Angelo Leogrande[1]*°
*LUM University Giuseppe Degennaro, Casamassima, Bari, Puglia, Italy, EU
°LUM Enterprise s.r.l., Casamassima, Bari, Puglia, Italy, EU

The Employment Rate in Europe

Between 2009 and 2022 it grew by an average of 11.08%

Eurostat calculates the value of the employment rate in Europe. The indicator measures the share of the population aged between 20 and 64 in employment. Subordinate workers are all persons who, during a reference week, performed at least one hour of paid or gainful work or were temporarily absent from such work.

Ranking of countries by value of employment rate in Europe in 2022. Iceland is in first place by employment rate in Europe in 2022 with a value equal to 84.8, followed by the Netherlands with an amount of 82.9 units and from Sweden with a value of 82.2 units. In the middle of the table are Cyprus and Slovenia with an amount of 77.9, followed by Portugal with a value of 77.5 units. Romania closes the ranking with a value of 68.5 units, followed by Greece with a value of 66.3 units and Italy with a value of 64.8 units.

Ranking of European countries by the value of the percentage change in employment in Europe between 2009 and 2022. Malta is in first place by the value of the percentage change in the employment rate in Europe with a value of 37.46% equal to an amount of 22.1 units, followed by Hungary with a value of 28.32% equal to an amount of 17.7 units, followed by Romania with a value of 27.09% equal to an amount of 14.6 units. In the middle of the ranking are Slovenia with a value of 9.1% equal to an amount of 6.5 units, followed by Spain with an amount of 8.59% equal to an amount of 5.5 units, and by Croatia with an amount of 8.57% equal to an amount of 5.5 units. Cyprus closes the ranking with an amount of 3.45% equal to an amount of 2.6 units, followed by Greece with a value equal to 1.38% equal to an amount of 0.9 units, and by Norway with a value of 0 units.

Clustering with k-Means algorithm optimized with the Silhouette coefficient. A clustering with k-Means algorithm optimized with the Silhouette coefficient is presented below. Three different clusters are identified, namely:

- Cluster 1: Ireland, Portugal, Slovakia, Slovenia, France, Hungary, Malta, Latvia, Belgium, Luxembourg, Bulgaria, Poland, Lithuania, Cyprus, Finland;
- Cluster 2: Italy, Croatia, Romania, Greece, Spain;
- Cluster 3: Sweden, Netherlands, Norway, Germany, Iceland, Denmark, Estonia, Czech Republic, Austria.

From the point of view of the median, it is possible to identify the following ordering of the clusters, namely: C3=81.3>C1=77.5>C2=68.5. From a geographical point of view, it appears that the employment rate tends to be higher in the Scandinavian countries and in Central and Northern Europe,

[1]Professor of Economics at LUM University Giuseppe Degennaro and Researcher at LUM Enterprise s.r.l. Email: leogrande.cultore@lum.it, Strada Statale 100 km 18, Casamassima, Bari, Puglia, Italia.

more attenuated in the Baltic countries and in some Eastern European countries and in France, and very low in the countries of the Southern Europe and Eastern Europe.

Network analysis with Euclidean distance. A network analysis with Euclidean distance is presented below. Six simplified network structures are identified, namely:

- Estonia and the Czech Republic have a connection with a value of 0.49 units;
- France and Luxembourg have a connection worth 0.37 units;
- Croatia and Spain have a connection worth 0.59 units;
- Lithuania and Latvia have a connection worth 0.48 units;
- Germany and Denmark have a connection worth 0.6 units;
- Slovakia and Ireland have a connection worth 0.5 units.

Conclusion. The average value of the employment rate for European countries grew between 2009 and 2022 by a value equal to 7.6 units equal to a value of 11.08%. The value of the employment rate has constantly grown between 2010 and 2019 going from an amount of 68.31% up to a value of 74.97%. However, between 2019 and 2020 the value of the employment rate decreased from an amount of 74.97% to a value of 73.97%. However, in the following years the value of the employment rate grows on average up to a maximum value of 76.82%. Covid 19 has reduced the average occupancy rate. The reasons that lead some countries to have an employment rate lower than the European average refer to the presence of undeclared work, the informal economy, the illegal economy. Certainly the lack of an adequate culture of legality can partly explain the divergence in employment rates between the countries of Central-Southern and Eastern Europe compared to the countries of Central-Northern Europe.

Declarations

Data Availability Statement. The data presented in this study are available on request from the corresponding author.

Funding. The author received no financial support for the research, authorship, and/or publication of this article.

Declaration of Competing Interest. The author declares that there is no conflict of interests regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication.

Software. The authors have used the following software: Gretl for the econometric models, Orange for clusterization and network analysis, and KNIME for machine learning and predictions. They are all free version without licenses.

*Acknowledgements***.** I am grateful to the teaching staff of the LUM University "Giuseppe Degennaro" and to the management of the LUM Enterprise s.r.l. for the constant inspiration to continue our scientific research work undeterred.

References

Laureti, L., Costantiello, A., Matarrese, M., & Leogrande, A. (2022). The Employment in Innovative Enterprises in Europe. Available at SSRN.

Leogrande, A., Magaletti, N., Cosoli, G., & Massaro, A. (2022). Fixed Broadband Take-Up in Europe. Available at SSRN 4034298.

Costantiello, A., Laureti, L., & Leogrande, A. (2021). The Intellectual Assets in Europe. Available at SSRN 3956755.

Leogrande, A. (2023). The Rule of Law in the ESG Framework in the World Economy. Available at SSRN 4355016.

Leogrande, A., Laureti, L., & Costantiello, A. (2022). The Innovation Index in Europe. Available at SSRN 4091597.

Laureti, L., Massaro, A., Costantiello, A., & Leogrande, A. (2023). The Impact of Renewable Electricity Output on Sustainability in the Context of Circular Economy: A Global Perspective. Sustainability, 15(3), 2160.

Laureti, L., Costantiello, A., Matarrese, M., & Leogrande, A. (2022). Foreign Doctorate Students in Europe. Available at SSRN 4032975.

Laureti, L., Costantiello, A., Matarrese, M., & Leogrande, A. (2022). Enterprises Providing ICT Training in Europe. Available at SSRN.

Costantiello, A., Laureti, L., Leogrande, A., & Matarrese, M. (2021). The Innovation Linkages in Europe. Available at SSRN 3983218.

Costantiello, A., & Leogrande, A. (2023). The Impact of Research and Development Expenditures on ESG Model in the Global Economy. Available at SSRN 4414232.

Laureti, L., Costantiello, A., & Leogrande, A. (2022). The Role of Renewable Energy Consumption in Promoting Sustainability and Circular Economy. A Data-Driven Analysis. A Data-Driven Analysis (December 25, 2022).

Leogrande, A., Costantiello, A., Laureti, L., & Leogrande, D. (2021). The Determinants of Design Applications in Europe. Available at SSRN 3956853.

Costantiello, A., Leogrande, A., & Laureti, L. (2021). The corporate innovation in Europe. Available at SSRN 3964043.

Costantiello, A., & Leogrande, A. (2023). The Regulatory Quality and ESG Model at World Level. Available at SSRN 4388957.

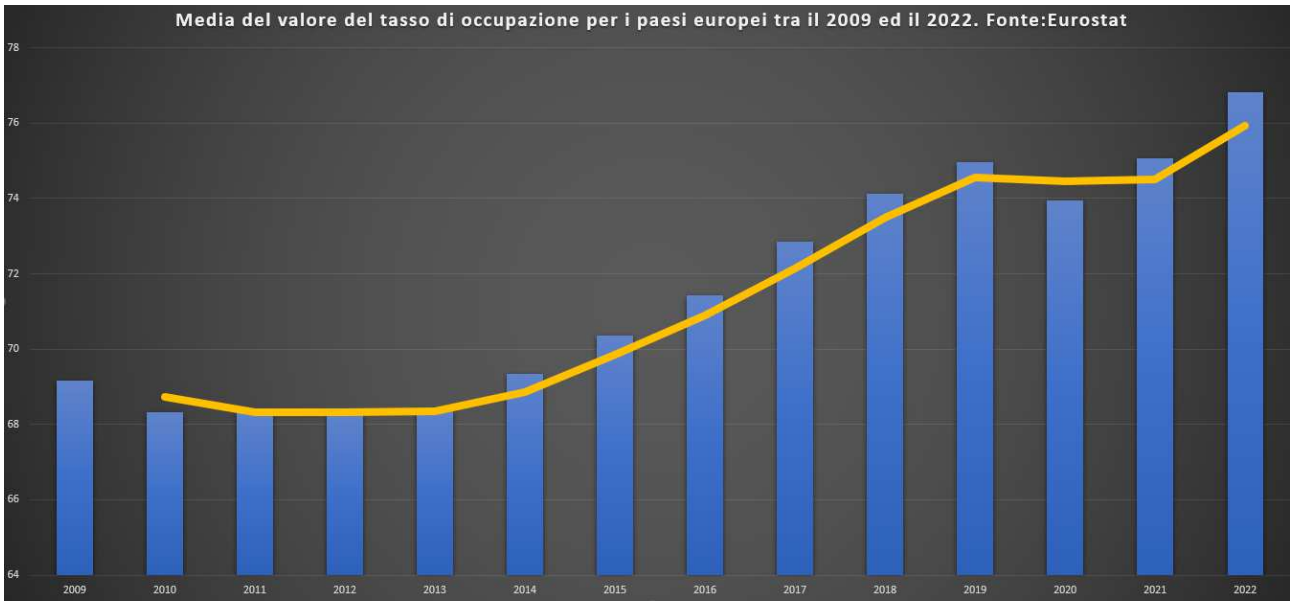
Costantiello, A., & Leogrande, A. (2023). The Role of Political Stability in the Context of ESG Models at World Level. Available at SSRN 4406997.

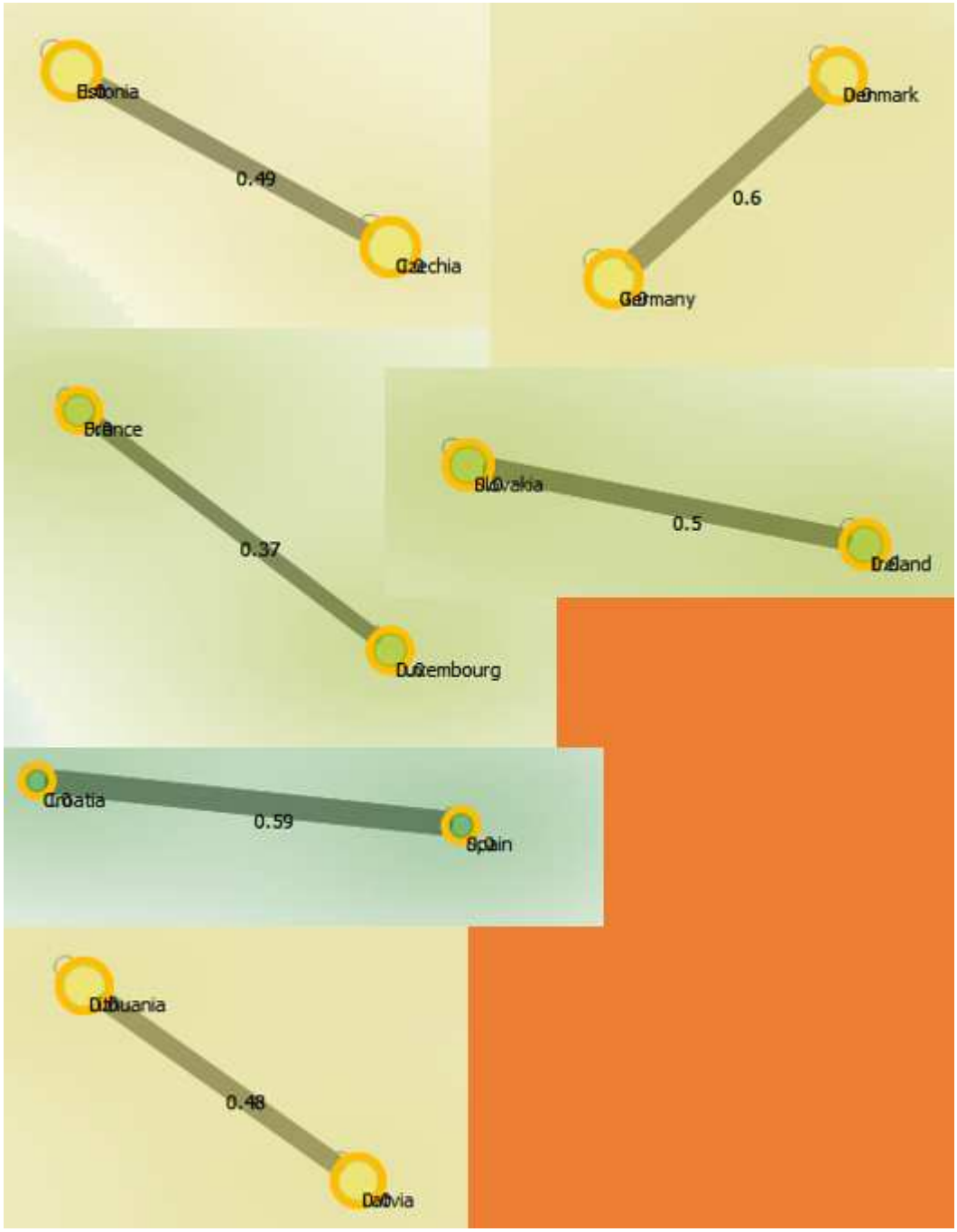
Laureti, L., Costantiello, A., & Leogrande, A. (2023). The Role of Government Effectiveness in the Light of ESG Data at Global Level. Available at SSRN 4324938.

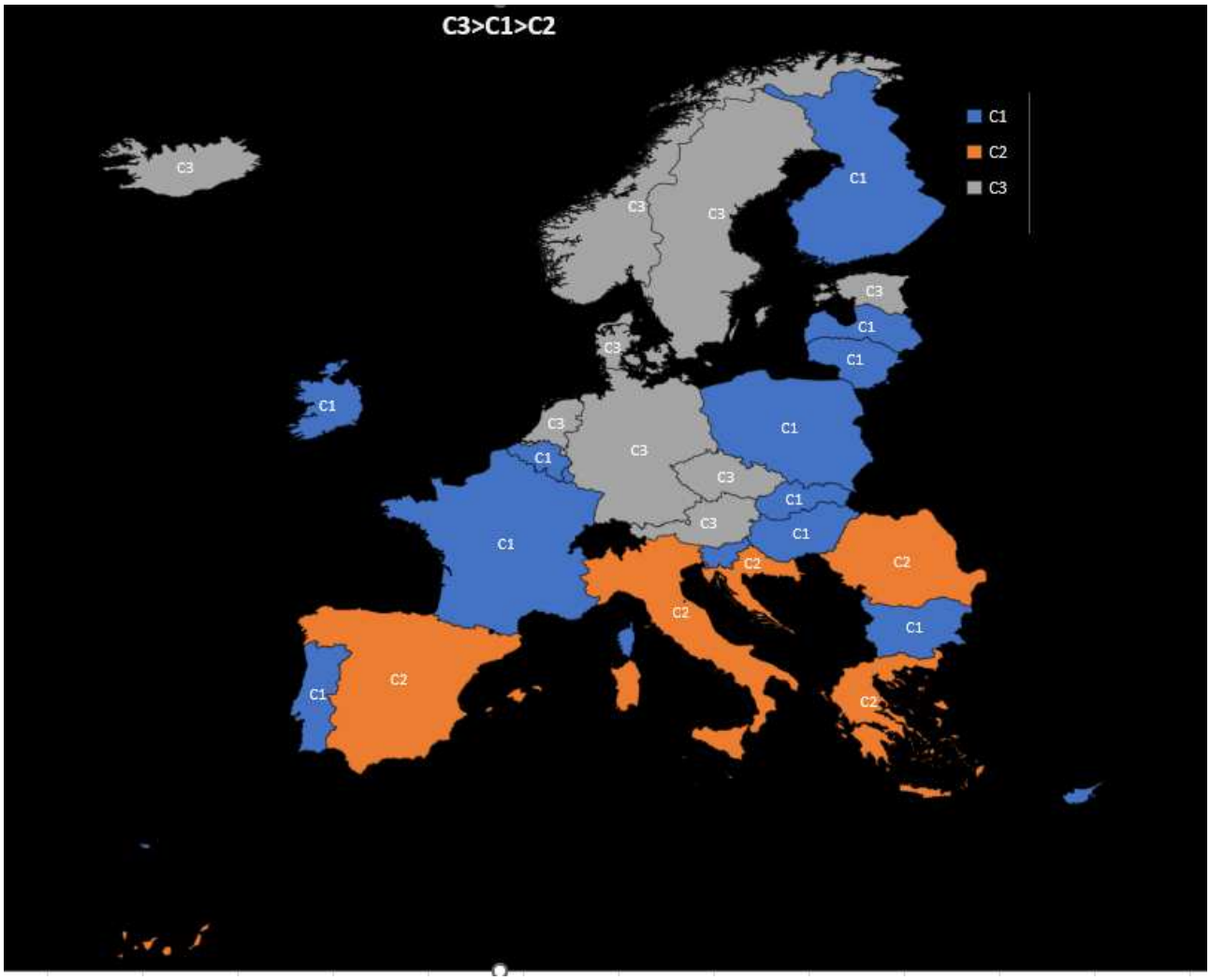
Laureti, L., Costantiello, A., & Leogrande, A. (2022). The Fight Against Corruption at Global Level. A Metric Approach. A Metric Approach (December 30, 2022).

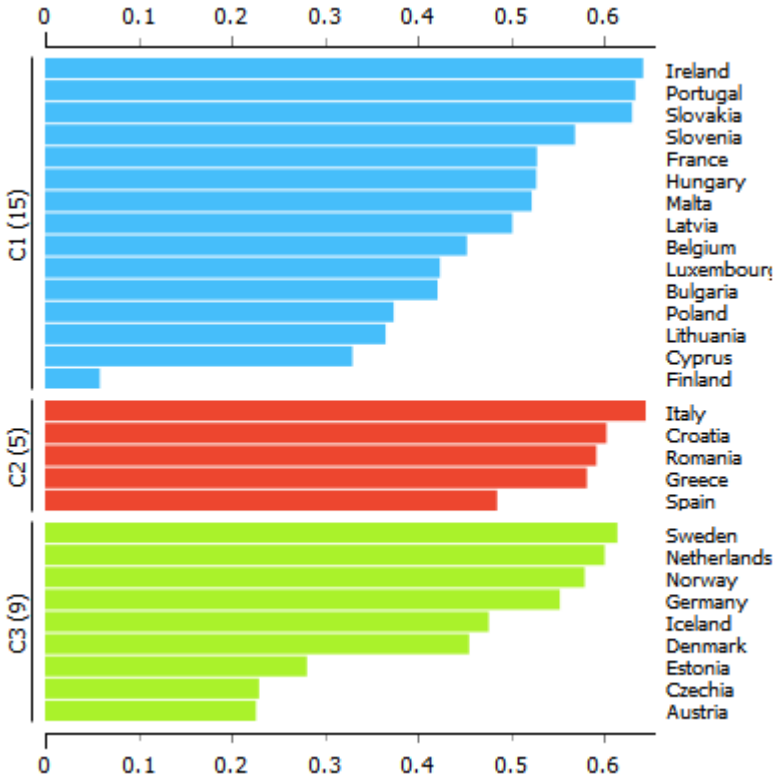
Costantiello, A., & Leogrande, A. (2023). The Impact of Voice and Accountability in the ESG Framework in a Global Perspective. Available at SSRN 4398483.

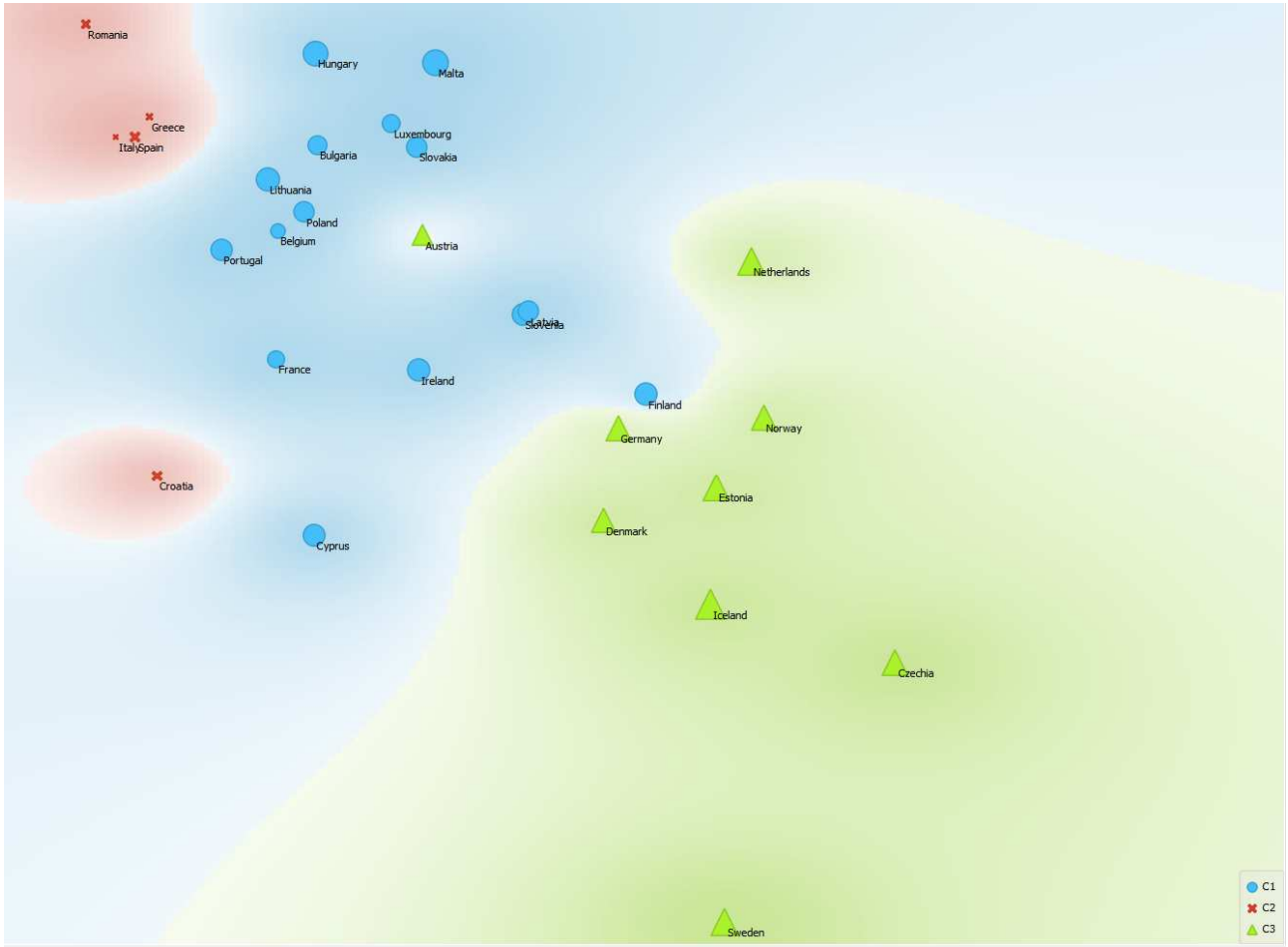
Leogrande, A., Costantiello, A., & Laureti, L. (2022). The Role of Non-R&D Expenditures in Promoting Innovation in Europe. Available at SSRN 4215981.

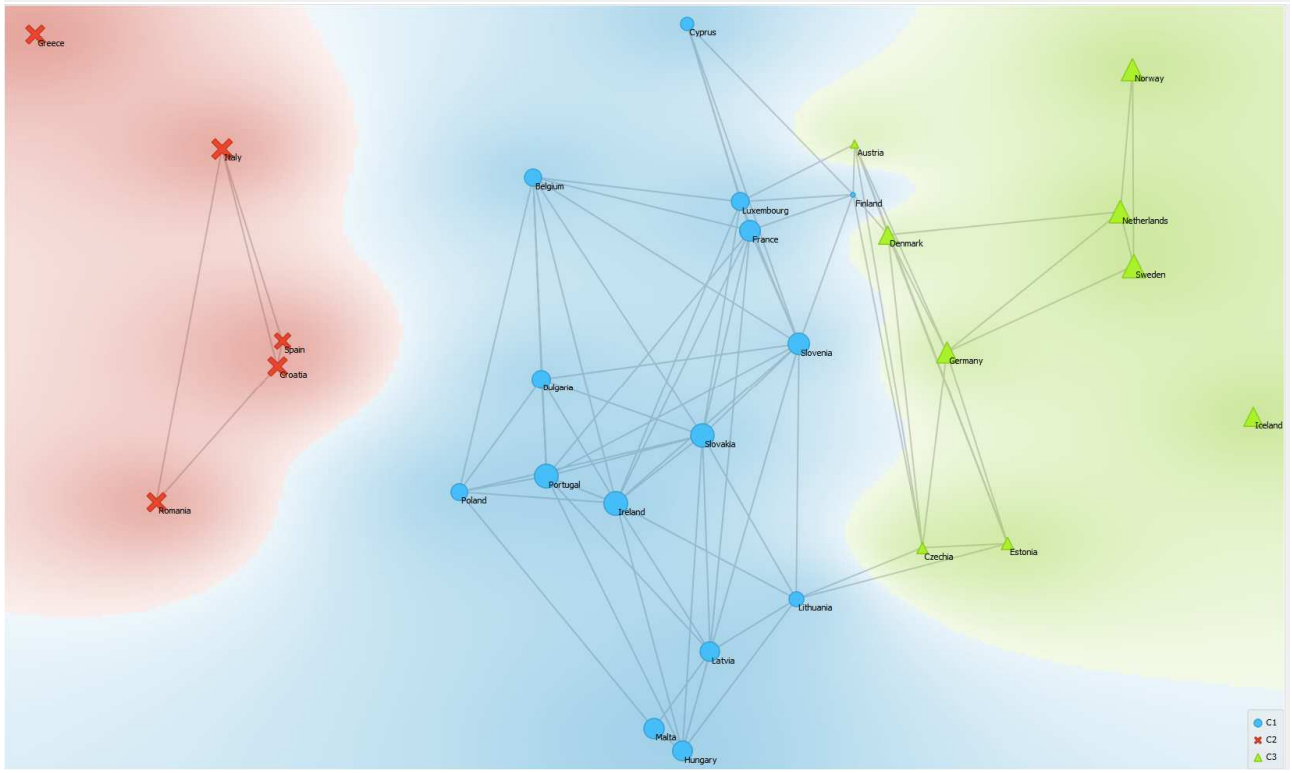

Media del valore del tasso di occupazione per i paesi europei tra il 2009 ed il 2022. Fonte:Eurostat
78
76
74
72
70
68
66
64
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022

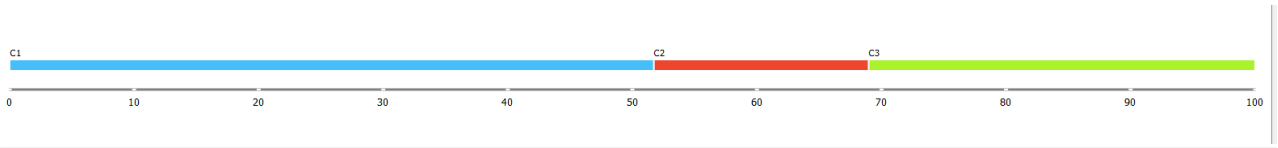

0.49
0.6
0.37
0.5
0.59
0.48

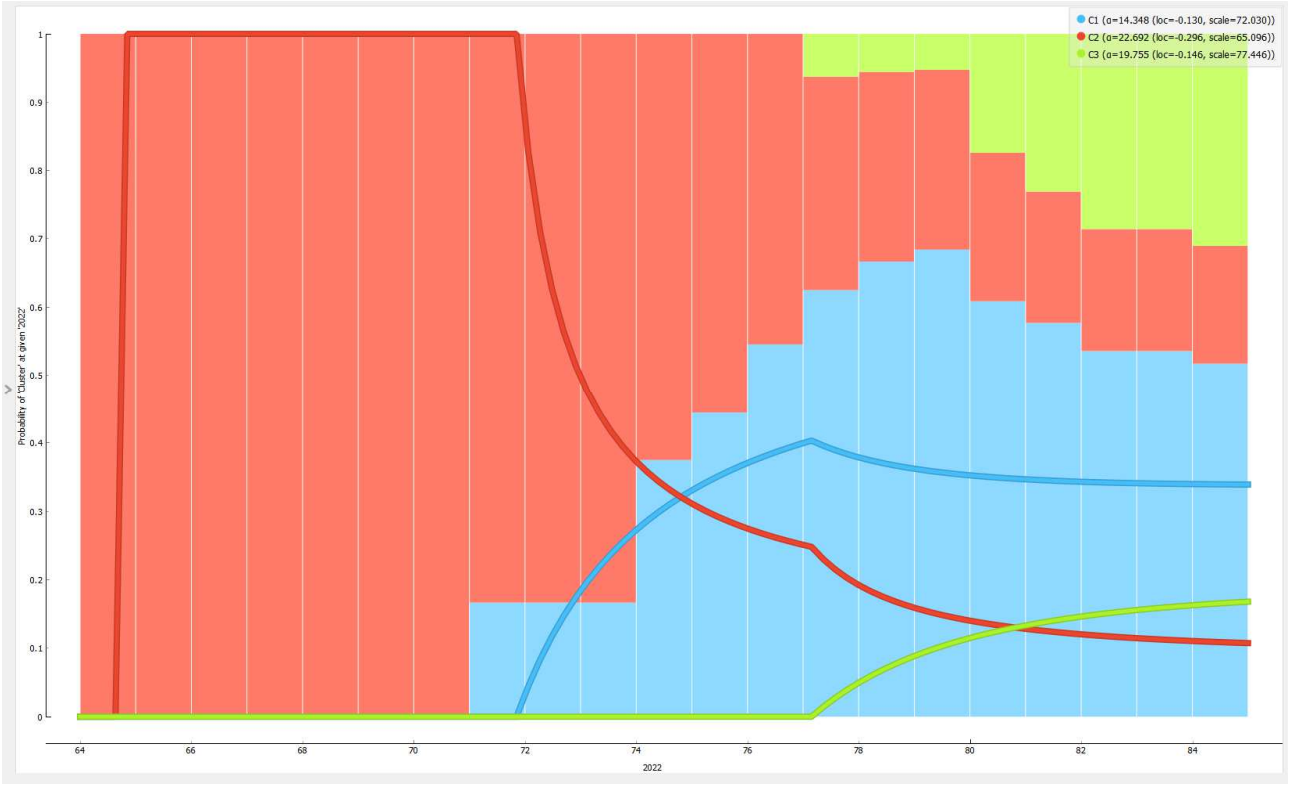

C3>C1>C2
C1
C2
C3

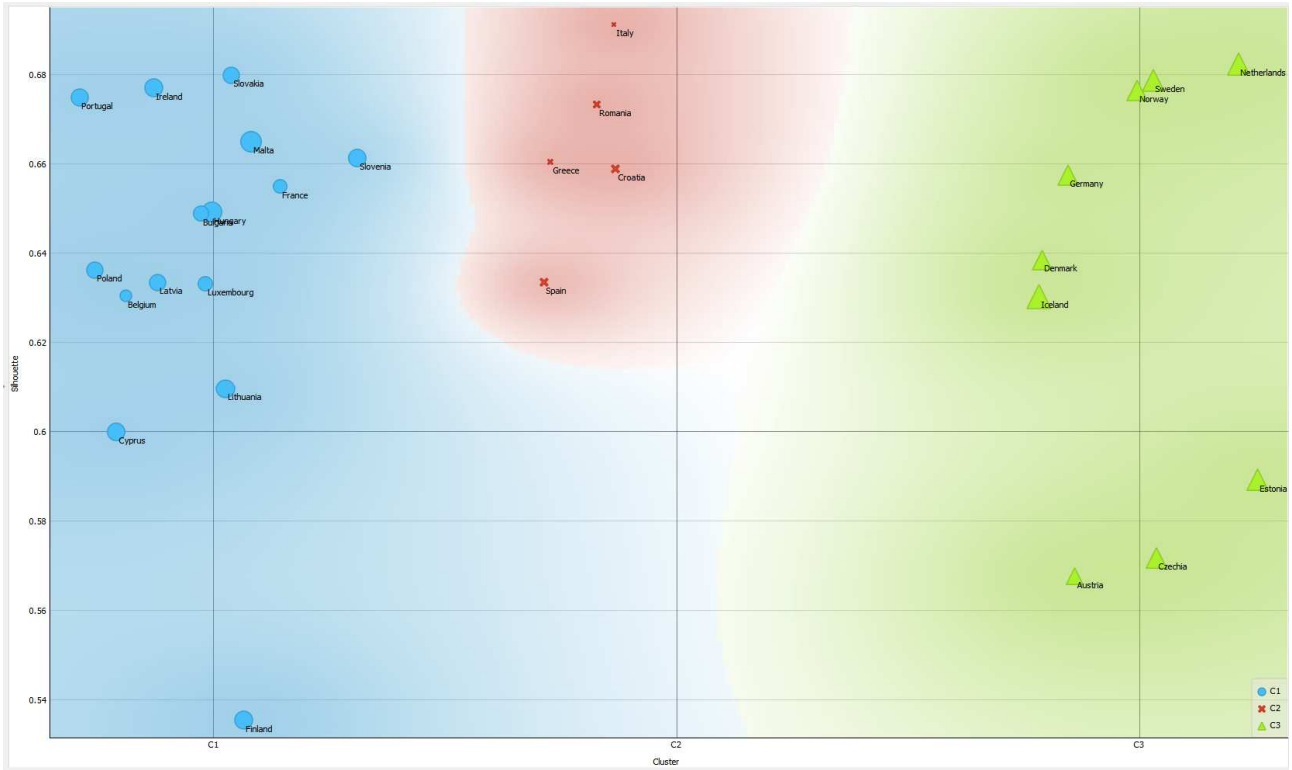

0
0.1
0.2
0.3
0.4
0.5
0.6
C1 (15)
C2 (5)
C3 (9)
Ireland
Portugal
Slovakia
Slovenia
France
Hungary
Malta
Latvia
Belgium
Luxembourg
Bulgaria
Poland
Lithuania
Cyprus
Finland
Italy
Croatia
Romania
Greece
Spain
Sweden
Netherlands
Norway
Germany
Iceland
Denmark
Estonia
Czechia
Austria

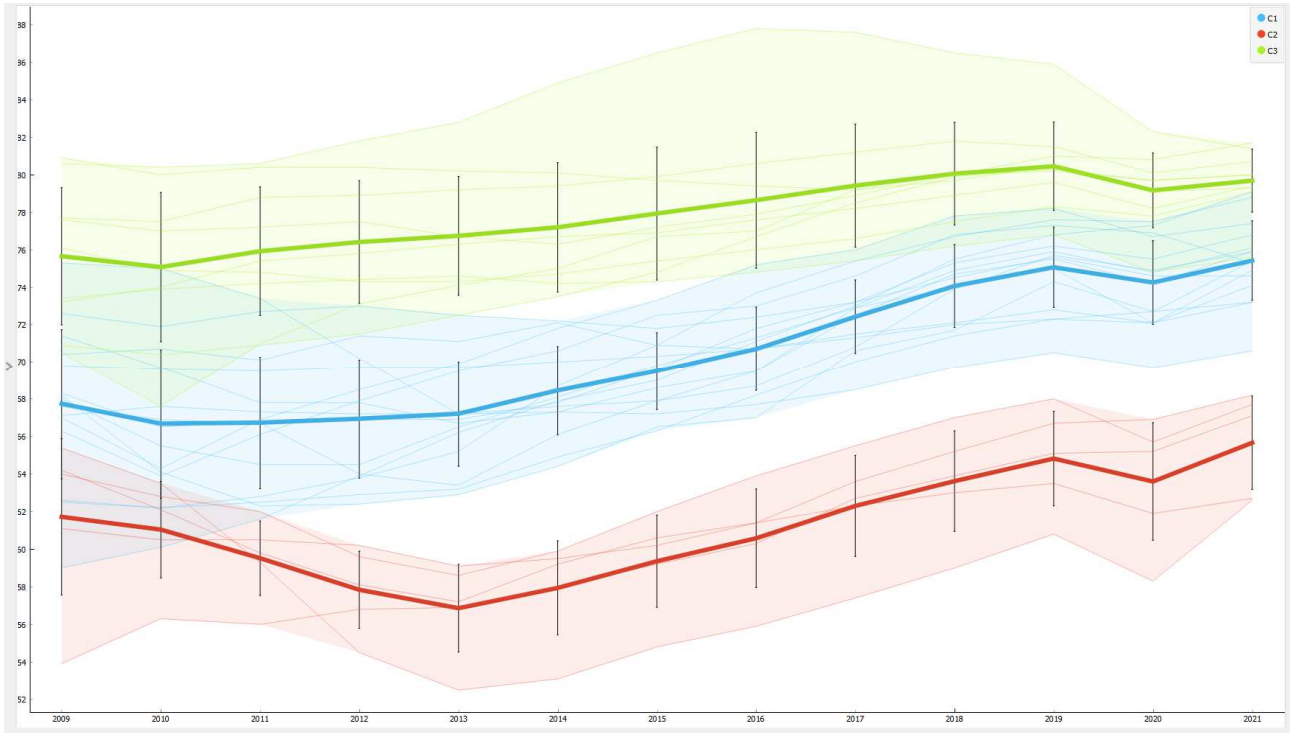

Romania
Hungary
Malta
Greece
Italy
Spain
Luxembourg
Bulgaria
Slovakia
Lithuania
Poland
Belgium
Austria
Portugal
Netherlands
Latvia
Slovenia
France
Ireland
Finland
Germany
Norway
Croatia
Estonia
Denmark
Cyprus
Iceland
Czechia
Sweden
C1
C2
C3

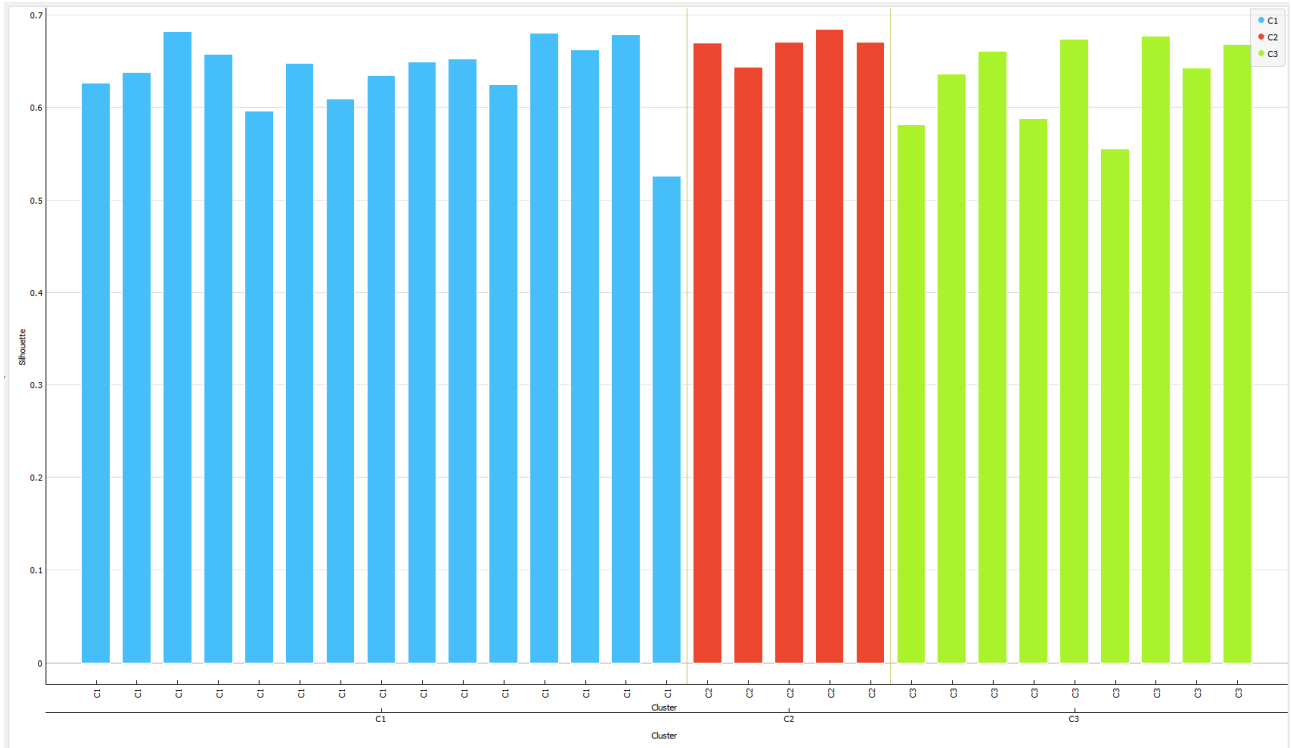

Greece
Cyprus
Norway
Italy
Austria
Belgium
Luxembourg
Finland
Netherlands
France
Denmark
Sweden
Spain
Slovenia
Germany
Croatia
Bulgaria
Iceland
Slovakia
Portugal
Poland
Ireland
Romania
Czechia
Estonia
Lithuania
Latvia
Malta
Hungary
C1
C2
C3

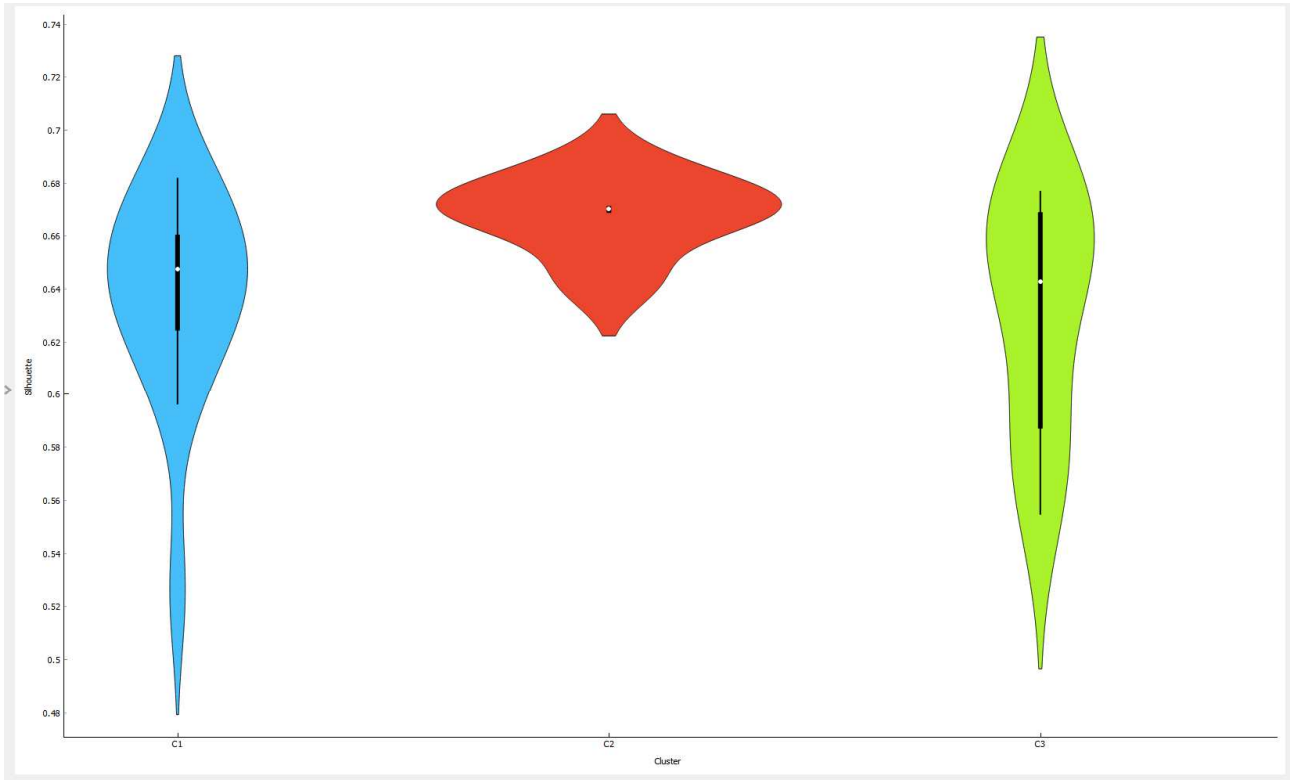

C1
C2
C3
0
10
20
30
40
50
60
70
80
90
100


C1 (α=14.348 (loc=-0.130, scale=72.030))
C2 (α=22.692 (loc=-0.296, scale=65.096))
C3 (α=19.755 (loc=-0.146, scale=77.446))
Probability of 'cluster' at given 2022
2022


Italy
Slovakia
Ireland
Portugal
Romania
Malta
Slovenia
Greece
Croatia
France
Hungary
Poland
Latvia
Luxembourg
Belgium
Spain
Lithuania
Cyprus
Finland
Netherlands
Sweden
Norway
Germany
Denmark
Iceland
Estonia
Czechia
Austria
C1
C2
C3
Silhouette
Cluster


C1
C2
C3
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021


C1
C2
C3
Silhouette
Cluster
C1
C2
C3


0.74
0.72
0.7
0.68
0.66
0.64
0.62
0.6
0.58
0.56
0.54
0.52
0.5
0.48
Silhouette
C1
C2
C3
Cluster