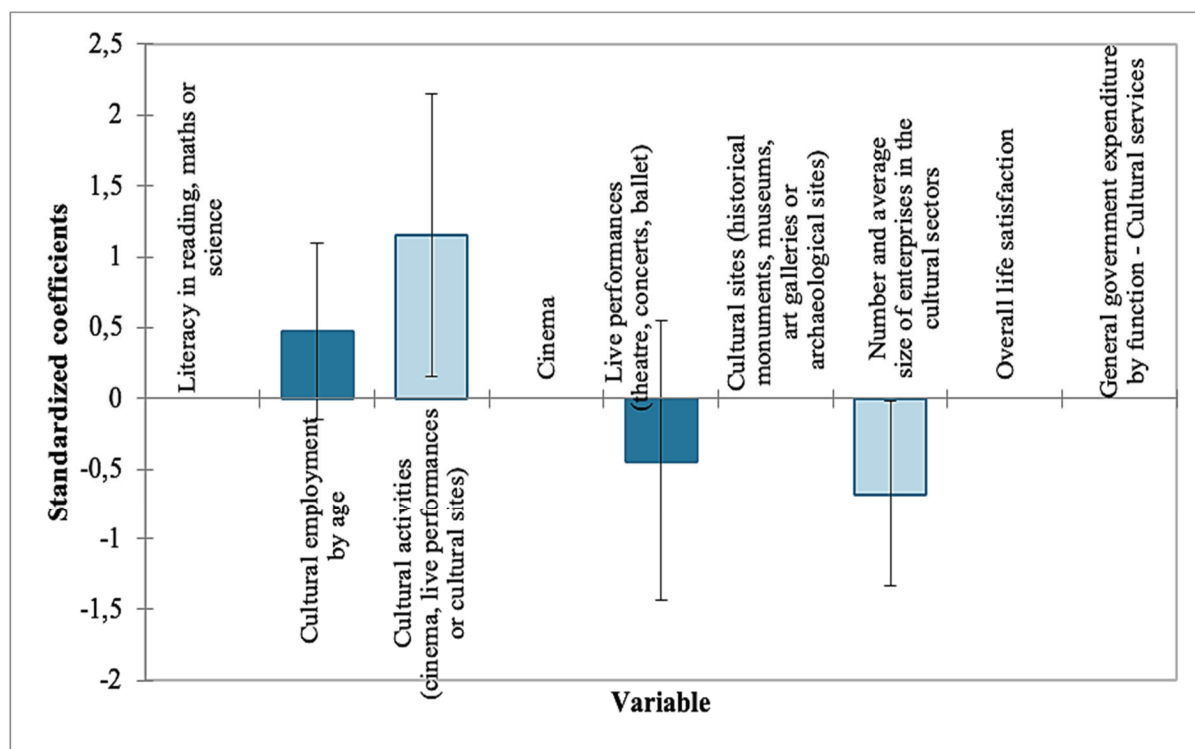
According to Figure 4, it is observed that the best regression model includes five predictors: literacy in reading, math or science; cultural employment; frequency of participation in cultural or sports activities at the cinema; frequency of participation in cultural or sports activities at live performances; general government expenditure on cultural services. The results of the regression analysis show that the mentioned cultural indicators explain 85.1% of the variance of the index of achievement of SDG 4 ( $\text{Adj}R^2 = 0.851$ ), which is statistically significant ( $F(5,26) = 30.663$ ;  $p < .0001$ ). Figure 4 shows that among the cultural indicators, the strongest predictor of the SDG4 index is literacy in reading, math or science, variable of education and human capital category, with a value of  $\beta = 0.514$ ,  $p < .0001$ . It is noted the negative correlation of the indicator regarding government expenditure in culture and SDG 4 which might suggest that allocation of higher budget to education could lead to reduced government funding the cultural sector.



**Figure 4: Dependent variable: SDG4 / Standardized coefficients (99% conf. interval)**

*Source: Authors' representation*

Culture may represent a supportive factor in raising literacy levels by enhancing language skills and comprehension, embracing diversity, cultural education and intercultural awareness at all levels. Moreover, the educational contexts contribute to increased awareness at the level of peoples' behavior and foster society-wide perception towards sustainability (Katrin, 2020).



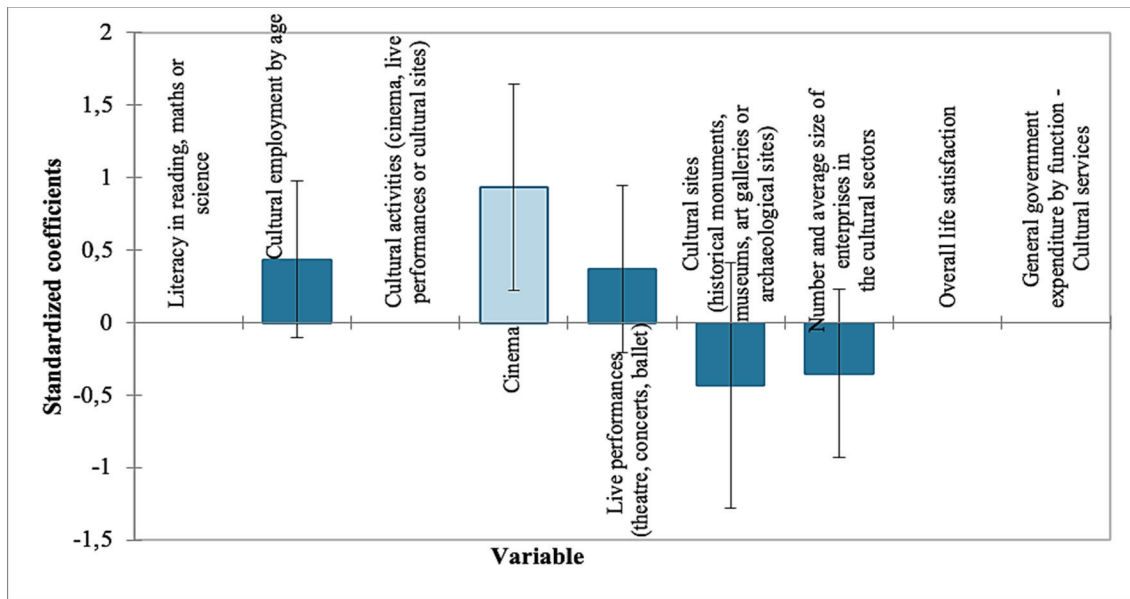
**Figure 5: Dependent variable: SDG8 / Standardized coefficients (99% conf. interval)**

*Source: Authors' representation*

Figure 5 presents that the best regression model includes four predictors of SDG 11: cultural employment; frequency of participation in cultural or sports activities - total; frequency of participation in cultural or sports activities at live performances; number and the average size of enterprises in the cultural sectors. The results of the regression analysis show that the mentioned cultural indicators explain 62.7% of the variance of the index of achievement of SDG 8 ( $\text{AdjR}^2=0.627$ ), a statistically significant percentage ( $F(4,26)=11.919$ ;  $p<.0001$ ). Figure 5 shows that among the cultural indicators, the strongest predictor of the SDG 8 is the frequency of participation in cultural or sports activities - total, including cinema, live performances, cultural sites, variable of cultural participation category (with a value of  $\beta= 1.149$ ,  $p<.004$ ).

Cultural participation is boosted by cultural and creative industries that provide a supportive framework of cultural experiences and expressions. Cultural industries, creative arts and heritage are sources of investment into cities and regions, contributing to competitiveness advantage and economic growth (Duxbury, Kangas and De Beukelaer, 2017).

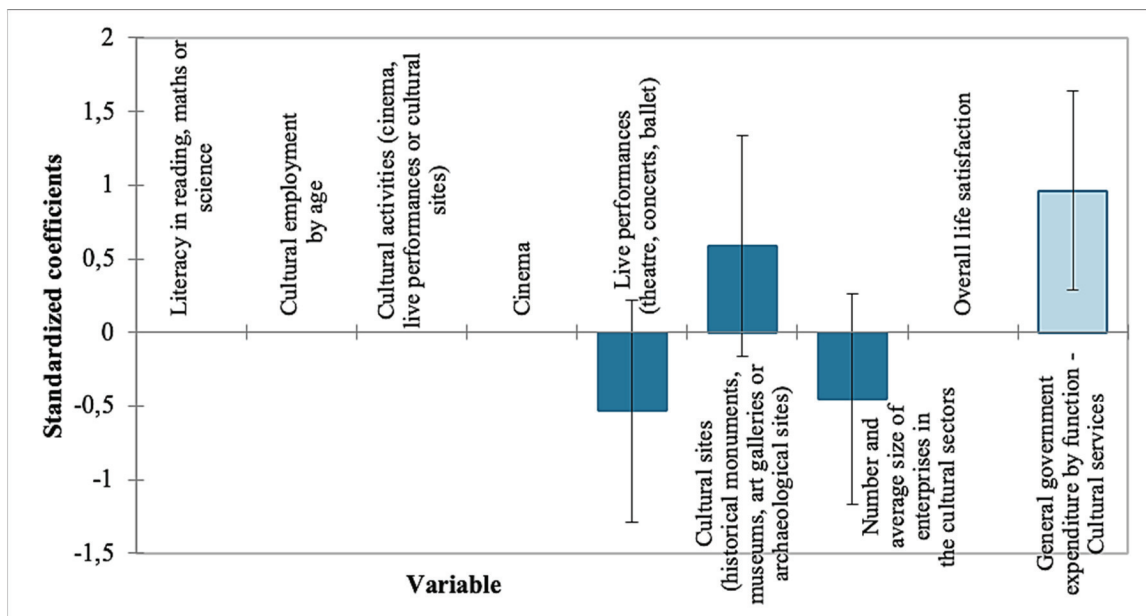
According to Figure 6 the best regression model includes five predictors: cultural employment; frequency of participation in cultural or sports activities - cinema; frequency of participation in cultural or sports activities at live performances; frequency of participation in cultural or sports activities - cultural sites; number and average size of enterprises in the cultural sectors. The results of the regression analysis show that the mentioned cultural indicators explain 73.1% of the variance of the achievement index of SDG 11 ( $\text{AdjR}^2=0.731$ ), which is statistically significant ( $F(5,26)=15.134$ ;  $p<.0001$ ). Figure 6 shows that among the cultural indicators, the strongest predictor of the SDG11 index is the frequency of participation in cultural or sports activities – cinema, variable of cultural infrastructure category (with a value of  $\beta= 0.936$ ,  $p<.001$ ).



**Figure 6: Dependent variable: SDG11 / Standardized coefficients (99% conf. interval)**

*Source: Authors' representation*

The cultural landscape is thus a contributor to Sustainable Cities and Communities' Goal by shaping local identities, preserving cultural heritage, and boosting social practices and cultural manifestations. Fostering cultural participation brings a favorable input to community belonging and shared norms and values. "What is notable in the way that mainstream international agendas have dealt with tangible and intangible cultural heritage is its embedding in place, and particularly in relation to the aspiration of sustainable cities and communities" (Perry, Ager and Sitas, 2020).



**Figure 7: Dependent variable: SDG13 / Standardized coefficients (99% conf. interval)**

*Source: Authors' representation*

As it can be observed in Figure 7, the best regression model includes four predictors: frequency of participation in cultural and sports activities - live performances; frequency of participation in cultural and sports activities - cultural sites; number and the average size of enterprises in cultural sectors; general government expenditure on cultural services. The results of the regression analysis show that the mentioned cultural indicators explain 55.0% of the variance

of the index of achievement of SDG 13 ( $\text{Adj}R^2=0.550$ ), which is statistically significant ( $F(4,26)=8.942$ ;  $p<.0000$ ). Figure 7 shows that among the cultural indicators, the strongest predictor of the SDG13 - climate action is the level of general government expenditure on cultural services, variable of governance category (with a value of  $\beta= 0.962$ ,  $p<.001$ ).

Investment in cultural services is supported to collectively promote sustainable behaviors and raise awareness on climate action, encompassing both national and cities levels. The potential of culture in addressing societal challenges strengthened the use of instrumental policies of public expenditure for culture (Duxbury, Kangas and De Beukelaer, 2017). Culture may become thus a promoter of climate action and a generator of environmental education, knowledge and practices.

#### 4. Culture's role within sustainable development – a focus on cities

Cities are often beneficial frameworks of rich cultural heritage, multicultural diversity, vibrant cultural manifestations and artistic expressions. Embracing culture as a factor of sustainable urban development may generate new opportunities and horizons of development. "The Sustainable Development Solutions Network estimated in 2016 that as much as 65% of the SDG agenda may not be fully achieved without the involvement of cities" (Lafortune, et al., 2019).

The paper includes a statistical analysis aiming to identify the level of influence of cultural variables on the achievement of the SDGs at the urban level within the European Union. The cities included in the analysis are 45 capital cities and large metropolitan areas in EU and EFTA. The hypothesis of the analysis is that the level of achievement of the SDGs is influenced by the level of cultural development in large EU cities.

**Table 2. Correlation coefficients between the cultural indicators and the Sustainable Development Goals (cities level)**

Variables	SDG Index	SDG4	SDG8	SDG11	SDG13
Index Score	<b>1</b>	<b>0.840</b>	<b>0.630</b>	0.397	-0.198
1. Cultural Vibrancy	0,256	0.393	0.128	0.201	-0.165
1.1 Cultural Venues & Facilities	-0,043	0.118	-0.077	0.040	-0.136
1.2 Cultural Participation & Attractiveness	<b>0,515</b>	<b>0.579</b>	0.322	0.321	-0.145
2. Creative Economy	0,346	0.313	0.413	0.129	0.167
2.1 Creative & Knowledge-based Jobs	0,346	0.237	0.186	0.103	0.173
2.2 Intellectual Property & Innovation	<b>0,570</b>	<b>0.590</b>	0.460	0.322	-0.043
2.3 New Jobs in Creative Sectors	-0,053	-0.016	0.272	-0.054	0.141
3. Enabling Environment	<b>0,583</b>	<b>0.615</b>	<b>0.524</b>	<b>0.529</b>	-0.332
3.1 Human Capital & Education	0,203	0.305	0.209	0.316	-0.075
3.2 Openness, Tolerance & Trust	<b>0,538</b>	0.473	0.493	0.341	-0.325
3.3 Local & International Connections	0,438	<b>0.515</b>	0.359	<b>0.588</b>	-0.285
3.4 Quality of Governance	<b>0,758</b>	<b>0.788</b>	<b>0.585</b>	0.481	-0.439

*Source: Authors' representation*

As presented in Table 2 among the correlations between SDG 4 and the Cultural and Creative Cities Monitor Sub-indexes, Enabling Environment with a value of 0.615 indicates the highest correlation value. We can state that there is a significant positive relationship between SDG4 and the dimensions of the Sub-index Enabling Environment, considering that the relation between SDG 4 and Quality of Governance of 0.788 indicates variables to be strongly correlated and it presents moderate correlations with Local & International Connections and Openness, Tolerance & Trust, with values of 0.515 and respectively 0.473. Among the dimensions of the sub-index Cultural Vibrancy, SDG 4 has significant positive correlations with Cultural Participation & Attractiveness with a value of 0.579. A weaker level of association is identified with the dimension of Cultural Venues & Facilities. In consideration of the sub-index Creative Economy, significant correlation is identified with the dimension Intellectual Property & Innovation with a value of 0.590.

**Table 3. Correlation coefficients between the cultural indicators and the SDGs applied to selected cities in the EU regions**

Variables	Central and Eastern Europe:					Northern Europe:				
	Index Score	SDG4	SDG8	SDG11	SDG13	Index Score	SDG4	SDG8	SDG11	SDG13
1. Cultural Vibrancy	0.695	0.843	0.368	0.704	-0.682	-0.737	-0.147	-0.032	-0.296	-0.874
1.1 Cultural Venues & Facilities	0.441	0.657	0.318	0.465	-0.530	-0.876	-0.658	-0.205	-0.145	-0.856
1.2 Cultural Participation & Attractiveness	0.745	0.797	0.321	0.737	-0.645	-0.471	0.271	0.106	-0.345	-0.697
2. Creative Economy	-0.005	-0.084	0.529	-0.179	0.357	-0.099	0.740	0.097	-0.462	-0.229
2.1 Creative & Knowledge-based Jobs	0.513	0.286	0.366	0.165	-0.202	0.196	0.879	0.257	-0.305	-0.039
2.2 Intellectual Property & Innovation	0.653	0.525	0.460	0.425	-0.057	-0.219	0.703	-0.585	-0.903	0.361
2.3 New Jobs in Creative Sectors	-0.552	-0.466	0.151	-0.459	0.485	-0.065	0.123	0.660	0.282	-0.795
3. Enabling Environment	0.756	0.638	0.158	0.689	-0.557	-0.740	-0.141	-0.042	-0.307	-0.868
3.1 Human Capital & Education	0.356	0.640	0.084	0.462	-0.375	-0.836	-0.381	-0.121	-0.250	-0.899
3.2 Openness, Tolerance & Trust	0.431	0.188	-0.060	0.308	-0.234	-0.488	0.227	0.118	-0.319	-0.730
3.3 Local & International Connections	0.725	0.588	0.332	0.721	-0.548	-0.835	-0.376	-0.119	-0.251	-0.900
3.4 Quality of Governance	0.874	0.684	0.513	0.718	-0.697	-0.426	0.597	-0.534	-0.909	0.051

Variables	Southern Europe:					Western Europe:				
	Index Score	SDG4	SDG8	SDG11	SDG13	Index Score	SDG4	SDG8	SDG11	SDG13
1. Cultural Vibrancy	-0.504	-0.081	-0.514	-0.209	0.202	0.484	0.424	0.584	0.033	0.122
1.1 Cultural Venues & Facilities	-0.792	-0.297	-0.678	-0.092	-0.370	0.386	0.253	0.524	-0.084	0.223
1.2 Cultural Participation & Attractiveness	0.218	0.254	0.055	-0.215	0.801	0.545	0.596	0.577	0.193	-0.037
2. Creative Economy	0.334	0.568	0.013	0.256	0.546	0.523	0.306	0.522	0.153	0.125
2.1 Creative & Knowledge-based Jobs	0.359	0.551	0.015	0.365	0.486	0.562	0.161	0.418	-0.083	0.307
2.2 Intellectual Property & Innovation	0.468	0.446	0.597	0.437	0.083	0.348	0.314	0.330	0.160	0.092
2.3 New Jobs in Creative Sectors	0.132	0.384	-0.157	-0.015	0.511	0.292	0.352	0.523	0.426	-0.202
3. Enabling Environment	0.723	0.674	0.674	0.537	-0.033	0.186	0.200	0.763	0.424	-0.241
3.1 Human Capital & Education	0.430	0.545	0.165	0.686	0.023	0.119	0.101	0.534	0.125	0.094
3.2 Openness, Tolerance & Trust	0.456	0.308	0.743	0.058	-0.173	0.084	0.063	0.555	0.339	-0.417
3.3 Local & International Connections	0.695	0.535	0.298	0.507	0.257	0.199	0.322	0.428	0.589	-0.242
3.4 Quality of Governance	0.226	0.428	0.336	-0.228	0.128	0.419	0.600	0.573	0.492	-0.403

*Source: Authors' representation*

SDG 8 presents significant positive correlations with the Sub-Index Enabling Environment with a value of 0.524, and among the component dimensions, the Quality of Governance is noticeable with a value of 0.585. A weak negative relation is identified with the dimension Cultural Venues & Facilities, with a value of -0.077.

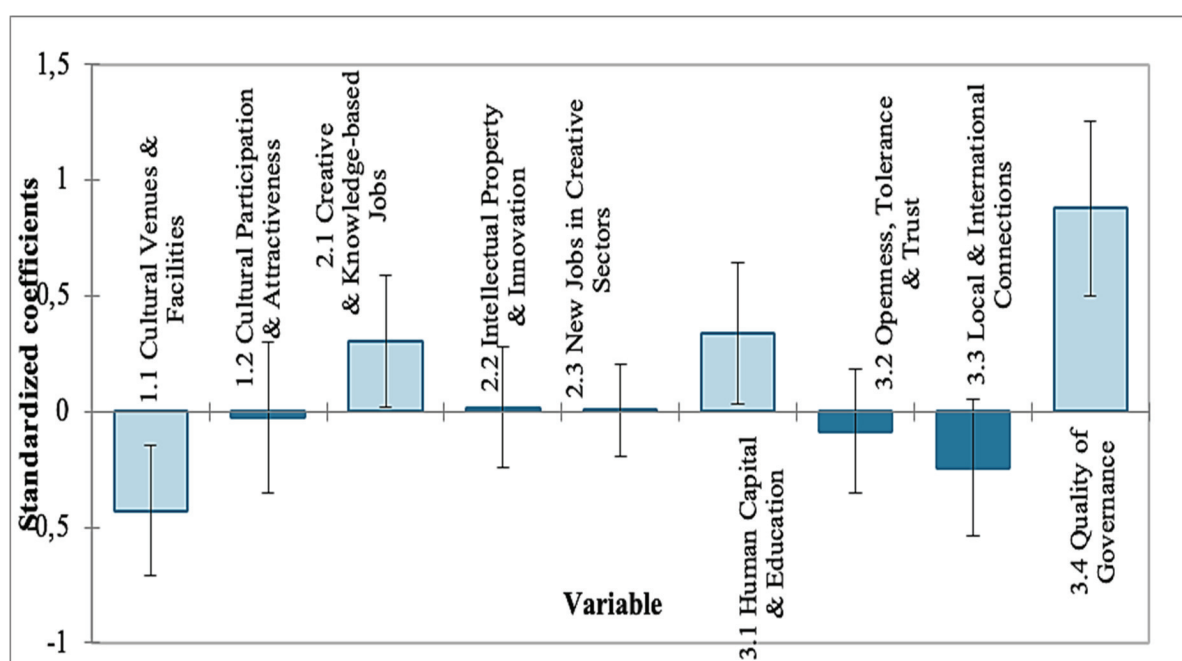
SDG 11 is identified with significant positive correlations with the Sub-Index Enabling Environment with a value of 0.529. Among the component dimensions, it is notable the correlation with Local & International Connections with a value of 0.588 and moderate correlation with Quality of Governance with a value of 0.481. A weak positive correlation is noticed with the dimension Cultural Venues & Facilities, with a value of 0.040.

SDG 13 is remarked as presenting negative correlations with several variables. Among these, the variable SDG13 and the Sub-index Enabling Environment have the highest value of –

0.332, and among the dimensions, Quality of Governance is found to be the highest negatively correlated with the SDG13 with a value of -0.439.

Thus, we can state that there is a significant positive relationship between the analyzed SDGs and the Sub-Index Enabling Environment, mostly with the dimension Quality of Governance and a moderate negative relationship between the SDG13 and the Sub-Index Enabling Environment, and mostly with the dimension Quality of Governance.

The analysis on the EU regions presents significant correlations among the variables for cities in Central and Eastern Europe, with the highest positive values among the SDG 4 and the cultural predictors and the highest negative relation among the SDG 13 and the cultural predictors. In Northern Europe, it is mostly noted higher positive correlation values between SDG 4 and the cultural predictors and negative significant correlation values between SDG 13 and the cultural predictors. Moderate correlation values are identified in Southern and Western Europe.

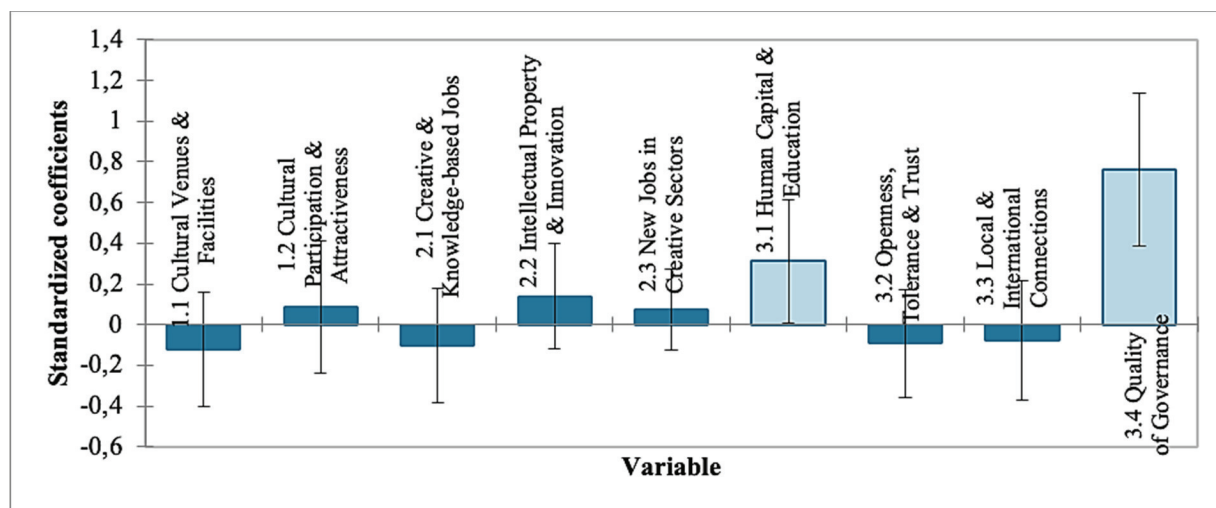


**Figure 8: Dependent variable: Index Score / Standardized coefficients (95% conf. interval)**

*Source: Authors' representation*

As presented in Figure 8, the best regression model includes four predictors: Cultural Venues & Facilities, Creative & Knowledge-based Jobs, Human Capital & Education, Quality of Governance. Among the explanatory variables, Quality of Governance, variable of governance category, is the most influential. The results of the regression analysis indicate that the nine cultural indicators explain 62% of the variance of the SDG Index Score ( $\text{Adj}R^2 = 0.623$ ), a statistically significant percentage ( $F(9,44) = 9.091$ ;  $p < .0001$ ).

Culture's presence within sustainable urban development leads to creative cities embedding economic, social and political factors (Vitkova and Silaci, 2019), stressing participatory decision-making processes for the benefit of community cohesion. The concept of smart cities tackles sustainability issues by several means including citizen engagement, efficiency measures and the governance system (Basiri, Azim and Farrokhi, 2017). Moreover, cultural governance is based on shared responsibility, promoting dialogue and cooperation among decision-makers and cultural stakeholders.

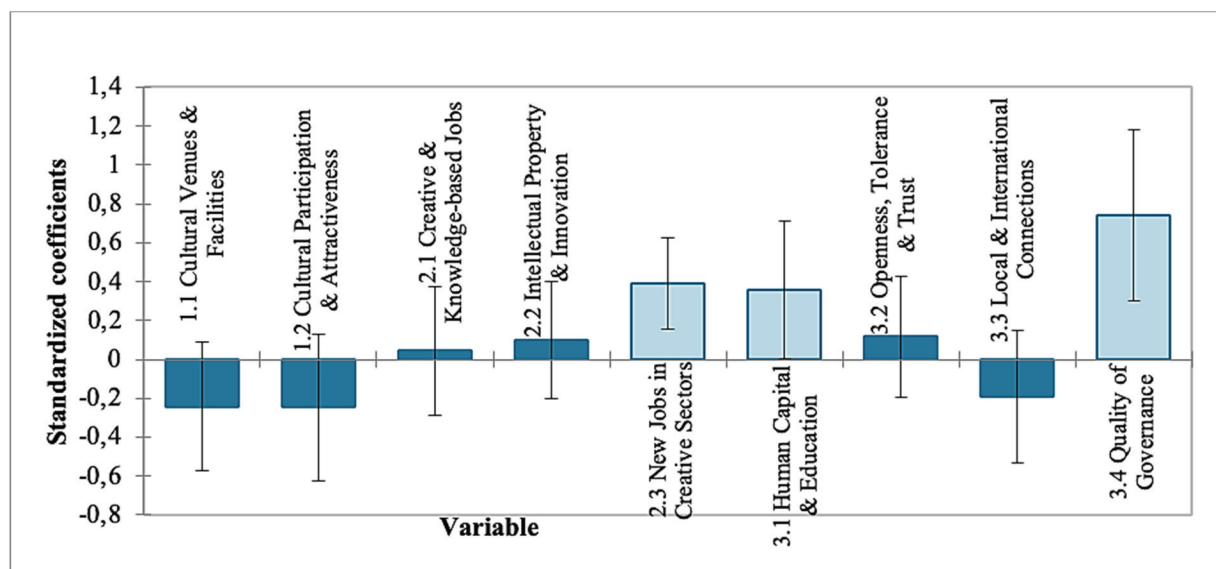


**Figure 9: Dependent variable: SDG4 / Standardized coefficients (95% conf. interval)**

*Source: Authors' representation*

As presented in Figure 9 the nine cultural predictors included in the analysis explain 62% of the variance of SDG 4 ( $AdjR^2 = 0.628$ ), a statistically significant percentage ( $F(9,44) = 9.249$ ;  $p < .0001$ ). Among the variables, the best model includes the predictors Human Capital & Education and Quality of Governance, with the variable Quality of Governance being the most influential.

Quality of governance facilitates inclusive education and cultural awareness based on the involvement of cultural entities and actors as well as participation opportunities created and promoted at the societal level by cultural stakeholders. Human capital and quality of governance become, in this context, enablers of sustainable urban development through increased knowledge and skills of community engagement.



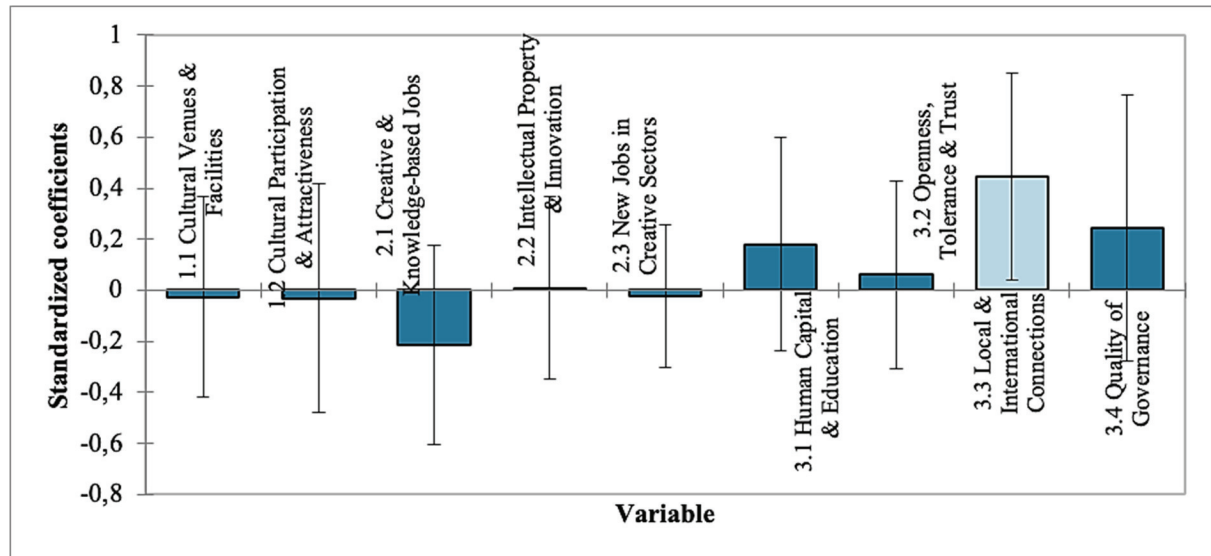
**Figure 10: Dependent variable: SDG8 / Standardized coefficients (95% conf. interval)**

*Source: Authors' representation*

According to Figure 10, given the  $AdjR^2$ , 49% of the variability of the dependent variable SDG8 is explained by the nine explanatory variables. The indicators that bring significant information are New Jobs in Creative Sectors, Human Capital & Education and Quality of Governance, the variable Quality of Governance being the most influential. The results of the

regression analysis explain 49% of the variance of the SDG8 ( $\text{Adj}R^2=0.491$ ), ( $F(9,44)=5.724$ ;  $p<.0001$ ).

Efficient use of governance tools could contribute to comprehensive policies answering the sustainable cities' development challenges by valuing the cultural landscape and creative sectors' capacities. In a governance process based on the cities' actual needs, local and cultural contexts shall be taken into consideration by urban planners and governments aiming at the sustainable development goals achievement (Chen, 2023).



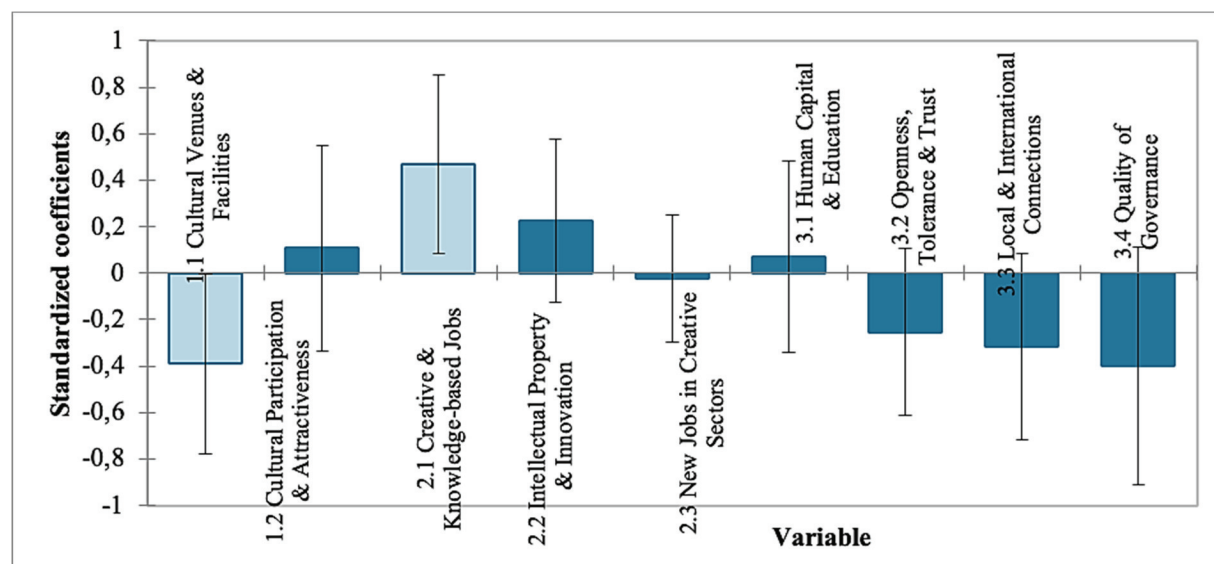
**Figure 11: Dependent variable: SDG11 / Standardized coefficients (95% conf. interval)**

*Source: Authors' representation*

Figure 11 illustrates that 28% of the variability of the dependent variable SDG11 is explained by the nine indicators of the analysis at the cities level. The indicator that brings significant information to explain the variability of the variable SDG11 is Local & International Connections, variable of cultural infrastructure category. The results of the regression analysis explain 28% of the variance of the SDG11 ( $\text{Adj}R^2=0.283$ ), ( $F(9,44)=2.927$ ;  $p<.0011$ ).

Local and international connections facilitate the exchange of knowledge, ideas and practices, as well as collaboration between stakeholders. Smart cities should reflect stakeholders' cooperation in the identification and prioritization of public policies in the interest of the community (Helbing, et al., 2021).

According to Figure 12 the nine cultural predictors explain 30% of the variability of the dependent variable SDG13. The best model includes the variables Cultural Venues & Facilities and Creative & Knowledge-based Jobs. Variable Creative & Knowledge-based Jobs, component of cultural labor and enterprise category, is the most influential. The results of the regression analysis explain 30% of the variance of the SDG13 ( $\text{Adj}R^2=0.307$ ), ( $F(9,44)=3.164$ ;  $p<.007$ ). It is remarked the preponderant reverse correlation of the variables which might suggest that at cities level the climate challenges are negatively associated with the cultural aspects. This might be generated by factors such as infrastructure investments, differentiated funding allocations, excessive transportation usage, exploitation of green spaces or even conflicting values and governance priorities regarding cultural needs over climate-related actions. The highest negative correlation with Quality of governance may lead to the perception that urban governance it is not yet sufficiently oriented towards climate action.



**Figure 12: Dependent variable: SDG13 / Standardized coefficients (95% conf. interval)**

*Source: Authors' representation*

Factors such as protection of the environment, employment, social infrastructure and basic services are contributively to sustainable city development (Fayomi, et al., 2019). The cultural and creative sectors features, by their agglomerated nature, bring advantages to urban efficiency such as attraction of people and production factors as well as increased productivity (Cerisola and Panzera, 2021).

## 5. The implications and the limits of the multi-scale approach

The paper brings an integrated perspective of cultural related indicators under the umbrella of sustainable development at national and city level facilitating the understanding based on differences and similarities. Addressing the level of associations among cultural indicators and the SDGs in a multi-scale analysis brings an increased level of understanding of the cultural factors that contribute to sustainable development.

In consideration of the multi-scale dimensions included in the analysis it is noted that:

SDG4 were identified high values of prediction given by education and human capital category variables at national level and governance at cities level. Among the selected SDGs included in the study, SDG 4 has highest values of correlations of the cultural indicators at both national and city level stages. This indicates that the relationship between education and culture is complex and multifaceted and that culture is a contributor to supporting endeavors in ensuring quality education for all at levels.

SDG8 is higher influenced by cultural participation and governance categories variables at national and respectively, city scale. In this consideration it is underlined the potential of cultural sectors to create employment opportunities and contribute to economic growth considering as well the place-based differences in terms of economic development. The governance system shall be regarded as a key aspect in generating cultural incentives and action plans favorable to SDG8 targets as well as the importance of cultural stakeholders' engagement in decision-making processes.

SDG11 has higher levels of prediction given by the cultural infrastructure category variables, including participation in cultural activities in cultural sites (historical monuments, museums, art galleries or archaeological sites), cinema at national level, and local and international connections at cities level. This stresses the relevance of cultural facilities and heritage for

sustainable cities and communities as well as the importance of facilitating access to cultural spaces and manifestations for boosting social cohesion and culturally vibrant cities.

SDG13 indicates as higher dependence values on governance and cultural labor and enterprise categories at national and respectively, cities levels. It is noted that SDG 13 indicates negative values which underlines the importance of resources allocation planning which shall consider the interrelation of climate and cultural factors and that limitations on one side might affect other components and rather than creating a dichotomy among the two dimensions, synergic policies shall be approached.

In terms of particularities, it is observed a differentiation among regions within the cities level analysis in consideration of the cultural indicators association level with the SDGs. Such a perspective brings an informational input in understanding the cultural contexts that influence sustainable development and the needs of alignment and tailoring the policies of intervention to the societal challenges in accordance with the geographical boundaries and localized challenges and solutions.

The diversity of the cultural related indicators included in the analysis underlines the cross-sectional influences of the cultural domain and its multiple reverberations at societal level. The analysis results point out the interconnectivity among culture and the SDGs achievement and the importance of citizens and stakeholders engagement alongside decision makers' responsiveness in the governance processes. Moreover, as urban areas grow and face new challenges, analyzing the connection between culture and the SDGs draws attention to the potential benefits of cultural elements integration into sustainable urban development.

Through the methodology approached the paper's results are subjected to several limitations. The statistical analysis is based on secondary data collected from different data sources that brings a high range of complexity in the data analyzed including cultural related indicators and the four of the SDGs selected. Moreover, the complexity is given by the two levels of the analysis, at the national and the cities level which emphasizes the data variability and the need of differentiation between significant and less significant data.

Other limitations are related to the geographical scope, the number of cases and time references included in the official data sources identified. The analysis at national level includes 28 cases (consisting in the number of the member countries of EU at the time of the data analyzed) and the analysis at cities level includes 45 cases (consisting in capital cities and large metropolitan areas in EU and EFTA).

## **Conclusions**

The role of culture in sustainable development is underpinned by its complex system of values and creative potential, fostering social cohesion and providing economic effects, all of which are, in turn, reflected in well-being and future-oriented development measures. Culture is about people's actions, and it acts as a catalyst for social dialogue, an economic driver and an environment protection promoter. The cultural contribution is an investment in sustainable development while acting as a social bond for the community, developing horizons and strengthening the governance process. As "national and local economies can be regenerated through the cultural industries" (Hesmondhalgh and Pratt, 2005), it is critical to ensure that economic growth is inclusive and that everyone has access to the benefits of development. From an urban perspective, "the sustainable city is a city which in terms of sustainable urban development, economic growth, income and employment can fulfil the needs of its citizens" (Basiri, Azim and Farrokhi, 2017, p.79).

The current study presents in a structured way the statistical analysis of the links between the cultural and Sustainable Development Goals variables. By analyzing the influences of the

cultural indicators on sustainable development, it can be seen that these variables provide significant effects, and there are statistical links between the indicators included. In terms of the representativeness of cultural indicators, it is observed that the indicator comprising the frequency of participation in cultural activities has the highest correlation with the SDGs Total Index. At the national level analysis, participation in cultural activities (cinema, live performances, and cultural sites) is identified as a common favorable indicator of the benefit of the SDGs, followed by the indicators of literacy in reading, math or science and life satisfaction. At the city-level analysis, it is identified as the most favorable indicator the quality of governance followed by intellectual property & innovation, openness, tolerance & trust and cultural participation & attractiveness.

As common categories at both national and city level were identified to be governance and the cultural infrastructure whereas cultural labor and enterprise, education and human capital and cultural participation categories were identified differently in the levels of the analysis, national or cities.

There is also a differentiation of the predominant cultural indicators according to the specifics of each Sustainable Development Goal included in the analysis. Thus, it can be seen that the cultural pillar is relevant both for sustainable development as a whole and in relation to the SDGs, making a positive contribution to achieving the goals. We emphasize that participation in cultural activities is correlated with SDG4 as well as a generator of employment favorable to SDG8. Participatory governance and engagement through culture are as well favorable to SDG4 and SDG8. Cultural infrastructures envisaging cultural sites and accessibility facilities are assigned to SDG11 while government investments and creative jobs and knowledge based are potential contributors to SDG13. Among the cultural indicators, the participation in cultural activities at the national level analysis and the quality of governance at the city level analysis are seen as prevalent in the SDGs, therefore emphasizing the importance of citizens' engagement, connectivity and shared experiences.

The analysis carried out highlights that there is a significant link between cultural indicators and the achievement of Sustainable Development Goals, thus underlining the importance of the cultural dimension for sustainable development from a social, economic and environmental perspective, with a focus on the urban level. In conclusion, with sufficiently high relevance, we can say that Culture influences sustainable development providing a beneficial framework for the overall well-being.

The study reiterates the need for in-depth analyses of culture as a component that influences sustainable development to generate new information that can be of interest to other researchers involved in exploring the factors that can affect Sustainable Development Goals as well as to policymakers.

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