

Creativity and Economic Development

A. Bobirca, A. Draghici

Abstract—The objective of this paper is to construct a creativity composite index designed to capture the growing role of creativity in driving economic and social development for the 27 European Union countries.

The paper proposes a new approach for the measurement of EU-27 creative potential and for determining its capacity to attract and develop creative human capital. We apply a modified version of the 3T model developed by Richard Florida and Irene Tinagli for constructing a Euro-Creativity Index. The resulting indexes establish a quantitative base for policy makers, supporting their efforts to determine the contribution of creativity to economic development.

Keywords—European Creativity Index, talent, technology, tolerance

I. INTRODUCTION

CREATIVE industries, situated at the crossroads of art, culture, business and technologies, include activities related to design, production and distribution of goods and services that use intellectual capital as main input. It became apparent nowadays that EU's position in the world is increasingly determined by its capacity to innovate, both socially and economically. The role of creativity in this perspective was so far largely overlooked, with the mainstreaming of creativity in policies to foster innovation and with the move towards measuring the socio-economic performance of the sector growing to be a recent concern.

While the perception of creativity as having only a marginal economic contribution still persists, this may explain to a certain extent the lack of statistical instruments to quantify the contribution of the creative sector to economic growth.

Our research represents an attempt to remedy this situation and aims to contribute towards filling this gap, by constructing a creativity composite index designed to capture the growing role of creativity in driving economic and social development for the 27 European Union countries, including Romania.

According to recent research undertaken by the European Commission (2009), the creative sector is a growing one, developing at a higher pace than the rest of the economy. Also, the sector growth in terms of jobs out-performs the rest of the economy. Furthermore, it drives many other sectors of the European economy, and in particular innovation and ICT sectors.

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By attending to these considerations, our paper is mainly focused on exploring measurement possibilities of creativity in a European comparative manner, with the final goal of positioning Romania's creative sector in the European creative economy.

Therefore, in the following sections, we highlight the methodology used to construct creativity indexes, as well as the main results obtained. We also provide an interpretation of our findings and conclude by emphasizing on the potential of creativity to promote and sustain competitiveness.

II. METHODOLOGY AND DATA

Our research proposes a new approach for the measurement of EU-27 creative potential and for determining its capacity to attract and develop creative human capital. We apply a modified version of the 3T model developed by Richard Florida and Irene Tinagli (2004) for constructing a Euro-Creativity Index.

Our work extends and adapts to the current European and Romanian context the conceptual framework and indicators introduced by Richard Florida [1] and further adapted by Florida and Tinagli [2], as well as other works such as Impact of Culture on Creativity [3] and Global Creativity Index [4]. It is based on the 3T model of economic development – talent, technology and tolerance – used to analyse and compare 27 European countries.

A European and Romanian Creativity Index are developed, by adding new relevant indicators to the existing framework, as well as by a dynamic approach to the study of creative sector development for the 2001-2007 period of time.

Our index is based on a wider set of indicators and sub-indicators than those used in previous studies, representing more specific and appropriate tools for capturing the creative vitality of countries in Europe.

The present research represents the first attempt to apply the 3T framework at the EU-27 European level and in a dynamic manner, covering a large period of time.

The resulting indexes establish a quantitative base for policy makers in their efforts to determine the contribution of creativity to economic development.

Our proposed European-Creativity Index has a three-dimensional structure, as follows:

- the Talent Index, based on three indicators: the creative class index, the human capital index and the scientific talent index;
- the Technology Index, composed of three indicators: the innovation index, the technology innovation index and the research&development index;
- the Tolerance Index, based on three dimensions: the tourism

openness index, the students index and the creative talent index.

For the purpose of the study, we are calculating nine component sub-indexes, which represent the annual composite indexes mentioned above; annual aggregated creativity indexes, which represent the annual European Creativity Indexes; a global aggregated creativity index, which is the European Creativity Index corresponding to the entire period of time analysed; trend indexes, both at composite index level and at aggregated level (i.e. the European Creativity Trend Index and the Global European Creativity Trend Index), as well as the Creativity Matrix.

The talent measures include:

- the Creative Class Index, which measures the number of people employed in creative occupations as percentage of total employment. The data used is drawn from the International Labour Organization statistics for the 27 European countries. A similar procedure was used by Florida&Tinagli, as well as by the European Commission for approximating statistics for the cultural and creative sector;

- the Human Capital Index represents the percentage of population age 25-64 with a bachelor's degree or above and is based on EUROSTAT data;

- the Scientific Talent Index is calculated as the number of researchers per thousand workers and is based on data collected from EUROSTAT. The data is referring to people employed in research-related activities by sector, expressed in full time equivalents.

The European Talent Index is a composite index that combines these 3 sub-indexes. It is calculated based on a system of scores, the country with the highest values being assigned the highest score (which is 27). For the other countries, a distance indicator is calculated, reflecting their relative difference in values of the sub-indexes from the top.

The technology measures include:

- the Innovation Index, calculated as the number of patent applications to the EPO per million inhabitants and is based on data from EUROSTAT.

- the Technology Innovation Index, calculated as the number of high-tech patent applications to the EPO per million inhabitants and is also based on EUROSTAT data.

- the R&D Index, which represents the R&D expenditure as percentage of GDP and is drawn from the EUROSTAT data.

The European Technology Index combines the three measures illustrated above. It is based on a scale from 0 to 27 and is calculated in a similar manner with the European Talent Index.

The tolerance measures include:

- the Tourism Openness Index, calculated as the number of international tourist arrivals as percentage of total population. The choice of this indicator has been determined by the need to illustrate the tolerance to foreigners, as well as the degree of exposure to social and cultural diversity. The data is collected from UNCTAD.

- the Students Index, which represents the number of students

studying abroad and the number of foreign students studying on the domestic market, as percentage of the total number of students. The data for constructing this index is drawn from EUROSTAT [5].

- the Creative Trade Index, calculated as creative goods and services export as percentage of total exports. This is the indicator used by UNCTAD to determine the level of development of the creative sector and it was included in our study in order to emphasize the economic dimension and impact of the creative sector. Data is drawn from UNCTAD statistics [6].

The European Tolerance Index combines the three measures indicated above. It is also based on a system of scores ranging from 0 to 27.

The annual European Creativity Index is computed as follows: the values corresponding to the nine sub-indexes are ranked, the country with the highest value being ranked the first; the ranks are normalized; the index is calculated as the difference from the maximum value (i.e. 1) of the average of the nine values calculated.

The methodology for calculating the Global European Creativity Index is similar to the one presented above: the aggregated values are obtained as a difference from 1 of the average of each group of three normalized values.

Trend indexes are calculated based on the average annual growth coefficients and following the methodology illustrated above.

The correlation matrix (the Creativity Matrix) is a bidimensional representation of the relationship between the European Creativity Index and the European Creativity Trend Index. It allows for the classification of the countries analysed in four different categories: *leaders*, which are countries with developed creative economies and with high growth rates in creative potential; *up and comers*, which are countries with lower European Creativity Index scores, but with higher growth rates; *losing ground*, which are countries with relatively high European Creativity Index scores, but cannot sustain the growth of their creative capabilities; and *laggards*, which are countries with low scores for their European Creativity Index and with low rates of creative growth.

III. RESULTS AND DISCUSSION

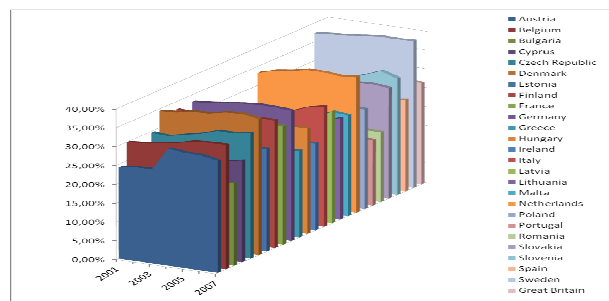


Fig. 1 European Creative Class Index

Considering the values of the Creative Class Index we find that for some of the European countries the percentage of people employed in creative occupations is constantly over 30% (Sweden, Denmark, the Netherlands, Finland, Germany), demonstrating their orientation towards an occupational structure that favours the development of the creative sector. This trend though is not characteristic to all European countries included in the analysis, as we find that Malta, Poland, Greece and Portugal show comparatively smaller values of the employees in creative sectors, with an unfavourable evolution over time.

The involvement of the recent EU member countries like Czech Republic, Slovenia and Slovakia in the development of the creative class is surprising, illustrating their commitment to stimulate creativity and creative talent. The creative class represents only 17% of the working class in Romania, but the growth rhythm is impressive, Romania being on the top position with respect to the growth potential of the creative class. In this context it is worth mentioning the significantly high growth rhythm found for Romania, the first place among the European countries, suggesting an important development potential of creative activities.

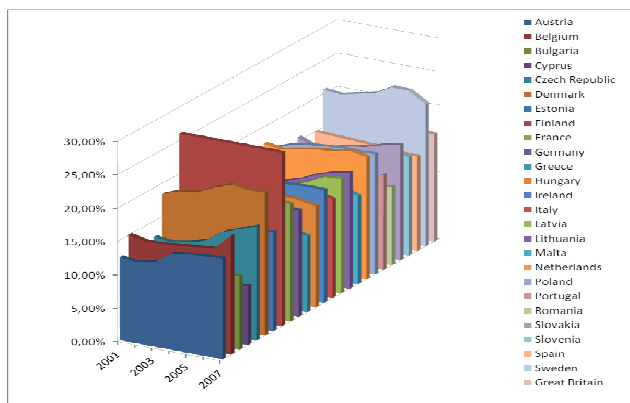


Fig. 2 European Talent Index

For the composite European Talent Index, a polarization of the European countries is apparent: some countries constantly register high values (e.g. Finland, Denmark, the Netherlands, France), while others are occupying the last positions for the entire period of time (e.g. Spain, Greece, Cyprus, Portugal), Spain showing almost unchanged values of the composite index. Germany, Belgium and Slovakia occupy the middle ranks due to small scores for Human Capital and Scientific Talent Indexes. Lithuania is also among the middle rankers compensating the relatively small score for Creative Class with a very good position in Human Capital. Finland, Poland, Latvia and Ireland show the highest number of bachelor degree holders while the Nordic countries show the highest number of researchers thus confirming the values found for the Creative Class Index. These countries are in a very good position to activate and develop the value of creative assets.

Romania sits on the 25th-26th position of the ranking, with low values of the sub-indexes, especially of the Scientific

Talent Index (the lowest number of researchers in Europe). Still, Romania ranks the first with respect to its growth rhythm, determined particularly by the trend of the Creative Class and of the Human Talent Indexes.

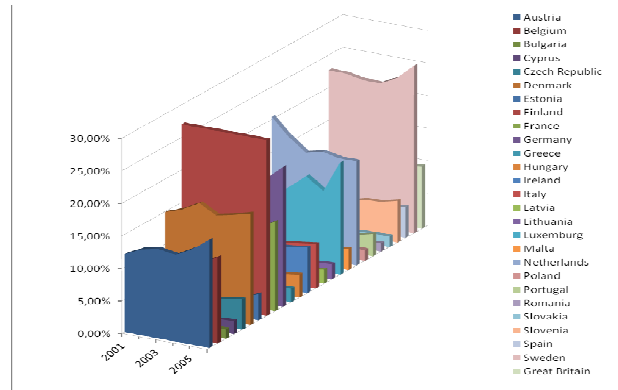


Fig. 3 European Technology Index

The results obtained for the European Technology Index indicate that the Nordic countries occupy the first positions, together with the Netherlands and Germany. We find important differences in the scores showed by European countries included in the analysis, 18 of them scoring below 10. We explain this variation by the high discrepancy between the number of high-tech patent applications made by the majority of European countries and the ones made by the countries in the front row – Finland, Sweden, Germany, Denmark, Luxembourg, Netherlands, Austria, Belgium and France. Their orientation towards innovating and developing new technologies is also supported by the amount of expenditure allocated for research and development, illustrated through the respective values of the R&D Index. Romania sits on the last position, due to the very low number of patent applications, as well as to the extremely low level of R&D expenditure as a percentage of GDP (i.e. 0.45%). With respect to the growth rhythm, Romania is on the middle of the European countries ranking, having a moderate increase, determined especially by the increase in R&D spending.

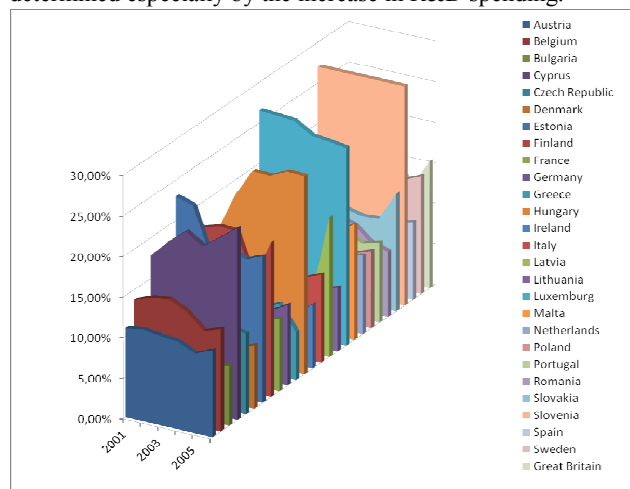


Fig. 4 European Tolerance Index

The results obtained for the European Tolerance Index reveal a change in the ranking of the European countries: Slovenia, Luxembourg, Hungary, Estonia occupy the first positions, particularly as a result of the values registered by the Tourism Index and by the Creative Trade Index. The evolution of the European countries performance is more volatile for this index, especially regarding the number of foreign students or international tourists.

The countries most active in the creative goods and services trade are Hungary, Estonia, Finland, Great Britain and Sweden.

Analysing the results obtained for the Tolerance Index we found a change of the ranking in favour of Slovenia, Luxemburg, Hungary, Estonia which occupy the first positions, mainly due to their output in Tourism and Creative Trade Indexes. The EU members' evolution is more volatile regarding the number of foreign students and tourists.

Romania ranks better for this index, especially due to its international trade with creative goods and services. Still, its growth rhythm is negative, indicating a deterioration of its international position, both in terms of international tourism, as well as international creative trade.

We can conclude that Romania has the best positioning among the European countries for the Human Capital, Creative Class and international trade in creative goods and services, as its maximum score, for all indexes considered is 27.

In order to better illustrate the results we have computed Talent, Technology and Tolerance Global Indexes for the entire period and each country considered. We have also computed a Global Creativity Index for 2001-2007.

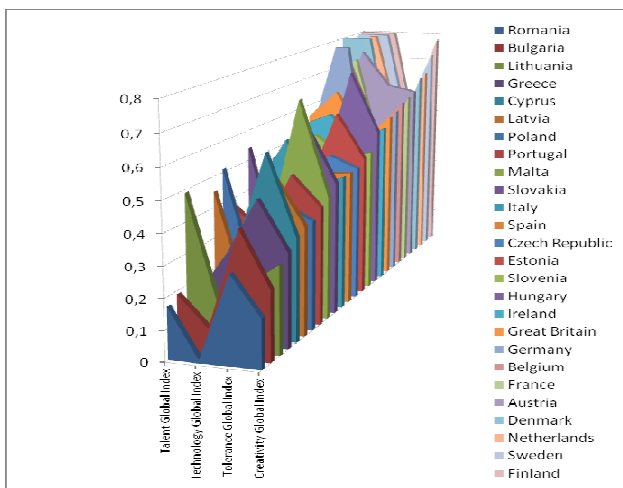


Fig. 5 European Creativity Index 2001-2007

Considering the results above Romania's scores for the Global Creativity Index 2001-2007 are similar to the annual values, Romania's rank remaining unchanged. Also we confirm the relative better ranking of Romania for the Creative Trade Index, Human Capital Index, and Students Index.

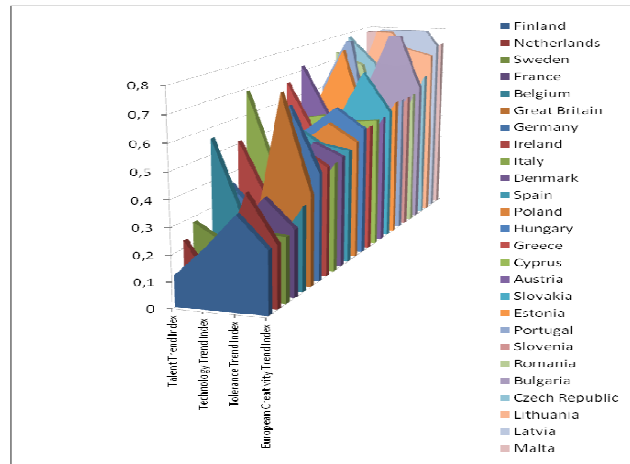


Fig. 6 European Creativity Trend Index

Considering the trend indexes we find Romania in the first part of the ranking, confirming the high growth rates identified earlier for the composite indexes. Also, as we expected the countries occupying the first ranks for the annual indexes show low growth rates.

Figure 7 illustrates the contribution of each component of the European Creativity Index (ECI) to the aggregated value. We notice that for the developed economies, the value of the ECI is significantly determined by the Talent and Technology Indexes, while for the countries occupying the middle ground, the contribution of the Tolerance index tends to increase. Unlike the other two dimensions of ECI, the Tolerance Index doesn't fluctuate in a predictable manner that is a constant decrease from the best ranking country on the creativity map to the last one.

Romania's ECI score, ranking the last for the entire period analyzed, is largely determined by the Tolerance and Talent Indexes.

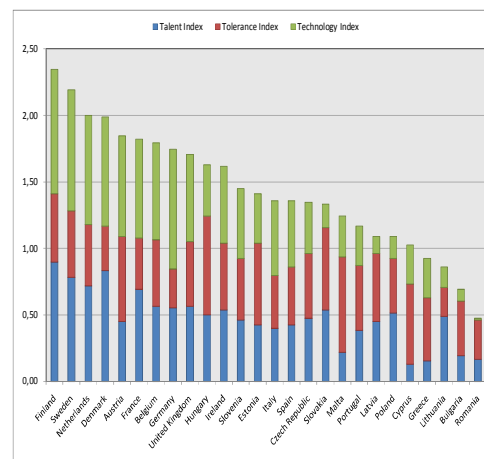


Fig. 7 The contribution of the ECI components

Figure 8 points to an indirect correlation between the values of the ECI and economic growth: the average values for the 2001-2006 period of time indicate that countries with high values of the creativity index had low rates of economic growth.

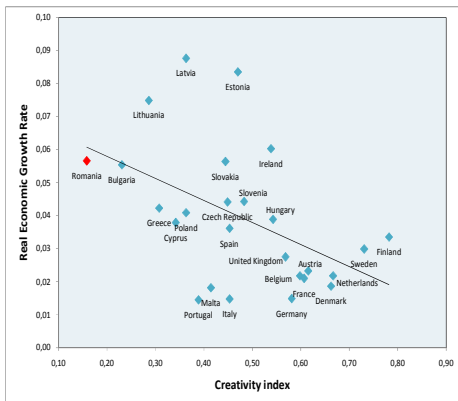


Fig. 8 Correlation ECI – economic growth

Figure 9 illustrates the contribution of each component of the trend index to the aggregated value. It is important to emphasize the reverse level of contribution to the aggregated value as compared to the European Creativity Index. Here, we observe an increased contribution of the technology and talent indicators for the highest growth countries, which are mostly the developing ones, as compared to the higher contribution of the tolerance index for the developed countries, representing the laggards of this ranking.

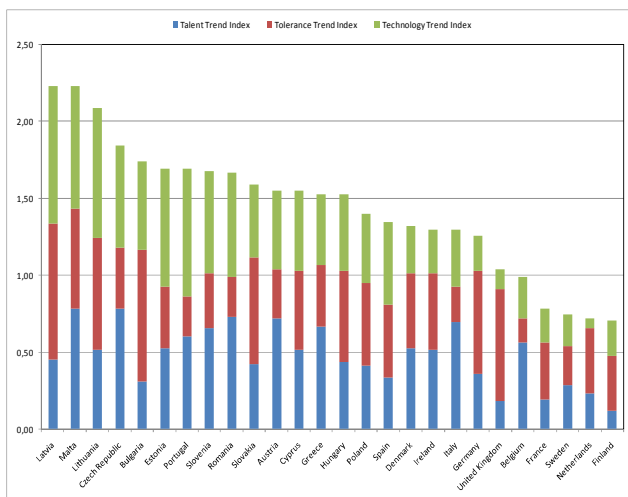


Fig. 9 Contribution of the European Creativity Trend Index component

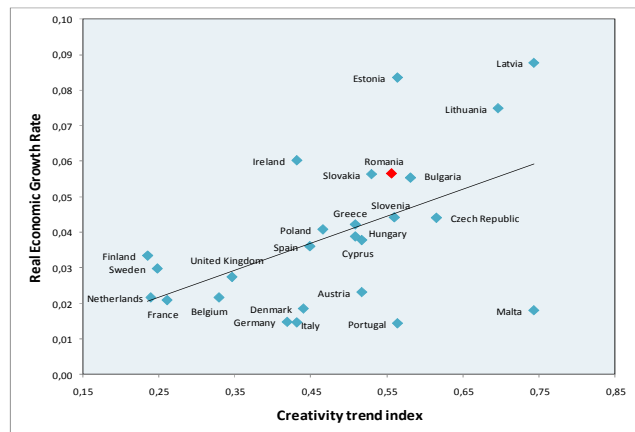


Fig. 10 Correlation European Creativity Trend Index – economic growth

We also emphasize, as figure 10 illustrates, a direct correlation between the European Creativity Trend Index and economic growth: the average values for the 2001-2006 period of time indicate that countries with high values of the creativity trend index had high rates of economic growth, as these countries are the new EU members in Central and Eastern Europe.

IV. CONCLUSION

Our research adapted and extended the indicators used by Florida and Tignali (2004) for computing the Euro-creativity index, both by adding new sub-indicators, that we considered more relevant for emphasizing the economic and socio-cultural parameters of the European creative sector, and by the dynamic analysis over 2011-2007. We have considered additional factors as relevant indicators for illustrating the creative strength of an economy thus creating the methodological context for testing the hypothesis that high levels of creative capital, technological development, social tolerance and trade openness determine speeding up the economic development. Our research represents the first systematic effort to apply the methodological framework proposed by Florida & Tinagli to all the 27 European Union member countries and for a longer period of time. The results obtained are relevant and illustrative.

The creative class represents on average about 30% of employment in the EU, registering an annual growth rate of 8%, higher in particular for countries with low index values. Romania ranks the first among the EU-27 countries in terms of the growth of its creative class, being in a very good position to mobilize and harness creative assets.

Our analysis confirms the results of Florida and Tinagli, according to which the epicenter of competitive Europe is transferred from traditional powers like France, Germany, United Kingdom to a creative cluster of Northern European countries, namely Finland, Sweden, the Netherlands. Finland tops the aggregate rankings of the creativity index. Sweden,

Netherlands and Denmark recorded also high values, suggesting their commitment to a development path centred on harnessing the creative economy potential. All these countries show a high technological development and have constantly invested in developing their creative talent. The Nordic countries are thus well positioned to demonstrate their creative competitiveness. Also, Ireland, Hungary, Slovenia and Estonia show high performances regarding their capacity to use the creative assets and capabilities. Considering the European Creativity Index and European Creativity Trend Index the European leaders are Slovenia, Hungary and Austria countries with mature creative economies and an above average growth rhythm.

European states ranking in the first positions have similar attitudes on attracting and retaining global creative talent, translated in liberalising labour policies and immigration. The small cultural distance among the European countries and the high number of English speakers are additional advantages in the international creative human capital, especially in relation to the United States.

Consequently, the ability of states to attract, retain and develop creative human capital and to exploit creative capabilities tends to become, to a significant extent, the key to global competitiveness. Thus, our survey confirms that talent and creativity have at a greater extent than traditional inputs such as labour or capital, the capacity to deliver sustainable economic growth and social development.

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