WORLD STATE OF QUALITY:

2016 European Quality Scoreboard

FOREWORD

In a globalized world, such as the one we live in, it is becoming increasingly important to make comparative studies of performance across organizations as well as territories. This allows one to identify strengths, gaps and areas for improvement, regarding the future of any given place. Therefore, rankings and benchmarks have become a common tool for different sectors of activity and countries as well.

Quite well known studies and reports are being produced regularly for characterization of how countries perform namely regarding issues such as competitiveness, innovation or entrepreneurship, just to name a few. However, when we tried to find similar information regarding quality and ways to portray the World State of Quality (WSQ), a lack of compiled information, data analysis or similar reports was found to be present, and as such representing also both a challenge and an opportunity.

Given this situation and context, we decided to go ahead and try to come up with an overall evaluation about how different countries perform in terms of quality, taking into account what were some of its most relevant dimensions. This is the overall ambition behind the attempt to create a World State of Quality (WSQ) report. Given the easier access to many sources of statistical information, we also decided at first, for this 2016 edition, to portray the State of Quality as it stands for the 28 European Union countries, corresponding to the present 2016 European Quality Scoreboard (EQS). As we get feedback from this effort, that we believe to be a pioneering one in the field, our plans include for 2017 the expansion to as many other nations in the world as possible, by means of using a subset of the indicators that support our EQS results, available on a broader international geographical space.

As a first effort, there may be several areas for improvement to take into account for future work either related with the WSQ or the EQS studies that we are trying to undertake, but open to additional possible partnerships. Therefore we, as WSQ and EQS team, are quite open to receiving your contributions, insights and comments, hoping to count also on your possible interest in further collaborations in this or other related projects. Just share with us any thoughts that this report may lead to!

Portugal, December of 2016

Pedro Saraiva, University of Coimbra (pas@eq.uc.pt)

Paulo Sampaio, University of Minho (paulosampaio@dps.uminho.pt)

Catarina Cubo, University of Minho (catarina.cubo@gmail.com)

Marco Reis, University of Coimbra (marco@eq.uc.pt)

João d'Orey, National Observatory of Human Resources (joao.orey@onrh.org)

TABLE OF CONTENTS

LIST OF ABBREVIATURES

ARWU .... Academic Ranking of World Universities

ASQ.. American Society for Quality

DTF.. Distance to Frontier

EFQM... European Foundation for Quality Management

EQS ....European Quality Scoreboard

EQS-R.. European Quality Scoreboard Report

EOQ.. European Organization for Quality

EU... European Union

EW... Environmental Wellbeing

FM... Feigenbaum Medal

GCI.. Global Competitiveness Index

GDP... Gross Domestic Product

gha .... global hectare

GII .... Global Innovation Index

IAQ.. International Academy for Quality

IRCA .... International Register of Certified Auditors

ISI.. Institute for Scientific Information

ISO.. International Organization for Standardization

Ixx .... Indicator number

MDGs .... Millennium Development Goals

OECD.. Organisation for Economic Co-operation and Development

OEQS .... Overall EQS Ranking Scores

pc.. per capita

PCA .... Principal Component Analysis

PISA .... Programme for International Student Assessment

Rxx .... Ranking number

WEF .... World Economic Forum

WHO.. World Health Organization

WSQ.. World State of Quality

WSQ-R .... World State of Quality Report

EXECUTIVE SUMMARY

The World Sate of Quality (WSQ) project that we have launched is aimed to assess, analyze and rank worldwide countries according to their levels of multidimensional quality performance, similarly to what has already been done for a while in terms of different sectors of activity or other fields of study, such as competitiveness, innovation or entrepreneurship, just to mention a couple of them. It tries to portray the levels of "macroquality" achieved in different countries across the world.

As a first deliverable, this report presents the 2016 European Quality Scoreboard (EQS) results, obtained for the 28 European Union countries, where easier access to statistical data can be found, regarding a total of 21 quality related indicators, according to the EQS structure described below. In the future, we plan to enlarge this coverage to other countries, possibly by using a smaller subset of metrics, for which values can be obtained over a larger geographical coverage of countries.

European Quality Scoreboard Indicators and Results

The EQS approach, whose results will be presented in this report, does comprise 2 quality axes, 10 quality dimensions and 21 quality indicators, which provide a multivariate portray of the "macroquality" levels of performance achieved by each of the 28 European Union countries. As shown below, the Enablers axis includes 5 dimensions, related with quality as it relates to: i) Organizations; ii) Professionals; iii) Research; iv) Education; and v) Health. This axis pretty much corresponds to the efforts being made, in each of such dimensions, as pillars that support quality implementation. On the other hand, as is also shown below, the Results axis includes another 5 dimensions, related with the outcomes being achieved regarding: i) Competitiveness; ii) Social Cohesion; iii) Sustainability; iv) Innovation and Entrepreneurship; and v) Satisfaction.

Then, for each of the above dimensions, as illustrated below, we are considering a total of 2 underlying quality related indicators, with the exception of Satisfaction, a dimension that collects perceived satisfaction levels achieved, for which we take into account a total of 3 indicators. Thus leading to an overall total of 21 indicators, whose values are studied for each of the 28 European Union countries, resulting in a 28x21 data matrix that comprises 588 values, the latest ones available at the time of data collection in 2016 for the different indicators and countries.

Besides a detailed analysis, regarding results, trends and comparisons of performance for the different countries according to each of the 21 individual indicators, and the corresponding rankings, we also computed and overall EQS ranking, based upon the positions occupied by each country and groups of countries according to weighted averages of the ranking positions for each of such indicators, that will be called Overall EQS ranking scores (OEQS). According to the final rankings obtained from such OEQS values, we have also defined 4 categories of countries, as shown below, each one comprising 7 European Union member states, with similar OEQS performance, corresponding either to what we have designated as being: i) leading; ii) follower; iii) moderate; and iv) lagging countries in terms of overall quality performance levels already achieved.

	Country	OEQS Score	Group
1	Finland	7.85	Leading
2	Austria	7.97	
3	Sweden	8.33	
4	Netherlands	8.45	
5	Denmark	9.05	
6	United Kingdom	10.20	
7	Luxembourg	10.86	
8	Germany	10.90	Follower
9	Ireland	11.18	
10	Slovenia	11.45	
11	Czech Republic	12.76	
12	Belgium	12.99	
13	France	13.10	
14	Spain	14.24	
15	Portugal	14.40	Moderate
16	Estonia	14.52	
17	Malta	14.65	
18	Italy	15.65	
19	Slovakia	17.00	
20	Poland	17.67	
21	Hungary	17.72	
22	Cyprus	17.83	Lagging
23	Romania	18.03	
24	Lithuania	18.61	
25	Latvia	19.39	
26	Croatia	19.65	
27	Greece	19.96	
28	Bulgaria	21.97	

Multivariate statistical analysis were performed over the available dataset, including principal component and cluster analysis, leading to the identification of quality profiles typically associated with certain subsets of countries, providing evidence that there is a diversity of ways being adopted to pursue the quality journey, depending on how societies and public policies have been adopted and implemented by different European Union countries, leading to a variety of situations, where groups of countries seem to be following more similar profiles than other ones, and no single country or group of countries being better or worse in all kinds of indicators, but just a subset of them. Such a variety of countrywide quality cultures is clearly one of the main conclusions reached also from the EQS approach.
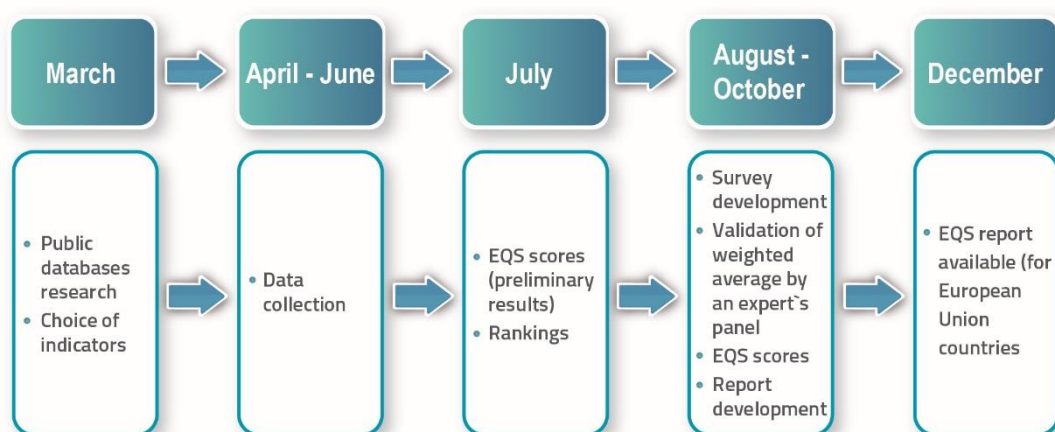
EQS Report Structure

The main report includes chapters that explain the model and working methodology adopted, indicators used and how they were standardized, then followed by specific country profiles, with data for each

indicator and general results obtained for each of the 28 European Union countries. More detailed information is provided in a set of Annexes to the main report.

Project Timeline for the 2016 EQS

The work that was conducted, regarding this 2016 EQS cycle, corresponds roughly to the months and milestones shown below, and allowed this final report to be prepared after around 9 months of data definition, collection and treatment, activities that took place between March and December of 2016, making usage of the most recent data available for each of the 21 indicators used by the time data collection took place.

March	April - June	July	August - October	December
• Public databases research • Choice of indicators	• Data collection	• EQS scores (preliminary results) • Rankings	• Survey development • Validation of weighted average by an expert`s panel • EQS scores • Report development	• EQS report available (for European Union countries)

INTRODUCTION AND INDICATORS

The WSQ approach and the EQS results presented in this report are aimed at studying and comparing the "macroquality" performance levels achieved by each of the 28 European Union (EU) countries, according to their results regarding a set of 21 main quality related indicators, showing strengths and improvement areas and helping national or international institutions and organizations to better understand where they need to act in order to improve the "macroquality" levels achieved at any particular territory. It thus addresses quality at its macro level (corresponding in this case to EU countries), one of the key components and scales of analysis that can be taken into account when we try to address quality from a multiscale perspective, under the so called "Multiscale Quality" perspective.

As a matter of fact, quality can be divided and studied under several scales, according to different dimensions of time and space, under the scope of a multiscale paradigm. Just like in the field of economics, where people got used to the idea of studying in a complementary way either "microeconomics", "mesoeconomics" and/or "macroeconomics", one can also talk about "microquality", "mesoquality" and "macroquality", depending on the scales of time and space at which quality challenges or problems are being addressed (Figure 1).
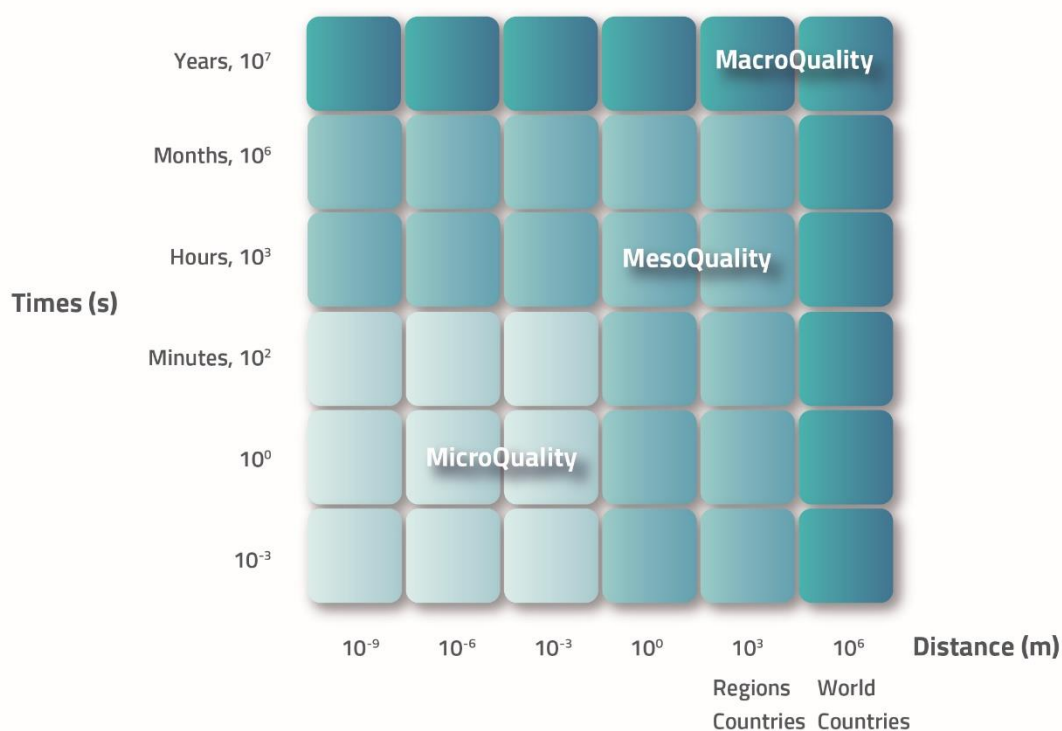

Figure 1 – Multiscale Quality.

Under this Multiscale Quality view:

- Microquality is mostly related with quality professionals and their contribution to the improvement of services, companies, processes and quality of life, but in a local scale, such as when one is trying to come up with a quality product in its manufacturing facilities and production lines. Quick local problems and solutions dominate this microquality world.

- Mesoquality concerns quality issues and challenges that relate to organizations, municipalities and regions, typically dealing with larger orders of magnitude regarding both scales of time and space, demanding for separate tools, mindsets and approaches, when compared with either microquality or macroquality. It focuses on the application of quality mostly in a local or regional level.

- Finally, macroquality is related with concerns about quality as it regards to a country or a number of countries, not to mention sometimes the world. It is a matter mostly related with large national or international organizations, including companies but also public and governmental entities.

These categories of scales are indicative, and there are of course situations where multiple categories need to be addressed simultaneously, and under the multiscale quality paradigm one should be able to travel easily from one scale to another, changing the corresponding quality toolbox and mindset, as appropriate, through the adoption also of "Glocal Quality" approaches, by means of which one tries to solve a particular quality challenge combining local and global components, whereas one needs both to "think global, and act local", but also to "think local, and act global", as far as quality is concerned, thus combining both a "top down" and a "bottom up" perspective.

Given this overview of "multiscale quality", there seems to be a lack of methodologies and results available for measuring and understanding "macroquality", specially as it regards to the characterization and comparison of overall quality efforts and outcomes being performed at a particular country, and how these relate with levels obtained by other countries as well.

Therefore, the WSQ approach and the EQS results are aimed at contributing to fill this gap of reliable evaluations and multidimensional analysis of macroquality levels achieved at any given sets of countries. The 2016 EQS report presents for the first time such portrays for the 28 European Union countries, where easier access to common data is available, with plans for further expanding in the future this methodology, possibly using a smaller subset of indicators, to other countries and continents.

The EQS approach, whose results will be presented in this report, does comprise 2 quality axes, 10 quality dimensions (Figure 2) and 21 quality indicators, which provide a multivariate portray of the "macroquality" levels of performance achieved by each of the 28 European Union countries. As shown below, the Enablers axis includes 5 dimensions, related with quality as it relates to: i) Organizations; ii) Professionals; iii) Research; iv) Education; and v) Health. This axis pretty much corresponds to the efforts being made, in

each of such dimensions, as pillars that support quality implementation. On the other hand, as is also shown below, the Results axis includes another 5 dimensions, related with the outcomes being achieved regarding: i) Competitiveness; ii) Social Cohesion; iii) Sustainability; iv) Innovation and Entrepreneurship; and v) Satisfaction.
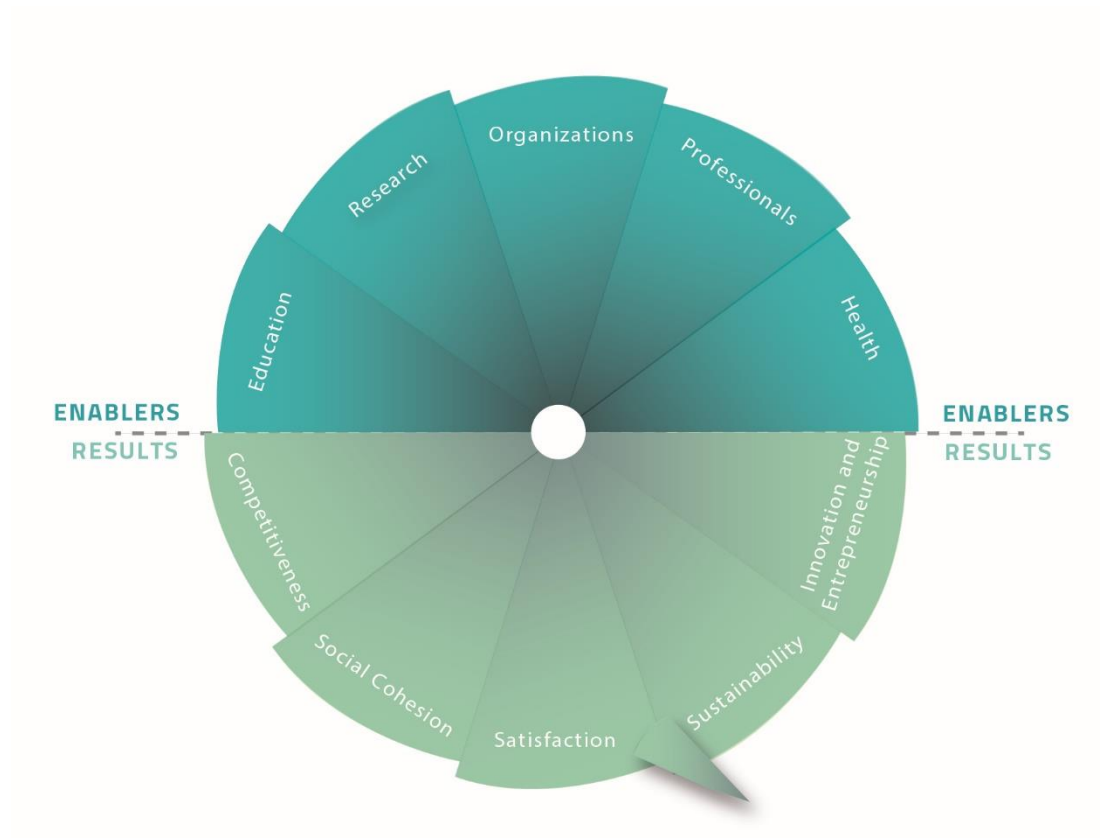

Figure 2 - European Quality Scoreboard dimensions.

Enablers correspond to the allocation of resources and achievements in terms of the societal quality infrastructure that can support its quality journey, under a favorable environment, including therefore the following 5 dimensions:

i)   Organizations, having to do with the number of entities that have been qualified according to relevant quality standards or models of excellence;

ii)   Professionals, dealing with the number of quality professionals qualified or recognized according to relevant processes and organizations;

iii)   Research, addressing the intensity of research activities carried out, and in particular those related specifically with the quality field;

iv)   Education, covering indicators that quantity the quality of education, as well as lifelong training practices;

v)   Health, including measurements that are connected with quality achieved in this sector and its impacts over personal lives.

A proper allocation of results and good performances in the Enablers dimensions need to be complemented by what each country is able to achieve in terms of results and outcomes, that are also connected with quality practices and impacts. For that purpose, the following set of 5 Results dimensions is also taken into account:

vi) Competitiveness, both based upon aggregate country ranking results as well as GDP values achieved;

vii) Social Cohesion, taking into account that standard deviation reduction in terms of wealth distribution is as important, in terms of societal quality, as the corresponding wealth average values;

viii) Sustainability, where one addresses environmental related indicators that are connected with the preservation of natural resources and reduction of negative impacts;

ix) Innovation and Entrepreneurship, as drivers also for quality, as well as outputs that can be made more efficient if carried out using appropriate quality tools and approaches;

x) Satisfaction, corresponding to the perceptions of citizens from each country regarding quality of life and other more specific perspectives.

The simplified overall conceptual model for evaluating quality societal performance therefore relies on the assumption that proper definition and implementation of quality in education and health, together with the availability of qualified people in the field of quality, as well as strong research activities in the area and finally the presence of quality organizations, as Enablers, will help any given country to obtain Results in terms of competitiveness, innovation and entrepreneurship, social cohesion and sustainability, as well as satisfaction levels from different perspectives that we may have as citizens (overall life satisfaction, job and customer satisfaction, although no reliable harmonized data were found so far to be available regarding customer satisfaction). Both Enablers and Results need to be taken into account, just as happens to be the case also in other quality standards or models of excellence, for one to be able to get a global evaluation of the quality levels achieved by any given place or countries under analysis.

In all of the above dimensions (except for the last one), two indicators were considered, as shown below (Table 1 and Table 2), taking into account the perspectives to be captured by each dimension, but also of course the availability of reliable and periodically updated data for all of the 28 European Union countries. Given the particular role that Satisfaction plays, as the ultimate goal of all quality related efforts and initiatives, this last dimension is covered with 3 indicators, and we would like to add even a fourth one (related with customer satisfaction), if appropriate data, resulting from a common methodology, becomes available to quantify the levels of overall customer satisfaction that are obtained in all of the 28 European Union countries, something that our search has found not to be the case right now.

Table 1 - Enablers indicators.

	Dimension	Indicator
ENABLERS	Organizations	Number of ISO 9001 Certified Organizations
		Number of Organizations Recognized by Quality Awards
	Professionals	Number of International Academy for Quality Members
		Number of Certified Quality Professionals
	Research	Number of Indexed Quality Papers Published
		Number of Universities in International Research Rankings
	Education	OECD PISA Test Results
		Lifelong Learning
	Health	Healthy Life Expectancy
		At Birth Mortality Rates

Table 2 - Results indicators.

	Dimension	Indicator
RESULTS	Competitiveness	Global Competitiveness Index
		Gross Domestic Product
	Social cohesion	Gini Index
		People at Risk of Poverty and Social Exclusion
	Sustainability	Environmental Wellbeing Results
		Ecological Footprint
	Innovation and entrepreneurship	Global Innovation Index
		Ease of Doing Business Results
	Satisfaction	Quality of Life
		Job Satisfaction
		Unemployment Rate

For all of such indicators, and whenever needed, scaled values were used, in order to allow for comparisons to be made between countries of different sizes, and this was mostly achieved by computing first the corresponding values *per capita*, taking into account the populations for each of the 28 European Union countries.

The EQS uses the latest data from public databases or published reports with periodic and reliable updates. All the values shown in this report correspond to the latest publicly available data, for each indicator, that we were able to find as of June 30th of 2016.

While a more complete list of indicators, data sources and computations performed is provided in Annex 1, here we will now just make a brief but more detailed enumeration for the 21 indicators being used as our EQS raw materials.

Indicator 1 – Number of ISO 9001 Certified Organizations

This indicator measures the number of valid ISO 9001 certificates that are issued by certification bodies in any given country, as reported every year by the ISO survey. That number is then divided by each country's total population (all residents) to get scaled values.

Indicator 2 – Number of Organizations Recognized by Quality Awards

This indicator measures the total number of organizations, in each country, that have an updated recognition according to the European Foundation for Quality Management (EFQM) Model of Excellence, including the several possible levels available (Committed to Excellence, Recognized for Excellence, EFQM Excellence Award Finalist, Prize Winner and Winner, and Committed to Sustainability). That number is then divided by each country's total population (all residents) to get scaled values.

Indicator 3 – Number of International Academy for Quality Members

This indicator measures the total number of International Academy for Quality (IAQ) members at any given country, and including the different types of IAQ membership (Councilor, Honorary Members, Academician Emeritus, Academician Members, Companion, Associate Academicians and Corresponding Academicians). That number is then divided by each country's total population (all residents) to get scaled values.

Indicator 4 – Number of Certified Quality Professionals

This indicator measures the total number of certified quality professionals, at any given country, recognized as such by the following organizations: International Register of Certified Auditors (IRCA), American Society for Quality (ASQ), European Organization for Quality (EOQ), and European Foundation for Quality Management (EFQM). That number is then divided by each country's total population (all residents) to get scaled values.

Indicator 5 – Number of Indexed Quality Papers Published

The number of quality papers published sums the indexed papers in Scopus and ISI that have keywords in their abstract, title or keywords that were considered to be related with quality research activities (quality management, quality improvement, quality engineering, quality culture, quality tools, quality goals, quality function deployment, design for six sigma, six sigma, process improvement, statistical process control, statistical quality control, design of experiments and total quality management). That number is then divided by each country's total population (all residents) to get scaled values.

Indicator 6 – Number of Universities in International Research Rankings

This indicator considers the number of universities from any given country that do show up in the Shanghai ranking (Academic Ranking of World Universities – ARWU) top 500 higher education institutions, according to a number of criteria, mostly related with research outputs being achieved. That number is then divided by each country's total population (all residents) to get scaled values.

Indicator 7 – OECD PISA Test Results

This indicator is the score obtained for mathematics in the PISA (Programme for International Student Assessment) results, derived from a test aimed at evaluating the knowledge and skills of 15 years old students, carried out by OECD (Organization for Economic Co-operation and Development), and the corresponding country ranking thus obtained.

Indicator 8 – Lifelong Learning

This indicator measures the percentage of persons (higher education students and adults) between 25 and 64 years of age that received education or training in the four weeks before the Eurobarometer survey, where this information is collected, was carried out.

Indicator 9 – Healthy Life Expectancy

This indicator corresponds to the expected number of years of life, under healthy conditions, without diseases and/or injuries that result in incapacity or less health, that correspond to each country.

Indicator 10 – At Birth Mortality Rates

This indicator considers the number of deaths of infants (under one) per 1000 live births at any given country.

Indicator 11 – Global Competitiveness Index

This indicator corresponds to the Global Competitiveness Index scores obtained for each country, according to the World Economic Forum (WEF) Competitiveness Position, an index published every year according to several dimensions and metrics that are combined together in an overall country competitiveness ranking supported by the WEF.

Indicator 12 – Gross Domestic Product

The Gross Domestic Product is a well known macroeconomic indicator that measures the expenditure on final goods and services by all resident producers at any given country. That number is then divided by each country's total population (all residents) to get scaled values.

Indicator 13 – Gini Index

The Gini index measures the degrees of inequality and dispersion of the distribution of income across families and individuals at any given country.

Indicator 14 – People at Risk of Poverty and Social Exclusion

This indicator describes the percentage of persons that are in risk of poverty and social exclusion according to a multidimensional approach that takes into account several dimensions (monetary poverty, material deprivation and low work intensity), for any given country.

Indicator 15 – Environmental Wellbeing Results

The Environmental Wellbeing (EW) indicator provides an aggregated evaluation of overall environmental performance achieved at any given country.

Indicator 16 – Ecological Footprint

This indicator is defined as the demand on nature regarding how much area of resources is being used by any given country, allowing for comparisons of results across different nations according to the corresponding sustainability metric.

Indicator 17 – Global Innovation Index

This indicator intends to analyze the overall innovation performance (including both drivers and results, as well as innovation as applied to organizations, products, services and processes) achieved in different countries.

Indicator 18 – Ease of Doing Business Results

This indicator scores the regulatory environment and bureaucracy in any given country according to several metrics that allow to measure efficiency in company creation and development, leading to an international ranking driven by how difficult or easy it is to do business.

Indicator 19 – Quality of Life

This indicator is directly related with perceived quality of life satisfaction, as expressed by citizens from any given country that is surveyed, in terms of their overall levels of satisfaction reached.

Indicator 20 – Job Satisfaction

This indicator assesses the perceived satisfaction with job for all the persons surveyed in that regard in different countries.

Indicator 21 – Unemployment Rate

This indicator measures the percentage of total labor force that is unemployed but actively looking for a paid job and ready to work within the scope of the population that is in working-age, for any given country. Different studies point out that unemployed people, as one might expect, typically present low perceived overall life satisfaction levels, and thus it is also taken into account here as being a proxy for satisfaction.

OVERALL EUROPEAN QUALITY SCOREBOARD RANKING SCORES

Given the EQS framework and indicators, as described above, we are able to come up with a 28x21 basic data matrix, containing, for each of the 28 European Union countries, the corresponding latest values (scaled, whenever appropriate, according to the corresponding populations) available by June of 2016 for the 21 indicators chosen to integrate the barometer, across the 10 dimensions already illustrated.

With this complete set of data, comprising therefore a total of 588 values (presented in Annex 2), we then computed a similar 28x21 data matrix, but now with the indicator values being replaced by the relative position of each country according to each of the indicators, meaning that for each indicator now in the columns rather than the absolute values we consider the relative positions for the 28 European Union countries, ranging from 1 (best performance) to 28 (worst performance), but also taking into account the situations where ties were found (this alternative data matrix is shown in Annex 3).

Over both of these data matrices (Annexes 2 and 3) several multivariate statistical analysis were performed, and the second one (Annex 3) supported the computation of our Overall European Quality Scoreboard Scores (OEQS). They correspond to an average of the ranking position obtained by each country over the set of 21 indicators considered (meaning for instance that a country always occupying the 10th position across all of the 21 EQS indicators would receive 10 as its OEQS value).

However, rather than using a simple average of the 21 indicator rankings, we used a weighted average, that takes into account the fact that some indicators might be considered to be more relevant than others in terms of contribution to the overall quality performance achieved at any particular country or territory. For that purpose, we asked a number of quality international experts to provide us with their own evaluation of the relevance that should for that purpose be connected with each of the 21 individual indicators considered, on a scale ranging from 1 (very small relevance) to 5 (very high relevance). A total of 19 answers were thus obtained from quality experts (Annex 4), resulting to the average relevance for the 21 indicators that is presented below (Figure 3).
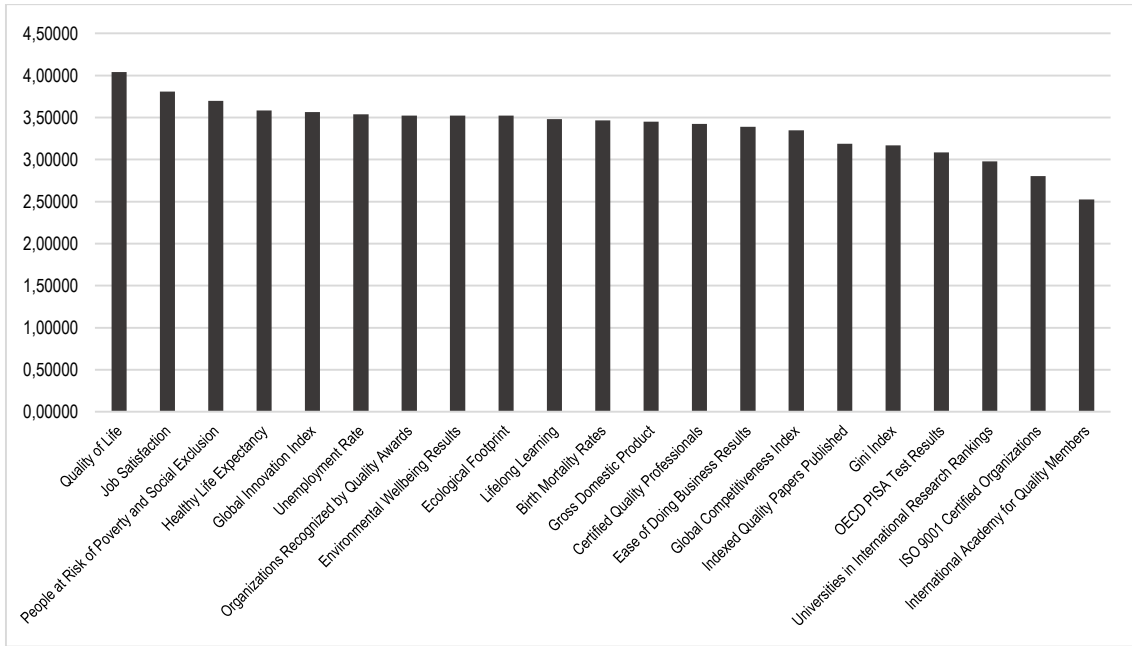
Figure 3 - Relevance average results for each indicator based on respondents' answers.

The final normalized weight for each indicator was obtained following some additional steps, where each answer was considered as j $(j = 1, \ldots, k)$ and each indicator was considered as i $(i = 1, \ldots, n)$. So, the matrix X was composed by all the opinions of the quality experts and each component was named x_{ji}. At first we standardized the implicit scale that was used by each quality expert in order to allow for a better comparison between them. For that purpose the average per respondent (μ_j) was computed for each $j = 1, \ldots, k$ according to $\mu_j = \frac{\sum_{i=1}^{n} x_{ji}}{n}$ and $i = 1, 2, \ldots, n$. The next step was the standardization of each component of the matrix X creating a new matrix (R) where each component (r_{ji}) was defined as $r_{ji} = \frac{x_{ji}}{\mu_j}$. Finally, the last step included the calculation of each indicator final standardized weight, P_i. For that purpose, a vector-line Z $(Z = [p_1 \; p_2 \ldots p_n])$ was divided by $\sum Z$, so that we get finally $p_i = \sum_{j=1}^{k} r_{ji}$. S and the final standardized weight for each indicator i becomes defined as $P_i = \frac{p_i}{\sum Z}$.

As one can see, from the above relevance results, all of the 21 indicators were found to be appropriate for an overall assessment of quality performance achieved at any given country, with slight differences however amongst them (e.g. perceived satisfactions were considered to be the most relevant, while the number of IAQ members was found to be the least relevant, and the number of organizations recognized according to models of excellence to be more relevant than the number of ISO 9001 certifications). Overall, these slight differences conducted to the final set of weights mentioned in Table 3. For a simple average over the 21 indicators all weights would be equal to 0.048, and the weights obtained, and taken into account for OEQS computations range from 0.036 (IAQ members) to 0.055 (perceived quality of life).

Table 3 – Weight of each indicator for the OEQS scores.

Indicator	Weight (P_i)
Number of ISO 9001 Certified Organizations	0,045
Number of Organizations Recognized by Quality Awards	0,050
Number of International Academy for Quality Members	0,036
Number of Certified Quality Professionals	0,051
Number of Indexed Quality Papers Published	0,047
Number of Universities in International Research Rankings	0,044
OECD PISA Test Results	0,044
Lifelong Learning	0,049
Healthy Life Expectancy	0,048
At Birth Mortality Rates	0,047
Global Competitiveness Index	0,050
Gross Domestic Product	0,048
Gini Index	0,042
People at Risk of Poverty and Social Exclusion	0,048
Environmental Wellbeing Results	0,046
Ecological Footprint	0,046
Global Innovation Index	0,049
Ease of Doing Business Results	0,049
Quality of Life	0,058
Job Satisfaction	0,055
Unemployment Rate	0,049

According to the above methodology, we computed the final OEQS values for the 28 European Union countries, and ranked the scores, considering then also the existence of 4 categories of 7 countries each, corresponding respectively to ranking positions 1-7 (Leading), 8-14 (Followers), 15-21 (Moderate) and 22-28 (Lagging), as shown in Table 4.

Table 4 – Final OEQS scores obtained.

	Country	OEQS Score	Group
1	Finland	7.85	Leading
2	Austria	7.97	
3	Sweden	8.33	
4	Netherlands	8.45	
5	Denmark	9.05	
6	United Kingdom	10.20	
7	Luxembourg	10.86	
8	Germany	10.90	Follower
9	Ireland	11.18	
10	Slovenia	11.45	
11	Czech Republic	12.76	
12	Belgium	12.99	
13	France	13.10	
14	Spain	14.24	
15	Portugal	14.40	Moderate
16	Estonia	14.52	
17	Malta	14.65	
18	Italy	15.65	
19	Slovakia	17.00	
20	Poland	17.67	
21	Hungary	17.72	
22	Cyprus	17.83	Lagging
23	Romania	18.03	
24	Lithuania	18.61	
25	Latvia	19.39	
26	Croatia	19.65	
27	Greece	19.96	
28	Bulgaria	21.97	

As one can see from these results, the OEQS scores range from 7.85, for Finland (best country in the EQS ranking), and 21.97 for Bulgaria (worst country in the EQS ranking). As will be explored later on in more detail, by looking at the quality profiles associated with each of the 28 European Countries, there are significant differences of performance, but under the scope of a wide variety of situations and diverse ways to achieve national "macroquality". Such a variety of situations is quite curious and important to understand the quality realities in the European Union geography, where no single country outperforms or underperforms the others for all the indicators considered, each of them presenting relative strengths and weaknesses. To illustrate such a diversity of profiles, with no single country being able to lead the way in all or most of the indicators, it is enough to state that even Finland, taking the overall first position in the ranking, over the weighted set of indicators, corresponds on average to occupying close to the 8th best position (OEQS=7.85), with individual indicator ranking positions that go all the way from the 1st to the 22nd position over the 28 countries studied. Similarly, but on the other hand, Bulgaria, even though receiving the lowest OEQS score, does have an weighted ranking average close to the 22nd position (OEQS=21.97), and does get a 3rd position for one indicator and the 7th position for two of the 21 indicators

considered. Therefore, there is no single way for interpreting and implementing quality in the European Countries, neither are there countries that outperform or underperform the others across most of the indicators used. This reality of diversity is clearly an interesting conclusion derived from this EQS report, and provides robustness and resilience to the macroquality that exists spread across the European Union geography, as illustrated in Figure 4.
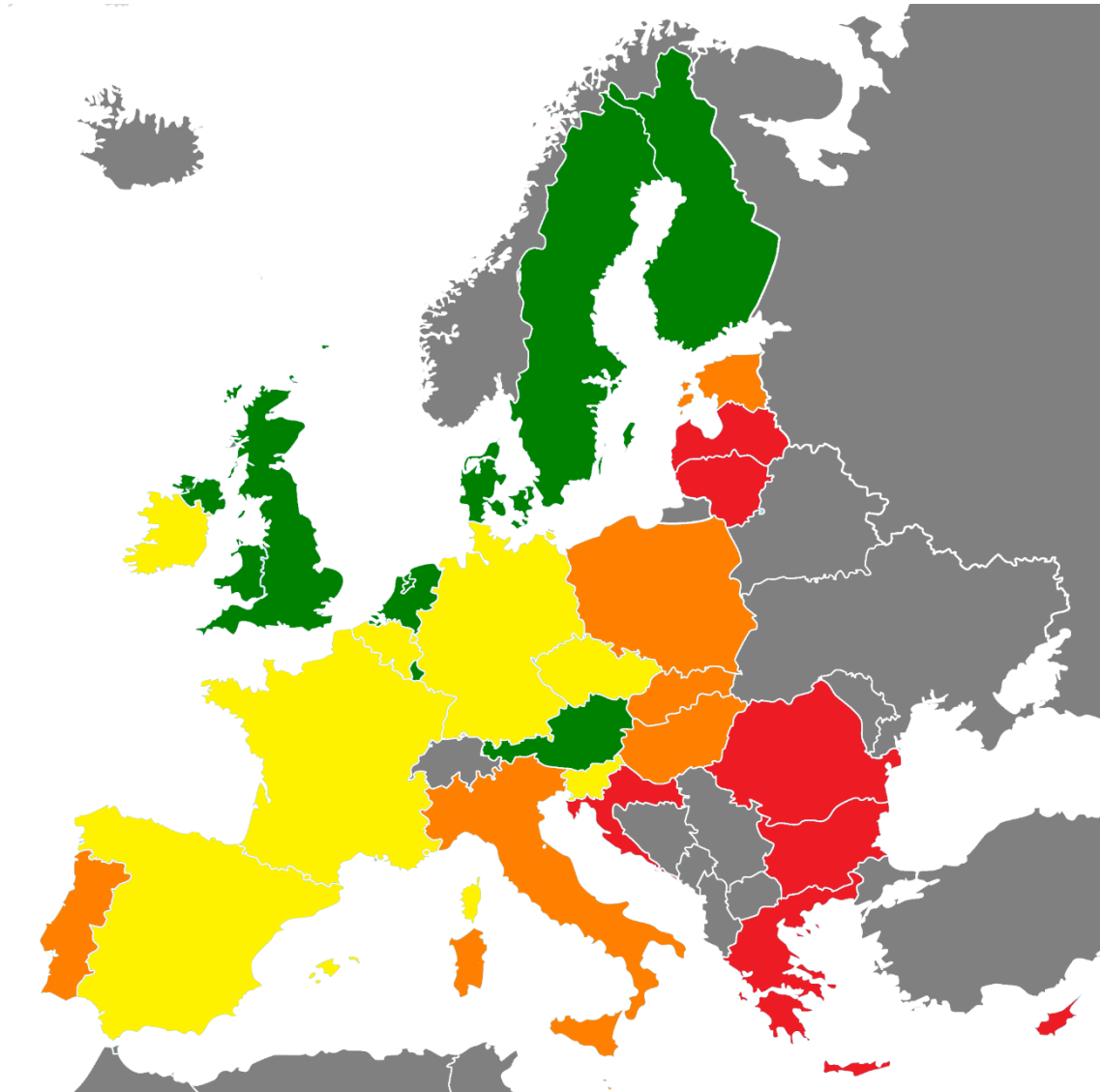
Figure 4 – Country performance according to OEQS 2016 scores (green: leading; yellow: follower; orange: moderate; red: lagging).

In the forthcoming paragraphs we will zoom into this overall picture and provide some additional insights about the corresponding four groups of countries considered.

Leading
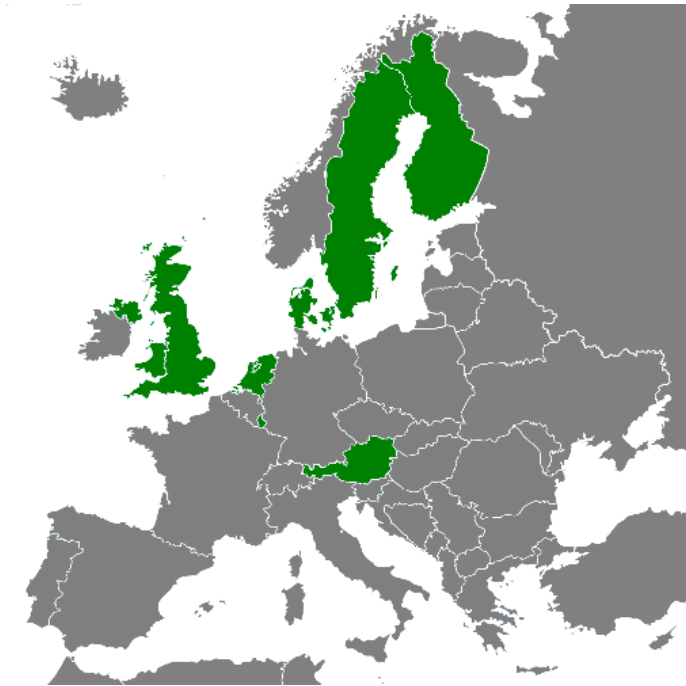
The leading countries are Finland, Austria, Sweden, Netherlands, Denmark, United Kingdom and Luxembourg, with OEQS scores ranging between 7.85 and 10.86.

It should be highlighted that all the Scandinavian countries under analysis in this project (Finland, Sweden and Denmark) are leading countries, which are mostly located in Northern Europe.

Followers
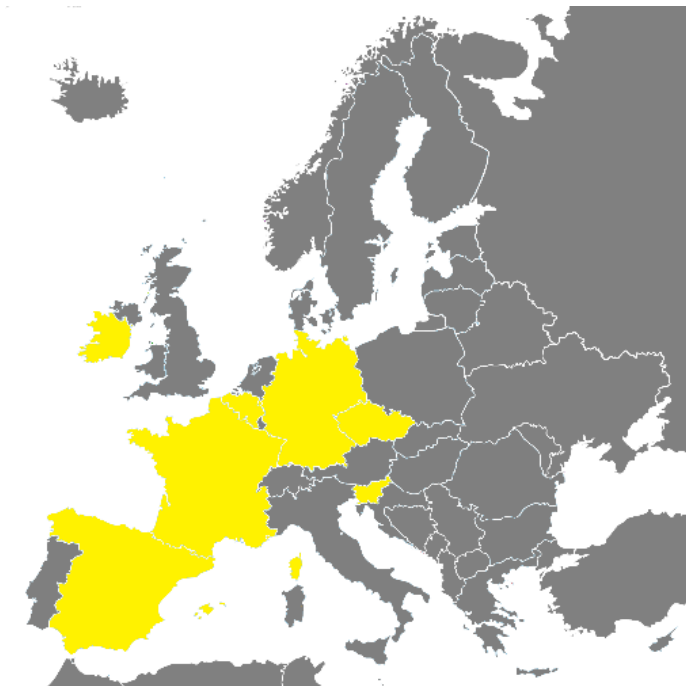
The countries in the followers category are Germany, Ireland, Slovenia, Czech Republic, Belgium, France and Spain, with OEQS scores ranging between 10.90 and 14.24. They correspond pretty much to a geographical continuum of Europe going all the way from Spain (on the Southeast) to Germany (on the Northwest).

Some countries in this second group are able to occupy the first positions in certain indicators (e.g. Germany for Global Competitiveness Index, Ireland for Certified Quality or Quality Papers Published, Spain for Organizations Recognized by Quality Awards and Models of Excellence).

Moderate

The moderate countries are Portugal, Estonia, Malta, Italy, Slovakia, Poland and Hungary, with OEQS scores ranging between 14.40 and 17.72. This group corresponds to a combination of some Southern Europe countries together with some Eastern Europe countries.

Lagging

The lagging countries are Cyprus, Romania, Lithuania, Latvia, Croatia, Greece and Bulgaria, with OEQS scores ranging between 17.83 and 21.97. They correspond to another subset of Eastern Europe countries, combined with another subset of Southern Europe countries.

EQS – MAIN MULTIVARIATE STATISTICAL RESULTS

Taking into account the data matrices presented earlier, with 28x21 values, either in terms of scaled data or ranking positions, for each of the 28 European Union countries and the 21 indicators considered (Annexes 2 and 3), several multivariate statistical analysis techniques were employed, including Principal Component, Clustering and Regression Analysis, in order to complement and consolidate results already presented in this report, as well as explore the opportunity to come up with additional insights and conclusions.

Applying first Principal Component Analysis (PCA) to the data set, one can verify that the first principal component explains approximately 45.5 % of the total data variation (Figure 5), meaning that there is a clear and strong correlation backbone linking a large portion of the indicators, to the point that a linear combination of them explains this large fraction of data variability, with much smaller complementary contributions coming from the next principal components.

Principal Components: on Correlations

Number	Eigenvalue	Percent	20 40 60 80	Cum Percent
1	9,5463	45,459		45,459
2	2,1948	10,451		55,910
3	1,8260	8,695		64,605
4	1,4232	6,777		71,383
5	1,0875	5,179		76,561
6	0,9942	4,734		81,296
7	0,9221	4,391		85,686
8	0,6621	3,153		88,839
9	0,5649	2,690		91,529
10	0,4486	2,136		93,665
11	0,3581	1,705		95,371
12	0,2728	1,299		96,670
13	0,2109	1,004		97,674
14	0,1528	0,728		98,402
15	0,1051	0,501		98,902
16	0,0880	0,419		99,321
17	0,0589	0,280		99,601
18	0,0366	0,175		99,776
19	0,0329	0,157		99,933
20	0,0105	0,050		99,982
21	0,0037	0,018		100,000

Figure 5 - PCA analysis: percentage of variability explained by the successive principal components.

This being the data underlying structure, it does not come as a surprise that the ranking of countries according to their first Principal Component (PC) values does resemble the overall final EQS ranking made according to our OEQS scores (Figure 6), providing further statistical consistency to the results thus obtained. Furthermore, we can see that all countries seem to fit under a common underlying PC model, with the possible exception of Luxembourg, falling outside the corresponding zone of confidence, but not much however.
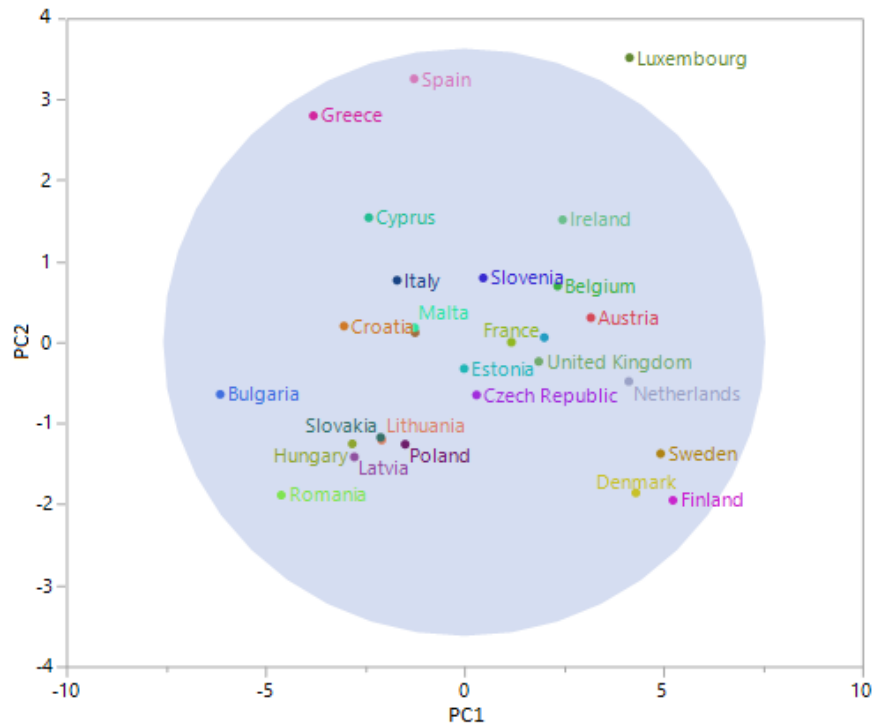
Figure 6 – PCA analysis: scores plot for the first two PCs, with 95% confidence level perimeter.
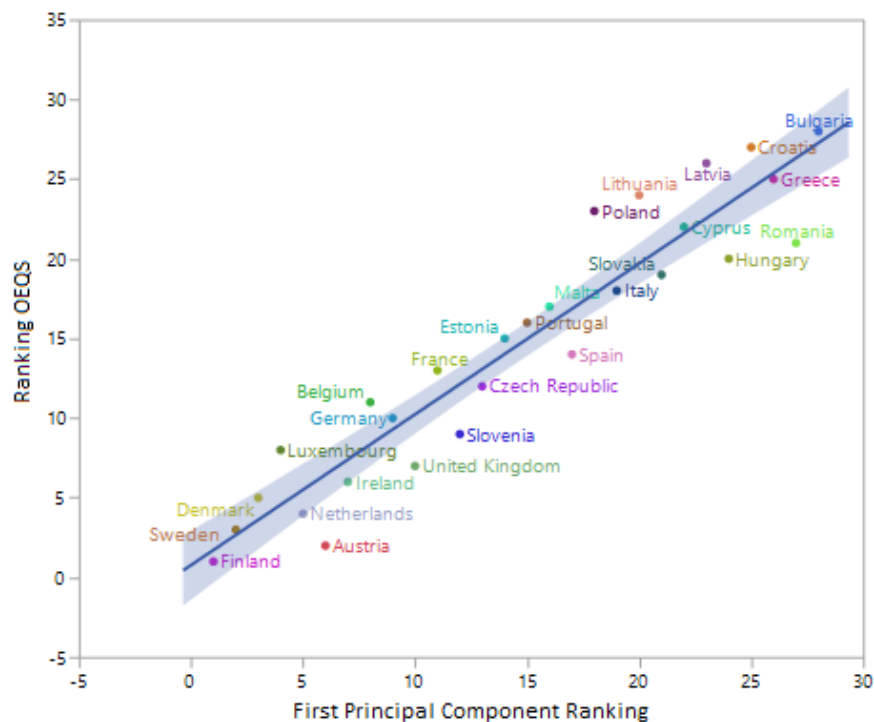
Figure 7 – OEQS versus first Principal Component rankings.

As for the relevance of each EQS indicator, in terms of their contributions to the first Principal Component, as reflected in the corresponding load values, one can see (Figure 8) that the highest absolute values

correspond to Global Competitiveness and Innovation, Quality of Life, Job Satisfaction and Risk of Poverty, while the smallest ones correspond to ISO 9001 Certifications, Recognized Organizations, Qualified Quality Professionals and Quality Papers. This presents some similarities but also some differences when a comparison is made with the weights provided by our panel of experts, as described before.
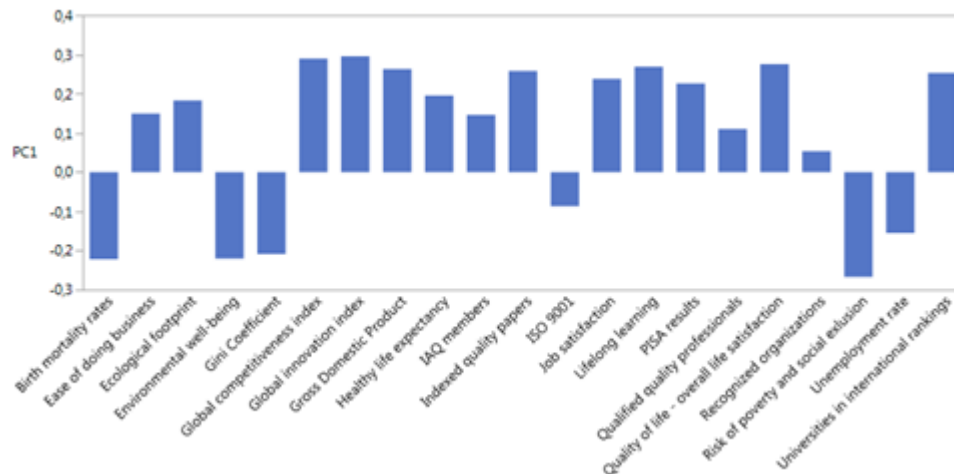
Figure 8 - Loads of the several EQS indicators in the first Principal Component.

Next, several types of clustering analysis were also conducted over the same sets of data, aimed at identifying relative similarities and closeness (or lack of them) across the 28 European Union countries, according to the positions they occupy in the multidimensional space that corresponds to the 21 EQS indicators considered.

As a first result, portrayed here under the format of the corresponding constellation plot, where closeness of countries corresponds to closeness in the 21 EQS indicators space (Figure 9), one can see from an hierarchical clustering perspective that a first partition creates two groups of countries, one corresponding to 12 countries (that includes all of our EQS Leading countries, an then 5 of the top 7 Follower countries), and the other remaining 16 countries (corresponding to all of the EQS Lagging and Moderate countries, as well as 2 of the Follower countries). Once again, there seems to be a quite consistent correspondence between these results and the ones corresponding to the OEQS categories of countries. A more detailed geographical analysis also points to the apparent existence of different closely connected countries, having similar quality profiles according to the set of 21 indicators considered, pointing towards a diversity of quality cultures, journeys or "ways" of its interpretation and implementation. A closer look at this constellation plot and its branches does point namely to the identification of the following: i) the Scandinavian quality way (Finland, Sweden and Denmark); ii) the Southern Europe quality way (Spain, Greece, Portugal and Cyprus); or iii) the Eastern Europe quality way (Croatia, Slovakia, Hungary, Estonia, Latvia, Lithuania and Poland).
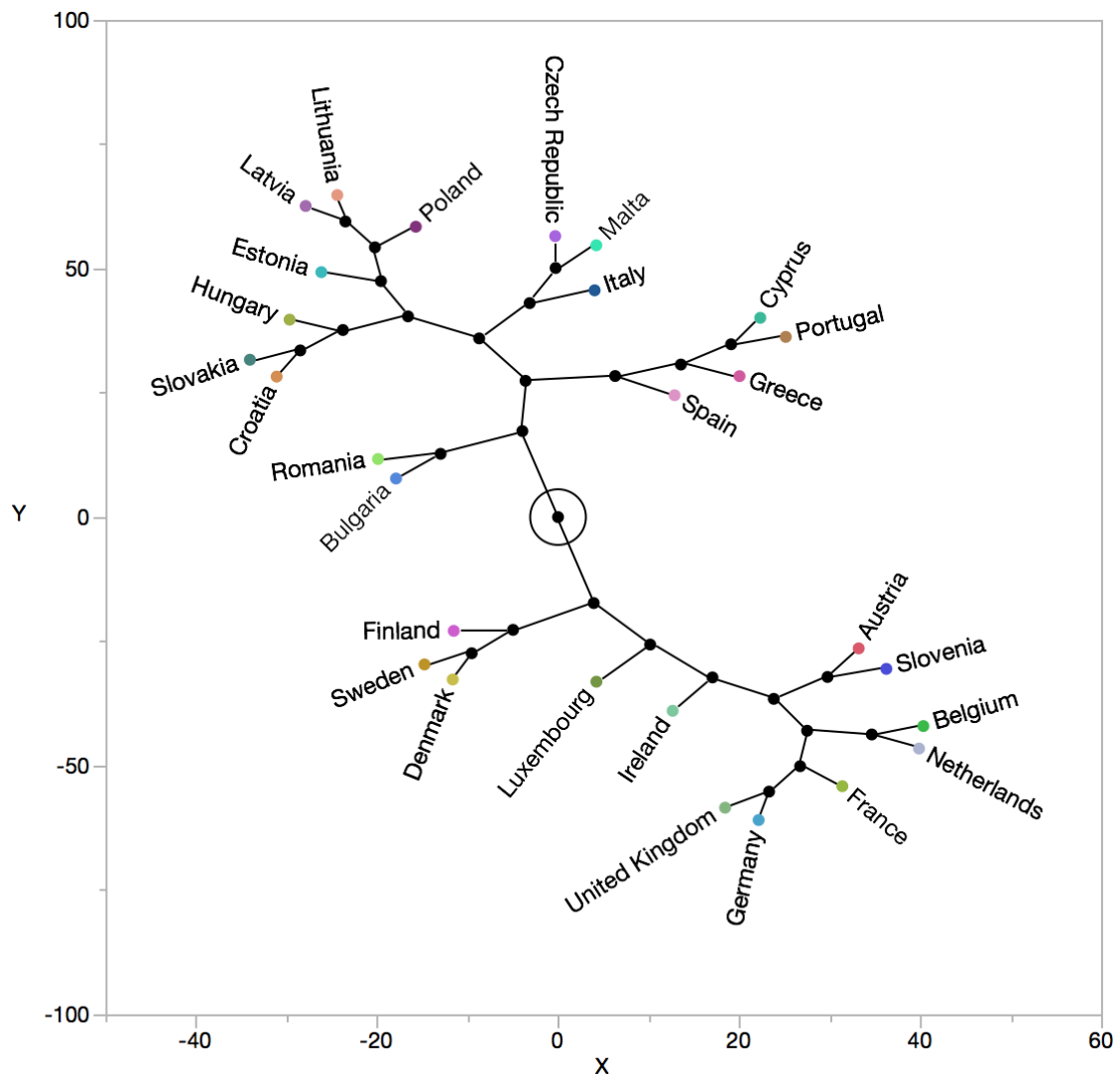
Figure 9 – Cluster Constellation Plot positions for the 28 European Union countries.

To get further insights into these types of clusters, and their typical quality profiles, according to the 21 EQS indicators, further hierarchical clustering tools were employed, including dendograms computed both for the scaled and ranking data matrices, with results illustrated here for this second situation.

The corresponding dendogram (Figure 10), does identify, at several levels of detail, the clusters and subclusters of countries that were found according to the ranking positions occupied by each country over the 21 indicators.

Dendrogram

- Austria
- Ireland
- France
- Germany
- United Kingdom
- Belgium
- Luxembourg
- Czech Republic
- Malta
- Slovenia
- Estonia
- Denmark
- Finland
- Sweden
- Netherlands
- Bulgaria
- Croatia
- Romania
- Slovakia
- Hungary
- Latvia
- Lithuania
- Poland
- Cyprus
- Greece
- Italy
- Portugal
- Spain
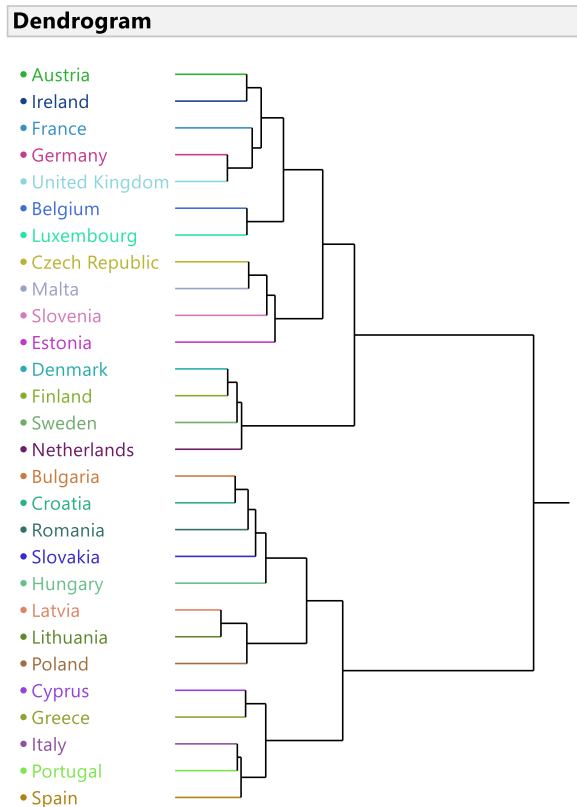
Figure 10 - Dendogram obtained for the 28 European Union countries using ranking values for the indicators.

Once again, there is here a close connection between the clusters and subclusters of countries found and the categories of countries that were built earlier based upon OEQS Scores. But we will rather here explore some of the dendogram branches in order to provide an illustration of previously identified quality ways, according to the European Union geography, to understand and stress some of the underlying diversity in the interpretation and implementation of quality, by looking at the corresponding ranking profiles, according to the ESQ 21 indicators, for the three examples already mentioned before (Scandinavia, Southern Europe and Eastern Europe).

By looking at the quality profiles of the Scandinavian countries (Denmark, Finland and Sweden), as illustrated in Figure 11, and after comparison with the other countries when can see that the average corresponding quality profiles are particularly strong regarding a considerable number of indicators or EQS Dimensions (IAQ Members, Research, Lifelong Learning, Birth Mortality Rates, Competitiveness, Social Cohesion, Innovation and Entrepreneurship, Perceived Satisfactions), but below the median position regarding also some indicators or EQS Dimensions (Organizations, Quality Professionals, Sustainability). As stated before, even though all of these countries are on the top 5 of OEQS Scores, there are some indicators where they stand at or below the 20th position out of the 28 European Union countries, reinforcing the idea that there are no countries leading the way across most or all of the 21 EQS indicators under analysis.
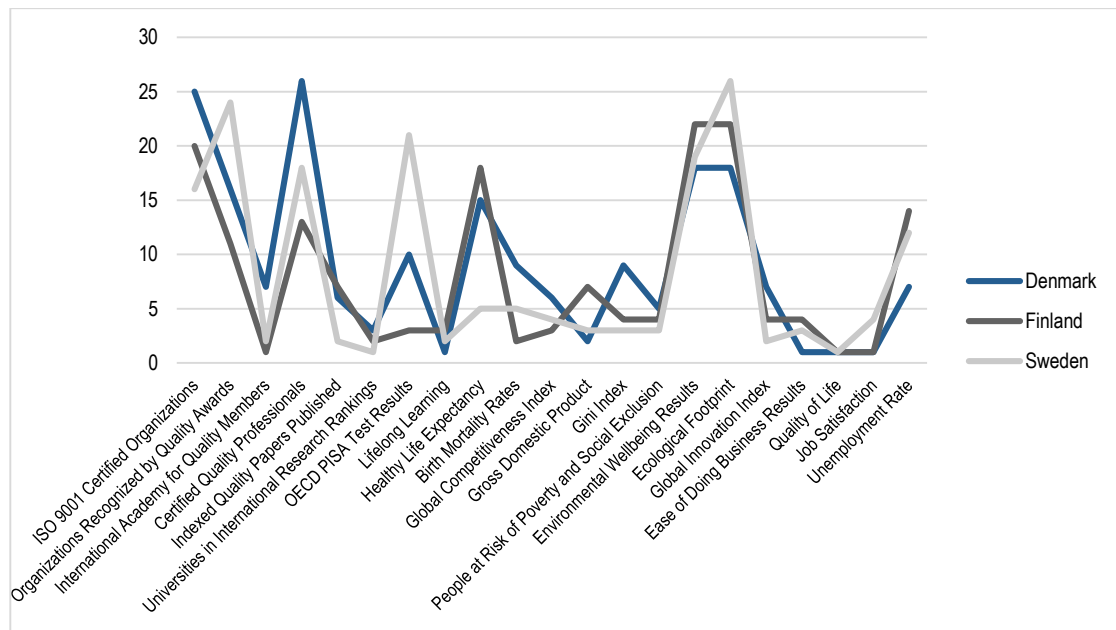
Figure 11 - Scandinavian EQS rankings quality profiles.

Moving now to the quality profiles of the Southern Europe countries (Cyprus, Greece, Italy, Portugal and Spain), as illustrated in Figure 12, and after comparison with the other countries we can see that the average corresponding quality profiles are particularly strong regarding some indicators or EQS Dimensions (Organizations, IAQ Members, Health Life Expectancy and Ecological Footprint), but stand below the 20th position regarding also some indicators or EQS Dimensions (PISA Results, Global Competitiveness Index, Social Cohesion, Innovation and Entrepreneurship, Satisfaction). This group of countries does fall mostly in the Moderate category of countries according to the OEQS values, but once again we can find here indicators where some of them to take the first position in the rankings.
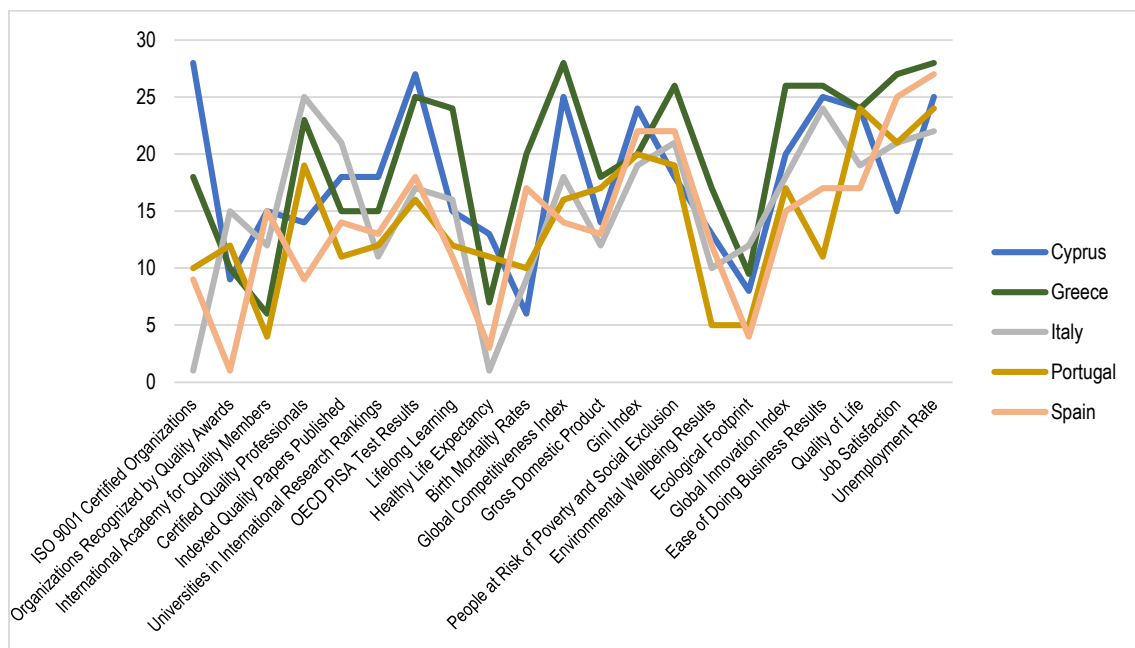
Figure 12 - Southern Europe EQS ranking quality profiles.

As a third and final example, let us look at the quality profiles of several clustered Eastern Europe countries (Bulgaria, Croatia, Romania, Slovakia, Hungary, Latvia, Lithuania and Poland). As illustrated in Figure 13, and after comparison with the other countries we can see that the average corresponding quality profiles are particularly strong regarding some indicators or EQS Dimensions, where they are close or above the median (ISO 9001 Certifications, Sustainability), but stand below the 23th position regarding also some indicators or EQS Dimensions (Lifelong Learning, Health Life Expectancy, Gross Domestic Product, Global Innovation Index). This group of countries does fall mostly in the Lagging category of countries according to the OEQS values, but we can also find here indicators where some of them to take one of the top 3 positions in the rankings.
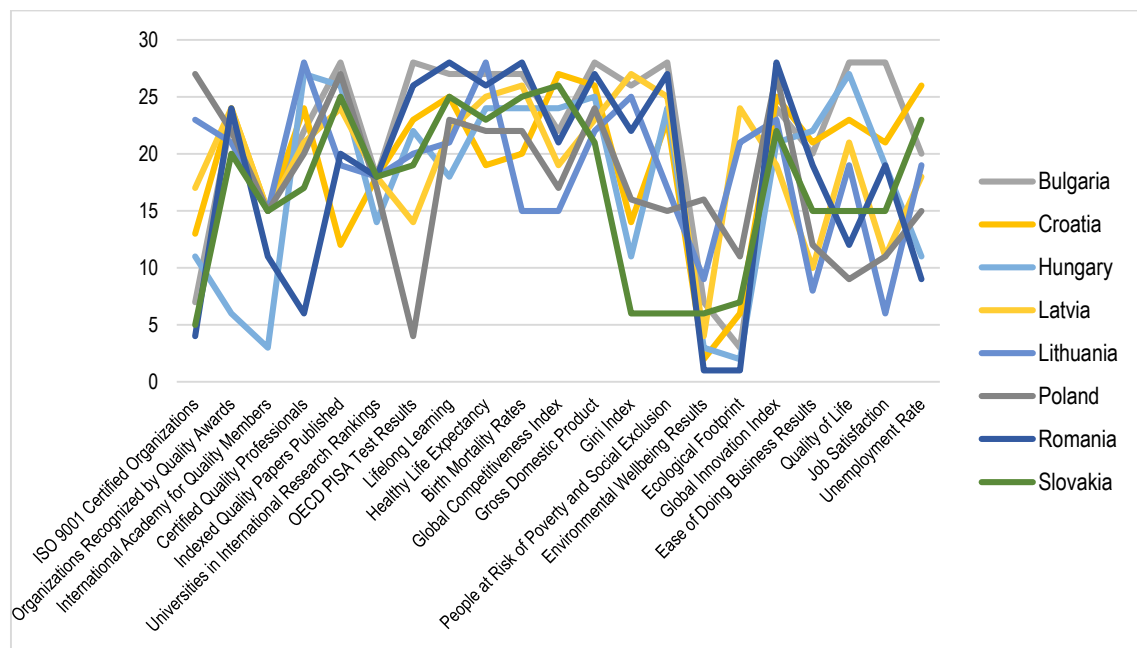
Figure 13 - Eastern Europe EQS ranking quality profiles.

Although other examples might also be provided, this sample seems to be appropriate enough to stress as one interesting feature coming from these ESQ results that in the European Union there is not a single way of interpreting or implementing quality at the societal level, with different clusters of countries following different quality profiles, and no single country or set of countries being always either the best or worst according to all of the dimensions or indicators taken into account. There is indeed room for a variety of quality profiles, with gaps and benchmarking opportunities available for all of the European Union countries to learn from each other, through the corresponding strengths, gaps and weaknesses. We believe that such a quality diversity happens to be one of the most interesting and promising features about the quality landscape found in the European Union.

Given the fact that overall perceived quality of life was found to be the most relevant of the indicators, on one hand, and also that it indeed corresponds by itself to some kind of overall quality level achieved at any given country, as perceived by its citizens, several multivariate regression analysis models were computed

in order to predict this indicator, considered as the response (Y), and all the other indicators, except for Job Satisfaction (removed from the analysis, given its strong correlation with quality of life), taken as independent variables (X).

As shown below (Table 5), from a Partial Least Squares (PLS) approach, the largest absolute values of the several indicators, thus having the highest impact over perceived Quality of Life, correspond to the following dimensions: Social Cohesion, Research, Innovation, Competitiveness and Education. On the other hand, Organizations do not seem to play a large impact, and for the ISO 9001 Certifications indicators even a negative coefficient was found, meaning that countries with a larger value tend to have a slightly smaller Quality of Life, when all the other indicators are kept at the same level. Overall, such a PLS regression model is able to explain 67% of the Quality of Life variability, when using just a single latent variable.

Table 5 – PLS Model Coefficients for Prediction of Quality of Life.

Model Coefficients for Centered and Scaled Data

Coefficient	Quality of life - overall life satisfaction	
Intercept	0,0000	
ISO 9001	-0,0249	
Recognized organizations	0,0140	
IAQ members	0,0413	
Qualified quality professionals	0,0362	
Indexed quality papers	0,0791	
Universities in international rankings	0,0820	
PISA results	0,0741	
Lifelong learning	0,0785	
Healthy life expectancy	0,0577	
Birth mortality rates	-0,0550	
Global competitiveness index	0,0895	
Gross Domestic Product	0,0773	
Gini Coefficient	-0,0767	
Risk of poverty and social exlusion	-0,0881	
Environmental well-being	-0,0551	
Ecological footprint	0,0474	
Global innovation index	0,0827	
Ease of doing business	0,0458	
Unemployment rate	-0,0555	

If, on the other hand, one does chose to perform a stepwise regression, a valid statistical model can be found that takes as independent variables first the Global Competitiveness Index, and then the Gini Coefficient (Table 6). Such a model is able to explain over 60% of the Quality of Life variability with just two predictor variables that illustrate the strong dependence of Quality of Life over competitiveness but also over the lack of large asymmetries or standard deviations when dealing with wealth distribution.

Table 6 – Stepwise Regression Model for Prediction of Quality of Life.

Response Quality of life - overall life satisfaction

Effect Summary

Source	LogWorth		PValue
Global competitiveness index	3,899		0,00013
Gini Coefficient	2,296		0,00506

Summary of Fit

RSquare	0,671193
RSquare Adj	0,644889
Root Mean Square Error	0,43105
Mean of Response	6,978571
Observations (or Sum Wgts)	28

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	9,482044	4,74102	25,5163
Error	25	4,645099	0,18580	Prob > F
C. Total	27	14,127143		<,0001*

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	5,2550699	1,367796	3,84	0,0007*
Global competitiveness index	0,8384708	0,185128	4,53	0,0001*
Gini Coefficient	-0,074442	0,024221	-3,07	0,0051*

This quite simple statistical model is able to come up with estimates for Quality of Life at any given European Union country with an average prediction error of just about 0.43, which corresponds to less than 10% of the predicted values (Figure 14).
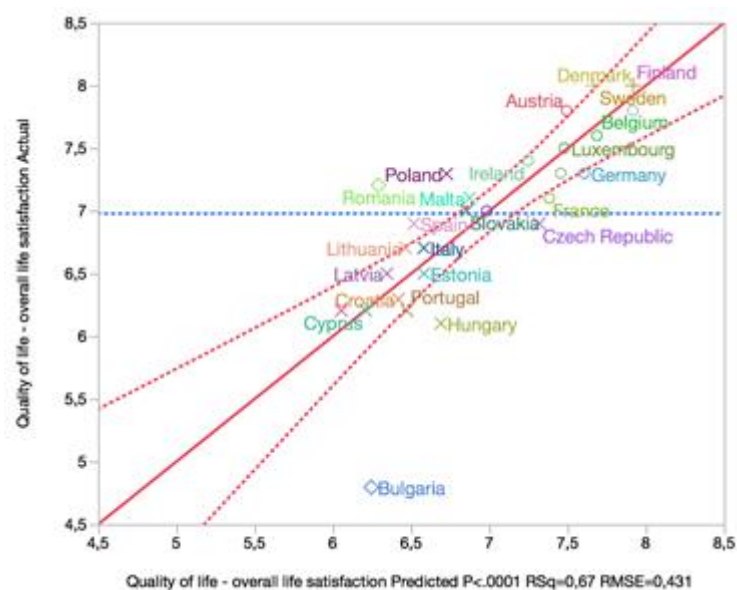
Figure 14 – Real versus predicted stepwise regression model values for Quality of Life.

COUNTRY PROFILES

This section describes each of the 28 European Union countries, through the presentation of their EQS profiles, with values and ranking positions obtained for all of the 21 indicators considered, as well as summary plot with the ranking positions across all of the indicators, from which one can extract strengths and weaknesses associated with each country quality profile. We also recall the category of countries to which each nation does belong, according to the computed OEQS values.

Example

COUNTRY NAME

Capital:................................   Population (2014):..............................   Quality group: ....

	Rank	Score
OEQS 2016..	....
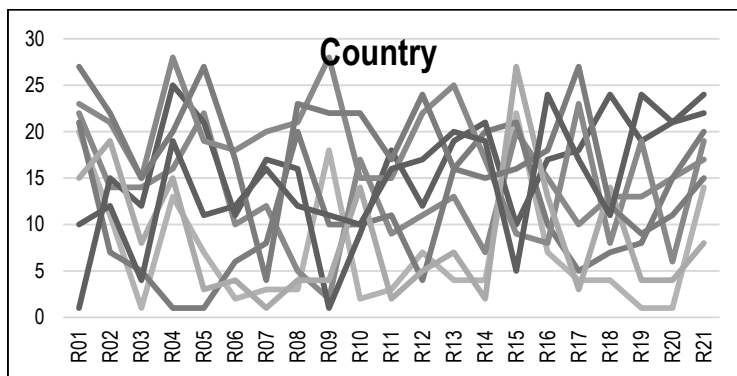
	Rank	Value			Rank	Value
I01. ISO 9001 Certified Organizations *1				I11. Global Competitiveness Index *5		
I02. Organizations Recognized by Quality Awards *1				I12. Gross Domestic Product *6		
I03. International Academy for Quality Members *1				I13. Gini Index *3		
I04. Certified Quality Professionals *1				I14. People at Risk of Poverty and Social Exclusion *3		
I05. Indexed Quality Papers Published *1				I15. Environmental Wellbeing Results *5		
I06. Universities in International Research Rankings *1				I16. Ecological Footprint *7		
I07. OECD PISA Test Results *2				I17. Global Innovation Index *5		
I08. Lifelong learning *3				I18. Ease of Doing Business Results *8		
I09. Healthy Life Expectancy *4				I19. Quality of Life *5		
I10. At Birth Mortality Rate *3				I20. Job Satisfaction *5		
				I21. Unemployment Rate *3		

*1 per 1,000 inhabitants; *2 math score; *3 percentage; *4 age; *5 score; *6 US dollars; *7 gha pc; *8 distance to frontier

Analysis

Brief comment about the quality profile of the country under analysis.

AUSTRIA

Capital:...................Vienna   Population (2014):...........8,534,492   Quality group: ....LEADING

	Rank	Score
OEQS 2016..	2	7.97
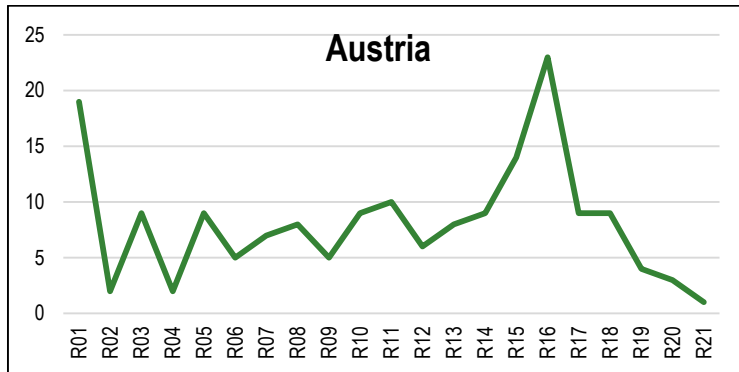
	Rank	Value
I01. ISO 9001 Certified Organizations *1	19	0.49364
I02. Organizations Recognized by Quality Awards *1	2	0.01453
I03. International Academy for Quality Members *1	9	0.00012
I04. Certified Quality Professionals *1	2	0.09608
I05. Indexed Quality Papers Published *1	9	0.12561
I06. Universities in International Research Rankings *1	5	0.00070
I07. OECD PISA Test Results *2	7	506
I08. Lifelong learning *3	8	14.4
I09. Healthy Life Expectancy *4	5	72.0
I10. At Birth Mortality Rate *3	9	2.9

	Rank	Value
I11. Global Competitiveness Index *5	10	5.12
I12. Gross Domestic Product *6	6	51,122.43
I13. Gini Index *3	8	27.6
I14. People at Risk of Poverty and Social Exclusion *3	9	19.2
I15. Environmental Wellbeing Results *5	14	3.93
I16. Ecological Footprint *7	23	6.06
I17. Global Innovation Index *5	9	54.07
I18. Ease of Doing Business Results *8	9	78.38
I19. Quality of Life *5	4	7.8
I20. Job Satisfaction *5	3	8.0
I21. Unemployment Rate *3	1	5.0

*1 per 1,000 inhabitants; *2 math score; *3 percentage; *4 age; *5 score; *6 US dollars; *7 gha pc; *8 distance to frontier

Analysis

Austria is in the top 10 countries for 19 out of 21 EQS indicators, and belongs to the top three regarding Unemployment Rate, Organizations Recognized by Quality Awards, Certified Quality Professionals and Job Satisfaction. Worst relative positions (14th to 23rd) were found regarding ISO 9001 Certified Organizations, Environmental Wellbeing Results and Ecological Footprint.

BELGIUM

Capital:...............Brussels   Population (2014):........11,225,207   Quality group: ....FOLLOWER

	Rank	Score
OEQS 2016...	12	12.99
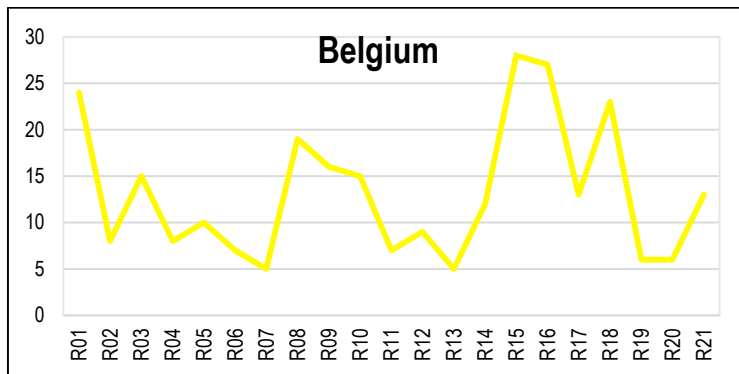
	Rank	Value			Rank	Value
I01. ISO 9001 Certified Organizations *1	24	0.32659		**I11.** Global Competitiveness Index *5	7	5.20
I02. Organizations Recognized by Quality Awards *1	8	0.00624		**I12.** Gross Domestic Product *6	9	47,327.62
I03. International Academy for Quality Members *1	15	0.00000		**I13.** Gini Index *3	5	25.9
I04. Certified Quality Professionals *1	8	0.02441		**I14.** People at Risk of Poverty and Social Exclusion *3	12	21.2
I05. Indexed Quality Papers Published *1	10	0.12240		**I15.** Environmental Wellbeing Results *5	28	2.28
I06. Universities in International Research Rankings *1	7	0.00062		**I16.** Ecological Footprint *7	27	7.44
I07. OECD PISA Test Results *2	5	515		**I17.** Global Innovation Index *5	13	50.91
I08. Lifelong learning *3	19	6.9		**I18.** Ease of Doing Business Results *8	23	72.50
I09. Healthy Life Expectancy *4	16	71.1		**I19.** Quality of Life *5	6	7.6
I10. At Birth Mortality Rate *3	15	3.3		**I20.** Job Satisfaction *5	6	7.5
				I21. Unemployment Rate *3	13	8.5

*1 per 1,000 inhabitants; *2 math score; *3 percentage; *4 age; *5 score; *6 US dollars; *7 gha pc; *8 distance to frontier

Analysis

Belgium does get its top relative positions (5th or 6th) regarding OECD PISA Test Results, Gini Index, Quality of Life and Job Satisfaction, and the worst ones (23rd to 28th) correspond to ISO 9001 Certified Organizations, Environmental Wellbeing Results, Ecological Footprint and Ease of Doing Business Results.

BULGARIA

Capital:......................Sofia   Population (2014):..........7,223,938   Quality group: ....LAGGING

	Rank	Score
OEQS 2016..	28	21.97

Bulgaria
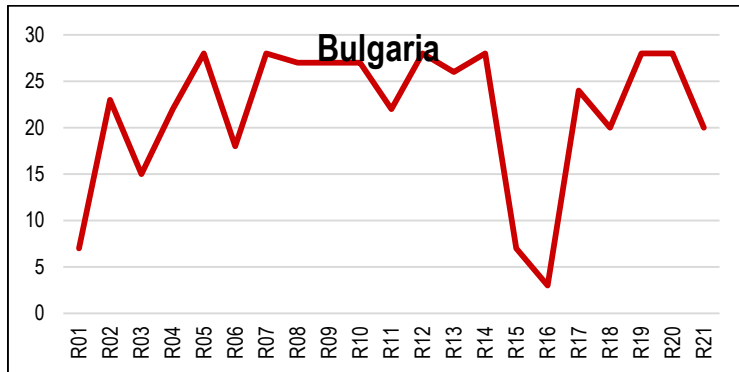
	Rank	Value
I01. ISO 9001 Certified Organizations *1	7	0.79320
I02. Organizations Recognized by Quality Awards *1	23	0.00014
I03. International Academy for Quality Members *1	15	0.00000
I04. Certified Quality Professionals *1..............................	22	0.00678
I05. Indexed Quality Papers Published *1........................	28	0.01564
I06. Universities in International Research Rankings *1..	18	0.00000
I07. OECD PISA Test Results *2	28	439
I08. Lifelong learning *3..	27	2.0
I09. Healthy Life Expectancy *4	27	66.4
I10. At Birth Mortality Rate *3..	27	9.3

	Rank	Value
I11. Global Competitiveness Index *5	22	4.32
I12. Gross Domestic Product *6	28	7,851.27
I13. Gini Index *3	26	35.4
I14. People at Risk of Poverty and Social Exclusion *3 ...	28	40.1
I15. Environmental Wellbeing Results *5	7	4.33
I16. Ecological Footprint *7..	3	3.32
I17. Global Innovation Index *5	24	42.16
I18. Ease of Doing Business Results *8..........................	20	73.72
I19. Quality of Life *5	28	4.8
I20. Job Satisfaction *5...	28	6.0
I21. Unemployment Rate *3...	20	11.6

*1 per 1,000 inhabitants; *2 math score; *3 percentage; *4 age; *5 score; *6 US dollars; *7 gha pc; *8 distance to frontier

Analysis

Bulgaria does get its top relative positions (3th to 7th) regarding ISO 9001 Certified Organizations, Environmental Wellbeing Results and Ecological Footprint, and the worst ones (28th) correspond to Indexed Quality Papers Published, OECD PISA Test Results, Gross Domestic Product, People at Risk of Poverty and Social Exclusion, Quality of Life and Job Satisfaction.

CROATIA

Capital:.................Zagreb   Population (2014):..........4,238,389   Quality group: ....LAGGING

	Rank	Score
OEQS 2016..	26	19.65
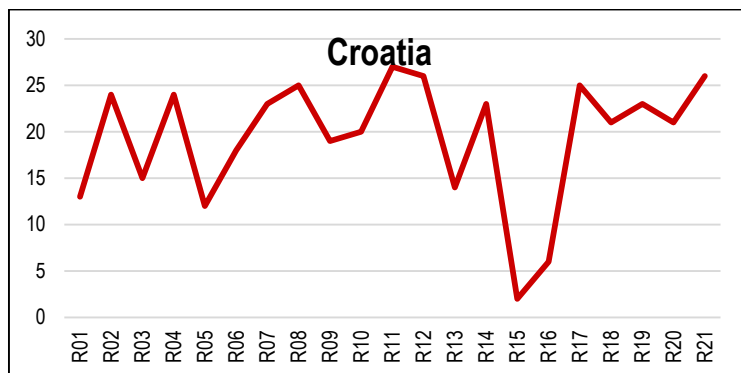
	Rank	Value			Rank	Value
I01. ISO 9001 Certified Organizations *1	13	0.66228		**I11.** Global Competitiveness Index *5	27	4.07
I02. Organizations Recognized by Quality Awards *1	24	0.00000		**I12.** Gross Domestic Product *6	26	13,475.26
I03. International Academy for Quality Members *1	15	0.00000		**I13.** Gini Index *3	14	30.2
I04. Certified Quality Professionals *1	24	0.00590		**I14.** People at Risk of Poverty and Social Exclusion *3	23	29.3
I05. Indexed Quality Papers Published *1	12	0.10122		**I15.** Environmental Wellbeing Results *5	2	4.85
I06. Universities in International Research Rankings *1	18	0.00000		**I16.** Ecological Footprint *7	6	3.92
I07. OECD PISA Test Results *2	23	471		**I17.** Global Innovation Index *5	25	41.70
I08. Lifelong learning *3	25	3.1		**I18.** Ease of Doing Business Results *8	21	72.71
I09. Healthy Life Expectancy *4	19	69.4		**I19.** Quality of Life *5	23	6.3
I10. At Birth Mortality Rate *3	20	3.6		**I20.** Job Satisfaction *5	21	7.0
				I21. Unemployment Rate *3	26	16.7

*1 per 1,000 inhabitants; *2 math score; *3 percentage; *4 age; *5 score; *6 US dollars; *7 gha pc; *8 distance to frontier

Analysis

Croatia does get its top relative positions (2nd to 12nd) regarding Indexed Quality Papers Published, Environmental Wellbeing Results and Ecological Footprint, and the worst ones (26th to 27th) correspond to Global Competitiveness Index, Gross Domestic Product and Unemployment Rate.

CYPRUS

Capital:.................Nicosia   Population (2014):..........1,153,658   Quality group: ....LAGGING

	Rank	Score
OEQS 2016..	22	17.83

Cyprus
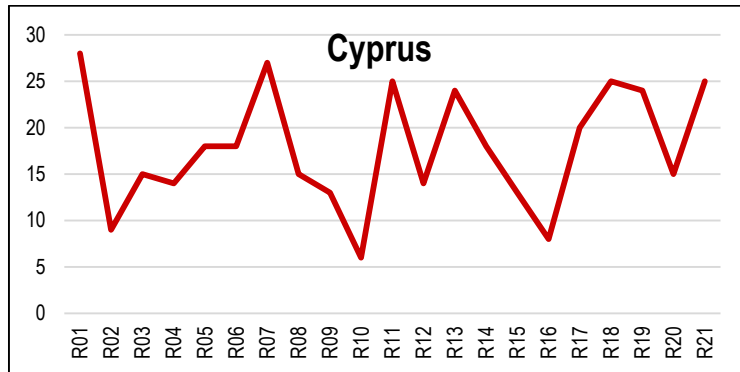
	Rank	Value
I01. ISO 9001 Certified Organizations *1	28	0.23924
I02. Organizations Recognized by Quality Awards *1	9	0.00607
I03. International Academy for Quality Members *1	15	0.00000
I04. Certified Quality Professionals *1	14	0.01560
I05. Indexed Quality Papers Published *1	18	0.06761
I06. Universities in International Research Rankings *1	18	0.00000
I07. OECD PISA Test Results *2	27	440
I08. Lifelong learning *3	15	7.5
I09. Healthy Life Expectancy *4	13	71.3
I10. At Birth Mortality Rate *3	6	2.5

	Rank	Value
I11. Global Competitiveness Index *5	25	4.23
I12. Gross Domestic Product *6	14	27,194.39
I13. Gini Index *3	24	34.8
I14. People at Risk of Poverty and Social Exclusion *3	18	27.4
I15. Environmental Wellbeing Results *5	13	3.94
I16. Ecological Footprint *7	8	4.20
I17. Global Innovation Index *5	20	43.51
I18. Ease of Doing Business Results *8	25	71.78
I19. Quality of Life *5	24	6.2
I20. Job Satisfaction *5	15	7.2
I21. Unemployment Rate *3	25	15.6

*1 per 1,000 inhabitants; *2 math score; *3 percentage; *4 age; *5 score; *6 US dollars; *7 gha pc; *8 distance to frontier

Analysis

Cyprus does get its top relative positions (6th to 9th) regarding Birth Mortality Rate, Ecological Footprint and Organizations Recognized by Quality Awards, and the worst ones (25th to 28th) correspond to Gross Domestic Product, Ease of Doing Business Results, Unemployment Rate, OECD PISA Test Results and to ISO 9001 Certified Organizations.

CZECH REPUBLIC

Capital:................Prague   Population (2014):....... 10,510,566   Quality group: ....FOLLOWER

	Rank	Score
OEQS 2016..	11	12.76
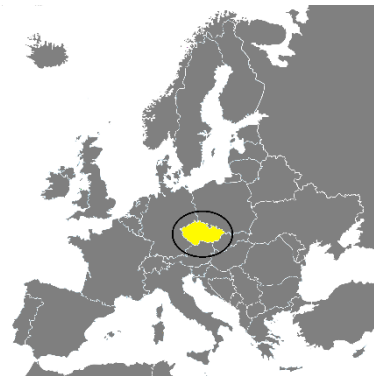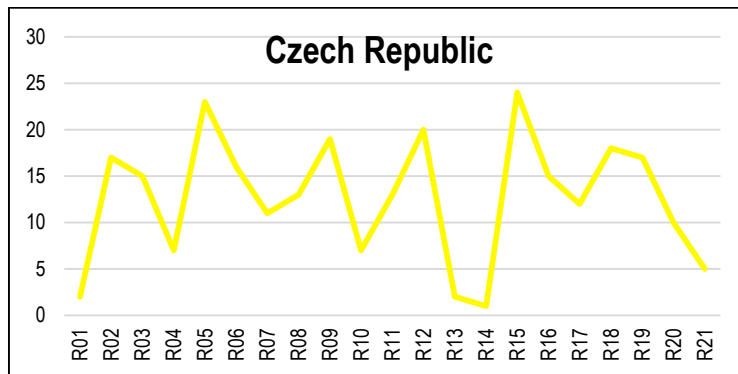
	Rank	Value
I01. ISO 9001 Certified Organizations *1	2	1.25864
I02. Organizations Recognized by Quality Awards *1	17	0.00095
I03. International Academy for Quality Members *1	15	0.00000
I04. Certified Quality Professionals *1	7	0.03359
I05. Indexed Quality Papers Published *1	23	0.04900
I06. Universities in International Research Rankings *1	16	0.00010
I07. OECD PISA Test Results *2	11	499
I08. Lifelong learning *3	13	8.5
I09. Healthy Life Expectancy *4	19	69.4
I10. At Birth Mortality Rate *3	7	2.8

	Rank	Value
I11. Global Competitiveness Index *5	13	4.69
I12. Gross Domestic Product *6	20	19,502.42
I13. Gini Index *3	2	25.1
I14. People at Risk of Poverty and Social Exclusion *3	1	14.8
I15. Environmental Wellbeing Results *5	24	3.04
I16. Ecological Footprint *7	15	5.19
I17. Global Innovation Index *5	12	51.32
I18. Ease of Doing Business Results *8	18	73.95
I19. Quality of Life *5	17	6.9
I20. Job Satisfaction *5	10	7.4
I21. Unemployment Rate *3	5	6.2

*1 per 1,000 inhabitants; *2 math score; *3 percentage; *4 age; *5 score; *6 US dollars; *7 gha pc; *8 distance to frontier

Analysis

Czech Republic does get its top relative positions (1st to 5th) regarding People at Risk of Poverty and Social Exclusion, Gini Index, ISO 9001 certified organizations and Unemployment Rate, and the worst ones (20th to 24th) correspond to Gross Domestic Product, Indexed Quality Papers Published and Environmental Wellbeing Results.

DENMARK

Capital:....... Copenhagen   Population (2014):..........5,639,565   Quality group: .... LEADING

	Rank	Score
OEQS 2016..	5	9.05

Denmark
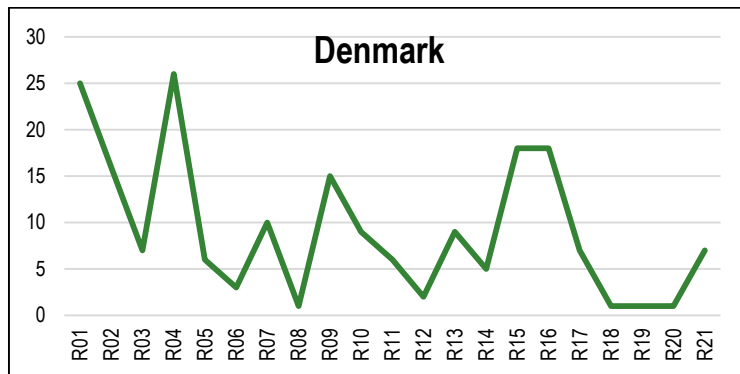
	Rank	Value
I01. ISO 9001 Certified Organizations *1	25	0.30002
I02. Organizations Recognized by Quality Awards *1	16	0.00142
I03. International Academy for Quality Members *1	7	0.00018
I04. Certified Quality Professionals *1	26	0.00479
I05. Indexed Quality Papers Published *1	6	0.15249
I06. Universities in International Research Rankings *1	3	0.00089
I07. OECD PISA Test Results *2	10	500
I08. Lifelong learning *3	1	31.3
I09. Healthy Life Expectancy *4	15	71.2
I10. At Birth Mortality Rate *3	9	2.9

	Rank	Value
I11. Global Competitiveness Index *5	6	5.33
I12. Gross Domestic Product *6	2	60,718.39
I13. Gini Index *3	9	27.7
I14. People at Risk of Poverty and Social Exclusion *3	5	17.9
I15. Environmental Wellbeing Results *5	18	3.75
I16. Ecological Footprint *7	18	5.51
I17. Global Innovation Index *5	7	57.70
I18. Ease of Doing Business Results *8	1	84.40
I19. Quality of Life *5	1	8.0
I20. Job Satisfaction *5	1	8.1
I21. Unemployment Rate *3	7	6.6

*1 per 1,000 inhabitants; *2 math score; *3 percentage; *4 age; *5 score; *6 US dollars; *7 gha pc; *8 distance to frontier

Analysis

Denmark belongs to the top 10 countries in 15 out of 21 EQS indicators, and does get its top relative positions (top 3) regarding Lifelong Learning, Ease of Doing Business Results, Quality of Life, Job Satisfaction, Gross Domestic Product and Universities in International Research Rankings, and the worst ones (18th to 26th) correspond to Environmental Wellbeing Results, Ecological Footprint, ISO 9001 Certified Organizations and Certified Quality Professionals.

ESTONIA

Capital:....................Talinn   Population (2014):..........1,313,645   Quality group: ......MODERATE

	Rank	Score
OEQS 2016..	16	14.52
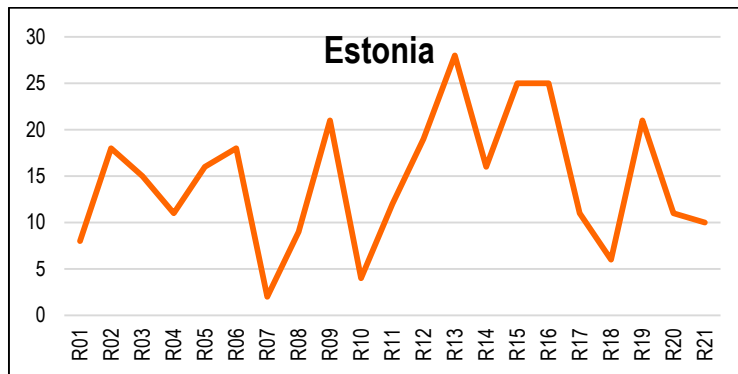
	Rank	Value
I01. ISO 9001 Certified Organizations *1	8	0.78256
I02. Organizations Recognized by Quality Awards *1	18	0.00076
I03. International Academy for Quality Members *1	15	0.00000
I04. Certified Quality Professionals *1	11	0.01675
I05. Indexed Quality Papers Published *1	16	0.07308
I06. Universities in International Research Rankings *1 ..	18	0.00000
I07. OECD PISA Test Results *2	2	521
I08. Lifelong learning *3	9	12.4
I09. Healthy Life Expectancy *4	21	68.9
I10. At Birth Mortality Rate *3	4	2.3

	Rank	Value
I11. Global Competitiveness Index *5	12	4.74
I12. Gross Domestic Product *6	19	20,147.78
I13. Gini Index *3	28	35.6
I14. People at Risk of Poverty and Social Exclusion *3 ...	16	26.0
I15. Environmental Wellbeing Results *5	25	2.68
I16. Ecological Footprint *7	25	6.86
I17. Global Innovation Index *5	11	52.81
I18. Ease of Doing Business Results *8	6	79.49
I19. Quality of Life *5	21	6.5
I20. Job Satisfaction *5	11	7.3
I21. Unemployment Rate *3	10	7.7

*1 per 1,000 inhabitants; *2 math score; *3 percentage; *4 age; *5 score; *6 US dollars; *7 gha pc; *8 distance to frontier

Analysis

Estonia does get its top relative positions (2nd to 6th) regarding OECD PISA Test Results, Birth Mortality Rate and Ease of Doing Business Results, and the worst ones (25th to 28th) correspond to Environmental Wellbeing Results, Ecological Footprint and Gini Index.

FINLAND

Capital:................Helsinki   Population (2014):..........5,463,596   Quality group: ....LEADING

	Rank	Score
OEQS 2016..	1	7.85
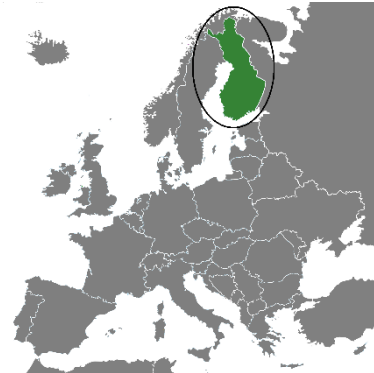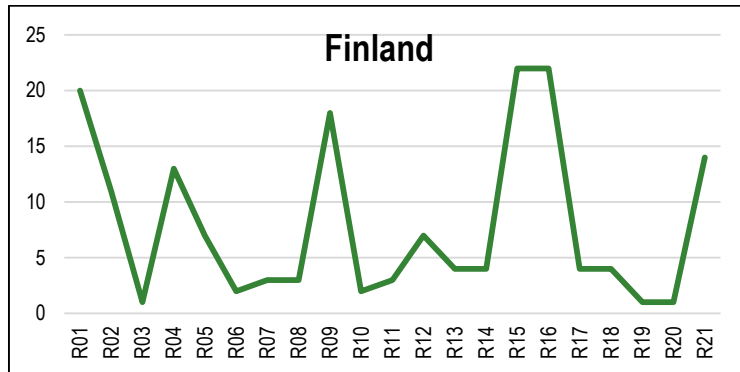
Rank   Value

I01. ISO 9001 Certified Organizations *1 .... 20......0.48485

I02. Organizations Recognized by Quality Awards *1 ..... 11......0.00494

I03. International Academy for Quality Members *1 .... 1......0.00092

I04. Certified Quality Professionals *1.............................. 13......0.01611

I05. Indexed Quality Papers Published *1.......................... 7......0.14825

I06. Universities in International Research Rankings *1.... 2......0.00110

I07. OECD PISA Test Results *2 .... 3.............519

I08. Lifelong learning *3..3.............25.4

I09. Healthy Life Expectancy *4 .... 18.............71.0

I10. At Birth Mortality Rate *3 .... 2.............1.9

Rank   Value

I11. Global Competitiveness Index *5 .... 3............5.45

I12. Gross Domestic Product *6 .... 7...49,842.71

I13. Gini Index *3 .... 4............25.6

I14. People at Risk of Poverty and Social Exclusion *3 ..... 4............17.3

I15. Environmental Wellbeing Results *5 .... 22............3.26

I16. Ecological Footprint *7... 22............5.87

I17. Global Innovation Index *5 .... 4..........59.97

I18. Ease of Doing Business Results *8............................ 4..........81.05

I19. Quality of Life *5 .... 1.............8.0

I20. Job Satisfaction *5 .... 1.............8.1

I21. Unemployment Rate *3.. 14.............8.6

*1 per 1,000 inhabitants; *2 math score; *3 percentage; *4 age; *5 score; *6 US dollars; *7 gha pc; *8 distance to frontier

Analysis

Finland belongs to the top 10 countries in 14 out of 21 EQS indicators, and does get its top relative positions (top 3) regarding IAQ Members, Quality of Life, Job Satisfaction, Universities in International Research Rankings, Birth Mortality Rate, OECD PISA Test Results, Lifelong Learning and Global Competitiveness Index, and the worst ones (20th to 22nd) correspond to ISO 9001 Certified Organizations, Environmental Wellbeing Results and Ecological Footprint.

FRANCE

Capital:......................Paris   Population (2014):.......66,206,930   Quality group: ....FOLLOWER

	Rank	Score
OEQS 2016...	13	13.10
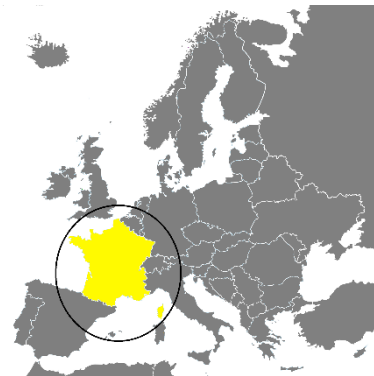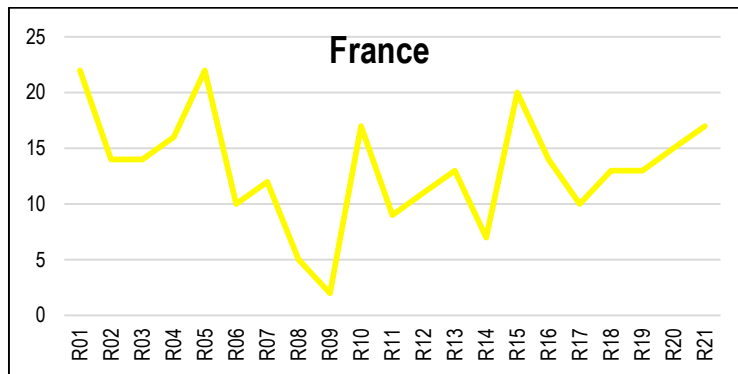
	Rank	Value
I01. ISO 9001 Certified Organizations *1	22	0.43986
I02. Organizations Recognized by Quality Awards *1	14	0.00189
I03. International Academy for Quality Members *1	14	0.00002
I04. Certified Quality Professionals *1	16	0.01281
I05. Indexed Quality Papers Published *1	22	0.04966
I06. Universities in International Research Rankings *1	10	0.00033
I07. OECD PISA Test Results *2	12	495
I08. Lifelong learning *3	5	18.6
I09. Healthy Life Expectancy *4	2	72.6
I10. At Birth Mortality Rate *3	17	3.5

	Rank	Value
I11. Global Competitiveness Index *5	9	5.13
I12. Gross Domestic Product *6	11	42,725.74
I13. Gini Index *3	13	29.2
I14. People at Risk of Poverty and Social Exclusion *3	7	18.5
I15. Environmental Wellbeing Results *5	20	3.40
I16. Ecological Footprint *7	14	5.14
I17. Global Innovation Index *5	10	53.59
I18. Ease of Doing Business Results *8	13	75.96
I19. Quality of Life *5	13	7.1
I20. Job Satisfaction *5	15	7.2
I21. Unemployment Rate *3	17	9.9

*1 per 1,000 inhabitants; *2 math score; *3 percentage; *4 age; *5 score; *6 US dollars; *7 gha pc; *8 distance to frontier

Analysis

France does get its top relative positions (2nd to 7th) regarding Healthy Life Expectancy, Lifelong Learning and People at Risk of Poverty and Social Exclusion, and the worst ones (20th to 22nd) correspond to Environmental Wellbeing Results, ISO 9001 Certified Organizations and Indexed Quality Papers Published.

GERMANY

Capital:..................Berlin   Population (2014):.......80,889,505   Quality group: ....FOLLOWER

	Rank	Score
OEQS 2016..	8	10.90

Germany
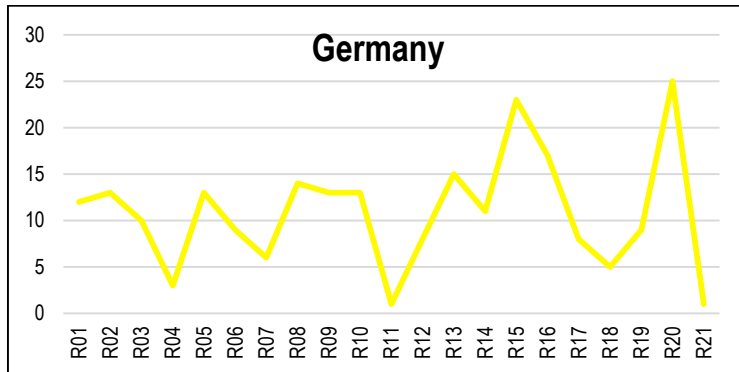
	Rank	Value
I01. ISO 9001 Certified Organizations *1	12	0.68443
I02. Organizations Recognized by Quality Awards *1	13	0.00340
I03. International Academy for Quality Members *1	10	0.00007
I04. Certified Quality Professionals *1	3	0.08985
I05. Indexed Quality Papers Published *1	13	0.09220
I06. Universities in International Research Rankings *1	9	0.00048
I07. OECD PISA Test Results *2	6	514
I08. Lifelong learning *3	14	8.1
I09. Healthy Life Expectancy *4	13	71.3
I10. At Birth Mortality Rate *3	13	3.1

	Rank	Value
I11. Global Competitiveness Index *5	1	5.53
I12. Gross Domestic Product *6	8	47,773.94
I13. Gini Index *3	15	30.7
I14. People at Risk of Poverty and Social Exclusion *3	11	20.6
I15. Environmental Wellbeing Results *5	23	3.13
I16. Ecological Footprint *7	17	5.3
I17. Global Innovation Index *5	8	57.05
I18. Ease of Doing Business Results *8	5	79.87
I19. Quality of Life *5	9	7.3
I20. Job Satisfaction *5	25	6.9
I21. Unemployment Rate *3	1	5.0

*1 per 1,000 inhabitants; *2 math score; *3 percentage; *4 age; *5 score; *6 US dollars; *7 gha pc; *8 distance to frontier

Analysis

Germany does get its top relative positions (1st to 3rd) regarding Global Competitiveness Index, Unemployment Rate and Certified Quality Professionals, and the worst ones (23rd to 25th) correspond to Environmental Wellbeing Results and Job Satisfaction.

GREECE

Capital:.................Athens   Population (2014):........ 10,957,740   Quality group: ....LAGGING

                                                                    Rank   Score

OEQS 2016.. 27 ....19.96

Greece
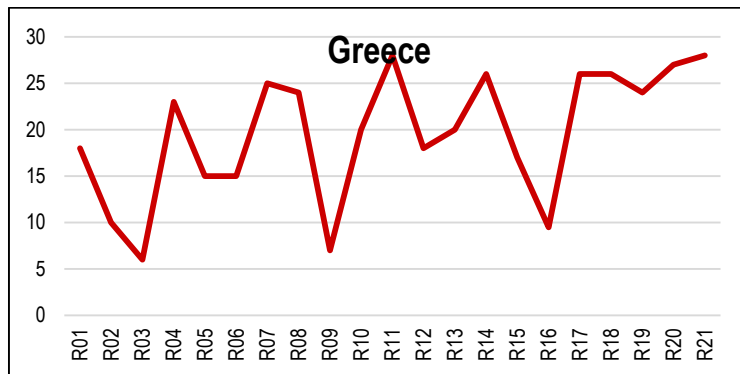
	Rank	Value
I01. ISO 9001 Certified Organizations *1	18	0.49700
I02. Organizations Recognized by Quality Awards *1	10	0.00557
I03. International Academy for Quality Members *1	6	0.00018
I04. Certified Quality Professionals *1	23	0.00675
I05. Indexed Quality Papers Published *1	15	0.07839
I06. Universities in International Research Rankings *1	15	0.00018
I07. OECD PISA Test Results *2	25	453
I08. Lifelong learning *3	24	3.3
I09. Healthy Life Expectancy *4	7	71.9
I10. At Birth Mortality Rate *3	20	3.6

	Rank	Value
I11. Global Competitiveness Index *5	28	4.02
I12. Gross Domestic Product *6	18	21,672.67
I13. Gini Index *3	20	34.5
I14. People at Risk of Poverty and Social Exclusion *3	26	36.0
I15. Environmental Wellbeing Results *5	17	3.80
I16. Ecological Footprint *7	9	4.38
I17. Global Innovation Index *5	26	40.28
I18. Ease of Doing Business Results *8	26	68.38
I19. Quality of Life *5	24	6.2
I20. Job Satisfaction *5	27	6.1
I21. Unemployment Rate *3	28	26.3

*1 per 1,000 inhabitants; *2 math score; *3 percentage; *4 age; *5 score; *6 US dollars; *7 gha pc; *8 distance to frontier

Analysis

Greece does get its top relative positions (6th to 9th) regarding IAQ Members, Healthy Life Expectancy and Ecological Footprint, and the worst ones (26th to 28th) correspond to People at Risk of Poverty and Social Exclusion, Global Innovation Index, Job Satisfaction, Global Competitiveness Index and Unemployment Rate.

HUNGARY

Capital:…………Budapest   Population (2014):……….9,861,673   Quality group: …… **MODERATE**

	Rank	Score
OEQS 2016………………………………………………………………………………	21	…………………………………………………17.72

Hungary
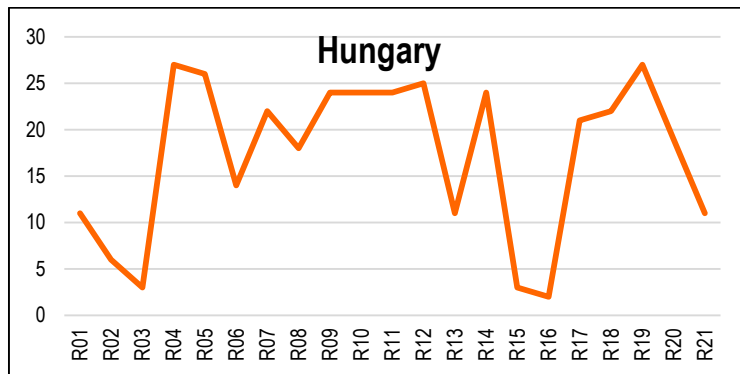
	Rank	Value
I01. ISO 9001 Certified Organizations *1	11	0.70252
I02. Organizations Recognized by Quality Awards *1	6	0.00679
I03. International Academy for Quality Members *1	3	0.00030
I04. Certified Quality Professionals *1	27	0.00456
I05. Indexed Quality Papers Published *1	26	0.03113
I06. Universities in International Research Rankings *1	14	0.00020
I07. OECD PISA Test Results *2	22	477
I08. Lifelong learning *3	18	7.1
I09. Healthy Life Expectancy *4	24	67.4
I10. At Birth Mortality Rate *3	24	5.3

	Rank	Value
I11. Global Competitiveness Index *5	24	4.25
I12. Gross Domestic Product *6	25	14,026.57
I13. Gini Index *3	11	28.6
I14. People at Risk of Poverty and Social Exclusion *3	24	31.8
I15. Environmental Wellbeing Results *5	3	4.69
I16. Ecological Footprint *7	2	2.92
I17. Global Innovation Index *5	21	43.00
I18. Ease of Doing Business Results *8	22	72.57
I19. Quality of Life *5	27	6.1
I20. Job Satisfaction *5	19	7.1
I21. Unemployment Rate *3	11	7.8

*1 per 1,000 inhabitants; *2 math score; *3 percentage; *4 age; *5 score; *6 US dollars; *7 gha pc; *8 distance to frontier

Analysis

Hungary does get its top relative positions (2nd to 3rd) regarding Ecological Footprint, Environmental Wellbeing and IAQ Members, and the worst ones (26th to 27th) correspond to Indexed Quality Papers Published, Certified Quality Professionals and Quality of Life.

IRELAND

Capital:...................Dublin   Population (2014):..........4,612,719   Quality group: ....<mark>FOLLOWER</mark>

Rank   Score

OEQS 2016...9 ....11.18
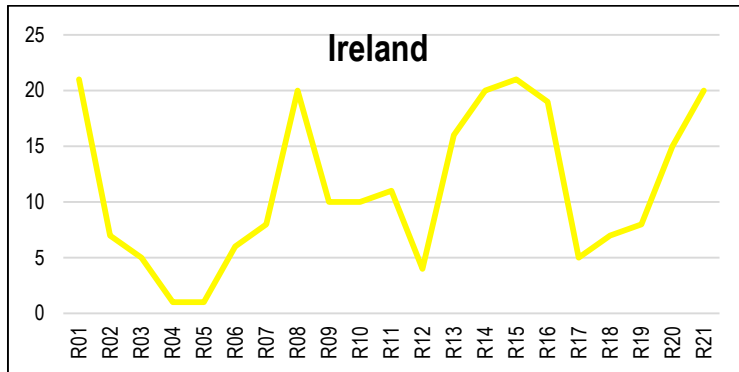
Rank   Value

I01. ISO 9001 Certified Organizations *1 .... 21......0.44811

I02. Organizations Recognized by Quality Awards *1 .... 7......0.00672

I03. International Academy for Quality Members *1 .... 5......0.00022

I04. Certified Quality Professionals *1................................ 1......0.20357

I05. Indexed Quality Papers Published *1.......................... 1......0.18015

I06. Universities in International Research Rankings *1.... 6......0.00065

I07. OECD PISA Test Results *2 .... 8.............501

I08. Lifelong learning *3.. 20.............6.5

I09. Healthy Life Expectancy *4 .... 10............71.5

I10. At Birth Mortality Rate *3.. 10.............3.0

Rank   Value

I11. Global Competitiveness Index *5 .... 11............5.11

I12. Gross Domestic Product *6 .... 4...54,339.32

I13. Gini Index *3 .... 16............30.8

I14. People at Risk of Poverty and Social Exclusion *3 ... 20.............27.6

I15. Environmental Wellbeing Results *5 .... 21.............3.39

I16. Ecological Footprint *7... 19.............5.57

I17. Global Innovation Index *5 .... 5..........59.13

I18. Ease of Doing Business Results *8............................. 7..........79.15

I19. Quality of Life *5 .... 8.............7.4

I20. Job Satisfaction *5.. 15.............7.2

I21. Unemployment Rate *3... 20............11.6

*1 per 1,000 inhabitants; *2 math score; *3 percentage; *4 age; *5 score; *6 US dollars; *7 gha pc; *8 distance to frontier

Analysis

Ireland does get its top relative positions (1st to 5th) regarding Certified Quality Professionals, Indexed Quality Papers Published, Gross Domestic Product, IAQ Members and Global Innovation Index, and the worst ones (20th to 21st) correspond to Lifelong Learning, People at Risk of Poverty and Social Exclusion, Unemployment Rate, ISO 9001 Certified Organizations and Environmental Wellbeing Results.

ITALY

Capital:....................Rome   Population (2014):.......61,336,387   Quality group: ...... <mark>MODERATE</mark>

                                            Rank   Score

OEQS 2016... 18 ....15.65
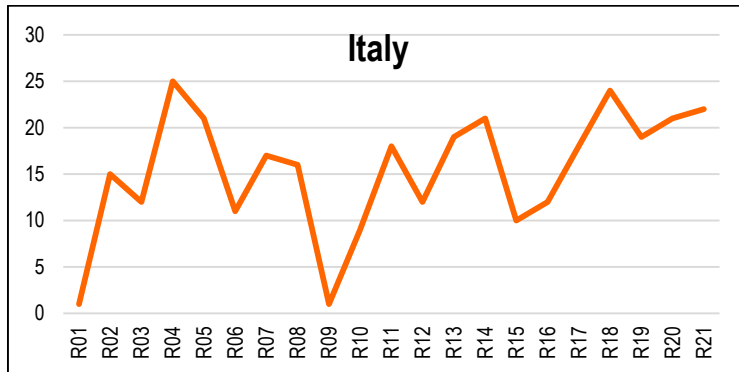
	Rank	Value
I01. ISO 9001 Certified Organizations *1	1	2.75465
I02. Organizations Recognized by Quality Awards *1	15	0.00143
I03. International Academy for Quality Members *1	12	0.00003
I04. Certified Quality Professionals *1	25	0.00489
I05. Indexed Quality Papers Published *1	21	0.05126
I06. Universities in International Research Rankings *1	11	0.00033
I07. OECD PISA Test Results *2	17	485
I08. Lifelong learning *3	16	7.3
I09. Healthy Life Expectancy *4	1	72.8
I10. At Birth Mortality Rate *3	9	2.9
I11. Global Competitiveness Index *5	18	4.46
I12. Gross Domestic Product *6	12	35,222.76
I13. Gini Index *3	19	32.4
I14. People at Risk of Poverty and Social Exclusion *3	21	28.3
I15. Environmental Wellbeing Results *5	10	4.29
I16. Ecological Footprint *7	12	4.61
I17. Global Innovation Index *5	18	46.40
I18. Ease of Doing Business Results *8	24	72.07
I19. Quality of Life *5	19	6.7
I20. Job Satisfaction *5	21	7.0
I21. Unemployment Rate *3	22	12.5

*1 per 1,000 inhabitants; *2 math score; *3 percentage; *4 age; *5 score; *6 US dollars; *7 gha pc; *8 distance to frontier

Analysis

Italy does get its top relative positions (1st to 9th) regarding ISO 9001 Certified Organizations, Healthy Life Expectancy and Birth Mortality Rate, and the worst ones (21st to 25th) correspond to Indexed Quality Papers Published, People at Risk of Poverty and Social Exclusion, Job Satisfaction, Unemployment Rate, Ease of Doing Business Results and Certified Quality Professionals.

LATVIA

Capital:........................Riga   Population (2014):...........1,990,351   Quality group: ....LAGGING

	Rank	Score
OEQS 2016..	25	19.39

	Rank	Value
I01. ISO 9001 Certified Organizations *1	17	0.50293
I02. Organizations Recognized by Quality Awards *1	24	0.00000
I03. International Academy for Quality Members *1	15	0.00000
I04. Certified Quality Professionals *1	21	0.00703
I05. Indexed Quality Papers Published *1	24	0.04874
I06. Universities in International Research Rankings *1	18	0.00000
I07. OECD PISA Test Results *2	14	491
I08. Lifelong learning *3	22	5.7
I09. Healthy Life Expectancy *4	25	67.1
I10. At Birth Mortality Rate *3	26	6.9

	Rank	Value
I11. Global Competitiveness Index *5	19	4.45
I12. Gross Domestic Product *6	23	15,692.19
I13. Gini Index *3	27	35.5
I14. People at Risk of Poverty and Social Exclusion *3	25	32.7
I15. Environmental Wellbeing Results *5	4	4.63
I16. Ecological Footprint *7	24	6.29
I17. Global Innovation Index *5	19	45.51
I18. Ease of Doing Business Results *8	10	78.06
I19. Quality of Life *5	21	6.5
I20. Job Satisfaction *5	11	7.3
I21. Unemployment Rate *3	18	10.0

*1 per 1,000 inhabitants; *2 math score; *3 percentage; *4 age; *5 score; *6 US dollars; *7 gha pc; *8 distance to frontier

Analysis

Latvia does get in its top relative positions (4th to 11th) regarding Environmental Wellbeing Results, Ease of Doing Business Results and Job Satisfaction, and the worst ones (24th to 27th) correspond to Indexed Quality Papers Published, Healthy Life Expectancy, People at Risk of Poverty and Social Exclusion, Birth Mortality Rate and Gini Index.

LITHUANIA

Capital:................. Vilnius   Population (2014):..........2,929,323   Quality group: .... LAGGING

	Rank	Score
OEQS 2016..	24	18.61

Lithuania
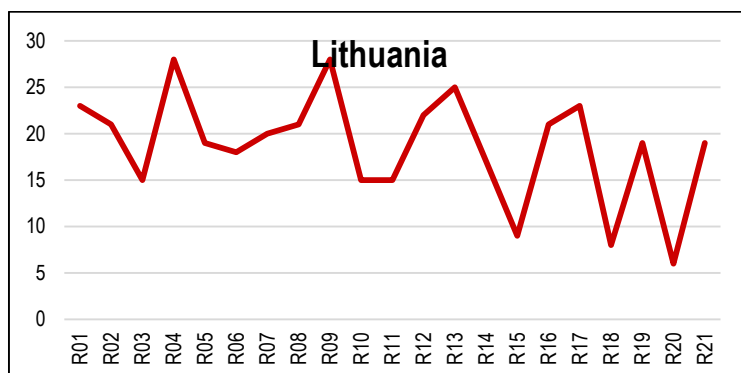
	Rank	Value
I01. ISO 9001 Certified Organizations *1	23	0.41580
I02. Organizations Recognized by Quality Awards *1	21	0.00034
I03. International Academy for Quality Members *1	15	0.00000
I04. Certified Quality Professionals *1	28	0.00171
I05. Indexed Quality Papers Published *1	19	0.06691
I06. Universities in International Research Rankings *1 ..	18	0.00000
I07. OECD PISA Test Results *2	20	479
I08. Lifelong learning *3	21	5.8
I09. Healthy Life Expectancy *4	28	66.0
I10. At Birth Mortality Rate *3	15	3.3

	Rank	Value
I11. Global Competitiveness Index *5	15	4.55
I12. Gross Domestic Product *6	22	16,489.73
I13. Gini Index *3	25	35.0
I14. People at Risk of Poverty and Social Exclusion *3 ...	17	27.3
I15. Environmental Wellbeing Results *5	9	4.30
I16. Ecological Footprint *7	21	5.83
I17. Global Innovation Index *5	23	42.26
I18. Ease of Doing Business Results *8	8	78.88
I19. Quality of Life *5	19	6.7
I20. Job Satisfaction *5	6	7.5
I21. Unemployment Rate *3	19	11.3

*1 per 1,000 inhabitants; *2 math score; *3 percentage; *4 age; *5 score; *6 US dollars; *7 gha pc; *8 distance to frontier

Analysis

Lithuania does get its top relative positions (6th to 9th) regarding Job Satisfaction, Global Innovation Index and Environmental Wellbeing Results, and the worst ones (23rd to 28th) correspond to ISO 9001 Certified Organizations, Global Innovation Index, Gini Index, Certified Quality Professionals and Healthy Life Expectancy.

LUXEMBOURG

Capital:....... Luxembourg   Population (2014):............. 556,074   Quality group: .... LEADING

	Rank	Score
OEQS 2016...	7	10.86

Luxembourg
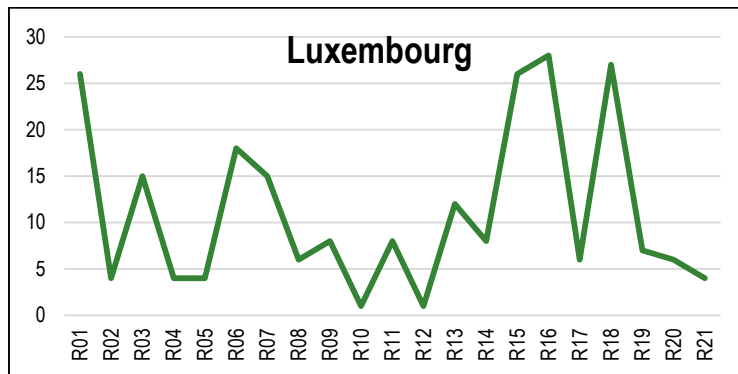
	Rank	Value
I01. ISO 9001 Certified Organizations *1	26	0.26975
I02. Organizations Recognized by Quality Awards *1	4	0.00899
I03. International Academy for Quality Members *1	15	0.00000
I04. Certified Quality Professionals *1	4	0.06834
I05. Indexed Quality Papers Published *1	4	0.15825
I06. Universities in International Research Rankings *1 ..	18	0.00000
I07. OECD PISA Test Results *2	15	490
I08. Lifelong learning *3	6	18.0
I09. Healthy Life Expectancy *4	8	71.8
I10. At Birth Mortality Rate *3	1	1.5

	Rank	Value
I11. Global Competitiveness Index *5	8	5.20
I12. Gross Domestic Product *6	1	116,612.88
I13. Gini Index *3	12	28.7
I14. People at Risk of Poverty and Social Exclusion *3	8	19.0
I15. Environmental Wellbeing Results *5	26	2.53
I16. Ecological Footprint *7	28	15.82
I17. Global Innovation Index *5	6	59.02
I18. Ease of Doing Business Results *8	27	68.31
I19. Quality of Life *5	7	7.5
I20. Job Satisfaction *5	6	7.5
I21. Unemployment Rate *3	4	6.1

*1 per 1,000 inhabitants; *2 math score; *3 percentage; *4 age; *5 score; *6 US dollars; *7 gha pc; *8 distance to frontier

Analysis

Luxembourg belongs to the top 10 countries in 14 out of 21 EQS indicators, and does get its top relative positions (top 5) regarding Birth Mortality Rate, Gross Domestic Product, Organizations Recognized by Quality Awards, Certified Quality Professionals, Indexed Quality Papers Published and Unemployment Rate, and the worst ones (26th to 28th) correspond to ISO 9001 Certified Organizations, Environmental Wellbeing Results, Ease of Doing Business Results and Ecological Footprint.

MALTA

Capital:................Valletta   Population (2014):..............427,404   Quality group: ...... MODERATE

	Rank	Score
OEQS 2016	17	14.65

Malta

	Rank	Value
I01. ISO 9001 Certified Organizations *1	3	1.09030
I02. Organizations Recognized by Quality Awards *1	24	0.00000
I03. International Academy for Quality Members *1	15	0.00000
I04. Certified Quality Professionals *1	12	0.01638
I05. Indexed Quality Papers Published *1	17	0.06785
I06. Universities in International Research Rankings *1	18	0.00000
I07. OECD PISA Test Results *2	24	463
I08. Lifelong learning *3	17	7.2
I09. Healthy Life Expectancy *4	9	71.7
I10. At Birth Mortality Rate *3	23	5.1

	Rank	Value
I11. Global Competitiveness Index *5	20	4.39
I12. Gross Domestic Product *6	16	22,776.19
I13. Gini Index *3	9	27.7
I14. People at Risk of Poverty and Social Exclusion *3	13	23.8
I15. Environmental Wellbeing Results *5	15	3.84
I16. Ecological Footprint *7	9	4.38
I17. Global Innovation Index *5	14	50.48
I18. Ease of Doing Business Results *8	28	63.70
I19. Quality of Life *5	13	7.1
I20. Job Satisfaction *5	6	7.5
I21. Unemployment Rate *3	3	5.9

*1 per 1,000 inhabitants; *2 math score; *3 percentage; *4 age; *5 score; *6 US dollars; *7 gha pc; *8 distance to frontier

Analysis

Malta does get its top relative positions (3rd to 9th) regarding ISO 9001 Certified Organizations, Unemployment Rate, Job Satisfaction, Healthy Life Expectancy, Gini Index and Ecological Footprint, and the worst ones (23rd to 28th) correspond to Birth Mortality Rate, OECD PISA Test Results and Ease of Doing Business Results.

NETHERLANDS

Capital:………Amsterdam	Population (2014):……. 16,854,183	Quality group: …………LEADING

	Rank	Score
OEQS 2016………………………………………………………………………4 ……………………………………………… 8.45		
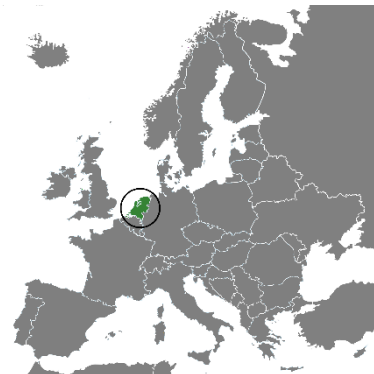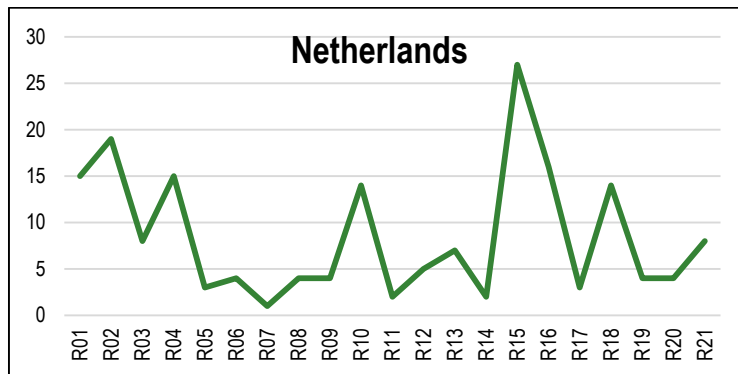
	Rank	Value
I01. ISO 9001 Certified Organizations *1	15	0.61902
I02. Organizations Recognized by Quality Awards *1	19	0.00071
I03. International Academy for Quality Members *1	8	0.00012
I04. Certified Quality Professionals *1	15	0.01448
I05. Indexed Quality Papers Published *1	3	0.16417
I06. Universities in International Research Rankings *1	4	0.00071
I07. OECD PISA Test Results *2	1	523
I08. Lifelong learning *3	4	18.9
I09. Healthy Life Expectancy *4	4	72.2
I10. At Birth Mortality Rate *3	14	3.2

	Rank	Value
I11. Global Competitiveness Index *5	2	5.50
I12. Gross Domestic Product *6	5	52,138.68
I13. Gini Index *3	7	26.2
I14. People at Risk of Poverty and Social Exclusion *3	2	16.5
I15. Environmental Wellbeing Results *5	27	2.34
I16. Ecological Footprint *7	16	5.28
I17. Global Innovation Index *5	3	61.58
I18. Ease of Doing Business Results *8	14	75.94
I19. Quality of Life *5	4	7.8
I20. Job Satisfaction *5	4	7.7
I21. Unemployment Rate *3	8	6.9

*1 per 1,000 inhabitants; *2 math score; *3 percentage; *4 age; *5 score; *6 US dollars; *7 gha pc; *8 distance to frontier

Analysis

Netherlands belongs to the top 10 countries in 14 out of 21 EQS indicators, and does get its top relative positions (top five) regarding OECD PISA Test Results, Global Competitiveness Index, People at Risk of Poverty and Social Exclusion, Indexed Quality Papers Published, Global Innovation Index, Universities in International Research Rankings, Lifelong Learning, Healthy Life Expectancy, Quality of Life, Job Satisfaction and Gross Domestic Product, and the worst ones (15th to 27th) correspond to ISO 9001 Certified Organizations, Certified Quality Professionals, Ecological Footprint, Organizations Recognized by Quality Awards and Environmental Wellbeing Results.

POLAND

Capital:................Warsaw   Population (2014):........37,995,529   Quality group: ...... MODERATE

	Rank	Score
OEQS 2016	20	17.67

Poland
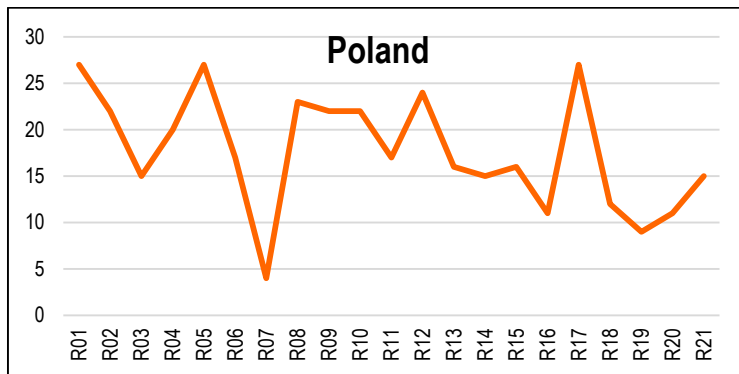
	Rank	Value
I01. ISO 9001 Certified Organizations *1	27	0.25287
I02. Organizations Recognized by Quality Awards *1	22	0.00029
I03. International Academy for Quality Members *1	15	0.00000
I04. Certified Quality Professionals *1	20	0.00774
I05. Indexed Quality Papers Published *1	27	0.02190
I06. Universities in International Research Rankings *1	17	0.00005
I07. OECD PISA Test Results *2	4	518
I08. Lifelong learning *3	23	3.5
I09. Healthy Life Expectancy *4	22	68.7
I10. At Birth Mortality Rate *3	22	4.5

	Rank	Value
I11. Global Competitiveness Index *5	17	4.49
I12. Gross Domestic Product *6	24	14,336.80
I13. Gini Index *3	16	30.8
I14. People at Risk of Poverty and Social Exclusion *3	15	24.7
I15. Environmental Wellbeing Results *5	16	3.81
I16. Ecological Footprint *7	11	4.44
I17. Global Innovation Index *5	27	40.16
I18. Ease of Doing Business Results *8	12	76.45
I19. Quality of Life *5	9	7.3
I20. Job Satisfaction *5	11	7.3
I21. Unemployment Rate *3	15	9.2

*1 per 1,000 inhabitants; *2 math score; *3 percentage; *4 age; *5 score; *6 US dollars; *7 gha pc; *8 distance to frontier

Analysis

Poland does get its top relative positions (4th to 12th) regarding OECD PISA Test Results, Quality of Life, Ecological Footprint, Job Satisfaction and Ease of Doing Business Results, and the worst ones (22nd to 27th) correspond to Organizations Recognized by Quality Awards, Healthy Life Expectancy, Birth Mortality Rate, Lifelong Learning, Gross Domestic Product, ISO 9001 Certified Organizations, Indexed Quality Papers Published and Global Innovation Index.

PORTUGAL

Capital:...................Lisbon   Population (2014):........10,397,393   Quality group: ......MODERATE

	Rank	Score
OEQS 2016	15	14.40
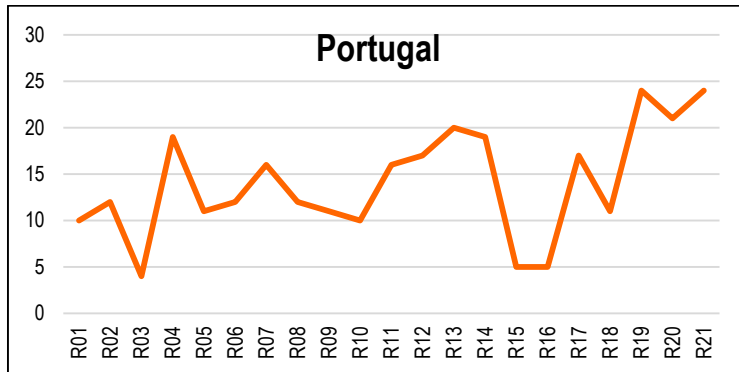
	Rank	Value
I01. ISO 9001 Certified Organizations *1	10	0.77000
I02. Organizations Recognized by Quality Awards *1	12	0.00385
I03. International Academy for Quality Members *1	4	0.00029
I04. Certified Quality Professionals *1	19	0.00846
I05. Indexed Quality Papers Published *1	11	0.11734
I06. Universities in International Research Rankings *1	12	0.00029
I07. OECD PISA Test Results *2	16	487
I08. Lifelong learning *3	12	9.7
I09. Healthy Life Expectancy *4	11	71.4
I10. At Birth Mortality Rate *3	10	3.0

	Rank	Value
I11. Global Competitiveness Index *5	16	4.52
I12. Gross Domestic Product *6	17	22,124.37
I13. Gini Index *3	20	34.5
I14. People at Risk of Poverty and Social Exclusion *3	19	27.5
I15. Environmental Wellbeing Results *5	5	4.61
I16. Ecological Footprint *7	5	3.88
I17. Global Innovation Index *5	17	46.61
I18. Ease of Doing Business Results *8	11	77.57
I19. Quality of Life *5	24	6.2
I20. Job Satisfaction *5	21	7.0
I21. Unemployment Rate *3	24	14.2

*1 per 1,000 inhabitants; *2 math score; *3 percentage; *4 age; *5 score; *6 US dollars; *7 gha pc; *8 distance to frontier

Analysis

Portugal does get its top relative positions (4th to 10th) regarding IAQ Members, Environmental Wellbeing Results, Ecological Footprint, ISO 9001 Certified Organizations and Birth Mortality Rate, and the worst ones (20th to 24th) correspond to Gini Index, Job Satisfaction, Quality of Life and Unemployment Rate.

ROMANIA

Capital:............Bucharest   Population (2014):........19,910,995   Quality group: ....LAGGING

	Rank	Score
OEQS 2016...	23	18.03

Rank   Value

I01. ISO 9001 Certified Organizations *1 .... 4......0.95359

I02. Organizations Recognized by Quality Awards *1 ..... 24......0.00000

I03. International Academy for Quality Members *1 .... 11......0.00005

I04. Certified Quality Professionals *1................................ 6......0.03917

I05. Indexed Quality Papers Published *1........................ 20......0.05997

I06. Universities in International Research Rankings *1.. 18......0.00000

I07. OECD PISA Test Results *2 .... 26.............445

I08. Lifelong learning *3.. 28..............1.3

I09. Healthy Life Expectancy *4 .... 26............66.8

I10. At Birth Mortality Rate *3.. 28..............9.7

Rank   Value

I11. Global Competitiveness Index *5 .... 21...........4.32

I12. Gross Domestic Product *6 .... 27 100,000.00

I13. Gini Index *3 .... 22............34.7

I14. People at Risk of Poverty and Social Exclusion *3 ... 27 ....39.5

I15. Environmental Wellbeing Results *5 .... 1............5.38

I16. Ecological Footprint *7.. 1............2.71

I17. Global Innovation Index *5 .... 28..........38.20

I18. Ease of Doing Business Results *8.......................... 19..........73.78

I19. Quality of Life *5 .... 12.............7.2

I20. Job Satisfaction *5.. 19.............7.1

I21. Unemployment Rate *3... 9.............7.0

*1 per 1,000 inhabitants; *2 math score; *3 percentage; *4 age; *5 score; *6 US dollars; *7 gha pc; *8 distance to frontier

Analysis

Romania does get its top relative positions (1st to 6th) regarding Environmental Wellbeing Results, Ecological Footprint, ISO 9001 Certified Organizations and Certified Quality Professionals, and the worst ones (26th to 28th) correspond to OECD PISA Test Results, Healthy Life Expectancy, Gross Domestics Product, People at Risk of Poverty and Social Exclusion, Lifelong Learning, Birth Mortality Rate and Global Innovation Index.

SLOVAKIA

Capital:............ Bratislava   Population (2014):...........5,418,506   Quality group: ...... MODERATE

	Rank	Score
OEQS 2016..	19	17.00
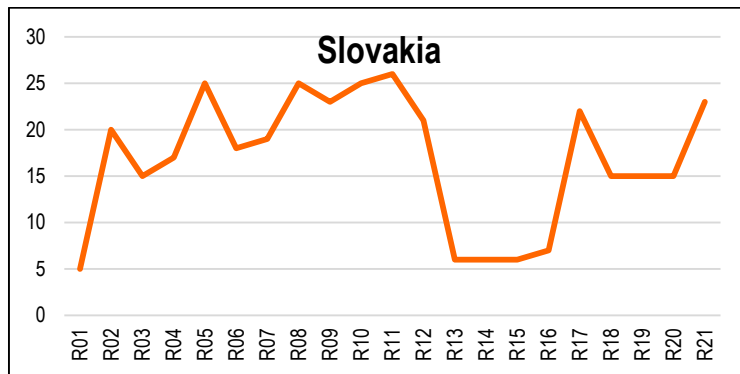
	Rank	Value		Rank	Value
I01. ISO 9001 Certified Organizations *1	5	0.84968	**I11.** Global Competitiveness Index *5	26	4.22
I02. Organizations Recognized by Quality Awards *1	20	0.00055	**I12.** Gross Domestic Product *6	21	18,500.66
I03. International Academy for Quality Members *1	15	0.00000	**I13.** Gini Index *3	6	26.1
I04. Certified Quality Professionals *1	17	0.01126	**I14.** People at Risk of Poverty and Social Exclusion *3	6	18.4
I05. Indexed Quality Papers Published *1	25	0.04669	**I15.** Environmental Wellbeing Results *5	6	4.59
I06. Universities in International Research Rankings *1	18	0.00000	**I16.** Ecological Footprint *7	7	4.06
I07. OECD PISA Test Results *2	19	482	**I17.** Global Innovation Index *5	22	42.99
I08. Lifelong learning *3	25	3.1	**I18.** Ease of Doing Business Results *8	15	75.62
I09. Healthy Life Expectancy *4	23	68.1	**I19.** Quality of Life *5	15	7.0
I10. At Birth Mortality Rate *3	25	5.8	**I20.** Job Satisfaction *5	15	7.2
			I21. Unemployment Rate *3	23	13.3

*1 per 1,000 inhabitants; *2 math score; *3 percentage; *4 age; *5 score; *6 US dollars; *7 gha pc; *8 distance to frontier

Analysis

Slovakia does get its top relative positions (5th to 7th) regarding ISO 9001 Certified Organizations, Gini Index, People at Risk of Poverty and Social Exclusion, Environmental Wellbeing Results and Ecological Footprint, and the worst ones (25th to 26th) correspond to Indexed Quality Papers Published, Lifelong Learning, Birth Mortality Rate and Global Competitiveness Index.

SLOVENIA

Capital:...............Ljubljana   Population (2014):...........2,062,218   Quality group: ....FOLLOWER

	Rank	Score
OEQS 2016..	10	11.45
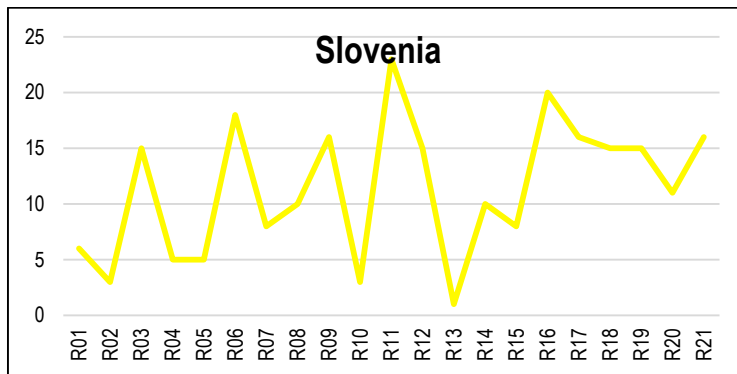
	Rank	Value
I01. ISO 9001 Certified Organizations *1	6	0.81078
I02. Organizations Recognized by Quality Awards *1	3	0.01067
I03. International Academy for Quality Members *1	15	0.00000
I04. Certified Quality Professionals *1...............................	5	0.04364
I05. Indexed Quality Papers Published *1..........................	5	0.15517
I06. Universities in International Research Rankings *1..	18	0.00000
I07. OECD PISA Test Results *2	8	501
I08. Lifelong learning *3...	10	11.9
I09. Healthy Life Expectancy *4	16	71.1
I10. At Birth Mortality Rate *3	3	2.1

	Rank	Value
I11. Global Competitiveness Index *5	23	4.28
I12. Gross Domestic Product *6	15	24,001.90
I13. Gini Index *3	1	25.0
I14. People at Risk of Poverty and Social Exclusion *3 ...	10	20.4
I15. Environmental Wellbeing Results *5	8	4.33
I16. Ecological Footprint *7..	20	5.81
I17. Global Innovation Index *5	16	48.49
I18. Ease of Doing Business Results *8..........................	15	75.62
I19. Quality of Life *5	15	7.0
I20. Job Satisfaction *5...	11	7.3
I21. Unemployment Rate *3...	16	9.5

*1 per 1,000 inhabitants; *2 math score; *3 percentage; *4 age; *5 score; *6 US dollars; *7 gha pc; *8 distance to frontier

Analysis

Slovenia does get its top relative positions (1st to 5th) regarding Gini Index, Organizations Recognized by Quality Awards, Birth Mortality Rate, Certified Quality Professionals and Indexed Quality Papers Published, and the worst ones (16th to 23rd) correspond to Healthy Life Expectancy, Global Innovation Index, Unemployment Rate, Ecological Footprint and Global Competitiveness Index.

SPAIN

Capital:.................Madrid   Population (2014):.......46,404,602   Quality group: ....<mark>FOLLOWER</mark>

	Rank	Score
OEQS 2016..	14	....14.24
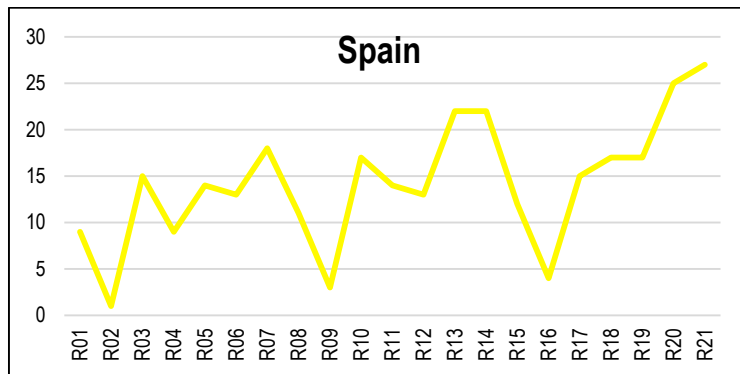
	Rank	Value
I01. ISO 9001 Certified Organizations *1	9	......0.77589
I02. Organizations Recognized by Quality Awards *1	1	......0.02715
I03. International Academy for Quality Members *1	15	......0.00000
I04. Certified Quality Professionals *1................................	9	......0.01892
I05. Indexed Quality Papers Published *1........................	14	......0.08307
I06. Universities in International Research Rankings *1..	13	......0.00028
I07. OECD PISA Test Results *2	18	484
I08. Lifelong learning *3...	11	..............9.9
I09. Healthy Life Expectancy *4	3	............72.4
I10. At Birth Mortality Rate *3	17	..............3.5

	Rank	Value
I11. Global Competitiveness Index *5	14	............4.59
I12. Gross Domestic Product *6	13	...29,721.60
I13. Gini Index *3	22	............34.7
I14. People at Risk of Poverty and Social Exclusion *3 ...	22	............29.2
I15. Environmental Wellbeing Results *5	12	............4.01
I16. Ecological Footprint *7..	4	............3.67
I17. Global Innovation Index *5	15	..........49.07
I18. Ease of Doing Business Results *8...........................	17	..........74.86
I19. Quality of Life *5	17	..............6.9
I20. Job Satisfaction *5	25	..............6.9
I21. Unemployment Rate *3...	27	............24.7

*1 per 1,000 inhabitants; *2 math score; *3 percentage; *4 age; *5 score; *6 US dollars; *7 gha pc; *8 distance to frontier

Analysis

Spain does get its top relative positions (1st to 9th) regarding Organizations Recognized by Quality Awards, Healthy Life Expectancy, Ecological Footprint, ISO 9001 Certified Organizations and Certified Qualified Professionals, and the worst ones (22nd to 27th) correspond to Gini Index, People at Risk of Poverty and Social Exclusion, Job Satisfaction and Unemployment Rate.

SWEDEN

Capital:...........Stockholm   Population (2014):..........9,689,555   Quality group: .... LEADING

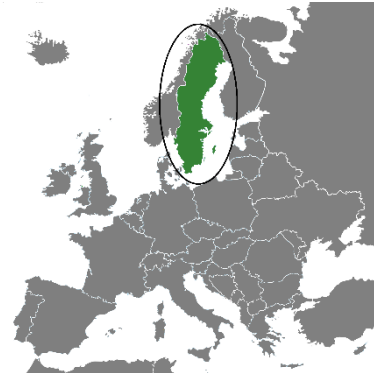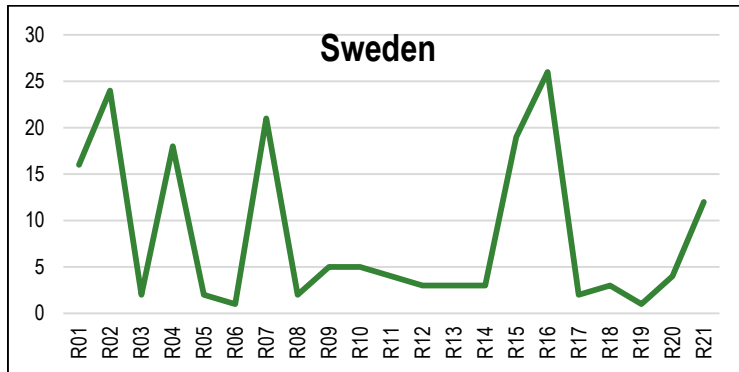|	Rank	Score
OEQS 2016..3 ....…............................... 8.33		

Sweden (chart)

	Rank	Value
I01. ISO 9001 Certified Organizations *1 .... 16......0.51581		
I02. Organizations Recognized by Quality Awards *1 ..... 24......0.00000		
I03. International Academy for Quality Members *1 .... 2......0.00052		
I04. Certified Quality Professionals *1............................. 18......0.01032		
I05. Indexed Quality Papers Published *1.......................... 2......0.17854		
I06. Universities in International Research Rankings *1.... 1......0.00114		
I07. OECD PISA Test Results *2 .... 21.............478		
I08. Lifelong learning *3.. 2.............29.4		
I09. Healthy Life Expectancy *4 .... 5...............72		
I10. At Birth Mortality Rate *3.. 5.............2.4		

	Rank	Value
I11. Global Competitiveness Index *5 .... 4............5.43		
I12. Gross Domestic Product *6 .... 3...58,898.93		
I13. Gini Index *3 .... 3.............25.4		
I14. People at Risk of Poverty and Social Exclusion *3 ..... 3............16.9		
I15. Environmental Wellbeing Results *5 .... 19............3.57		
I16. Ecological Footprint *7.. 26............7.25		
I17. Global Innovation Index *5 .... 2..........62.40		
I18. Ease of Doing Business Results *8............................ 3..........81.72		
I19. Quality of Life *5 .... 1..............8.0		
I20. Job Satisfaction *5 .... 4.............7.7		
I21. Unemployment Rate *3.. 12.............8.0		

*1 per 1,000 inhabitants; *2 math score; *3 percentage; *4 age; *5 score; *6 US dollars; *7 gha pc; *8 distance to frontier

Analysis

Sweden belongs to the top 10 countries in 14 out of 21 EQS indicators, and does get its top relative positions (top 3) regarding Universities in International Rankings, Quality of Life, IAQ Members, Lifelong Learning, Global Innovation Index, Gross Domestic Product, Gini Index, People at Risk of Poverty and Social Exclusion, and Ease of Doing Business Results, and the worst ones (19th to 26th) correspond to Environmental Wellbeing Results, OECD PISA Test Results and Ecological Footprint.
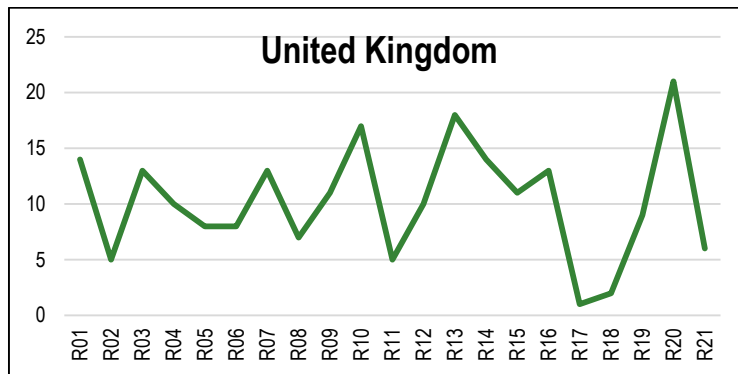
UNITED KINGDOM

Capital:................London   Population (2014):.......64,510,376   Quality group: ....LEADING

	Rank	Score
OEQS 2016..	6	10.20

United Kingdom

	Rank	Value
I01. ISO 9001 Certified Organizations *1	14	0.62316
I02. Organizations Recognized by Quality Awards *1	5	0.00842
I03. International Academy for Quality Members *1	13	0.00003
I04. Certified Quality Professionals *1..............................	10	0.01857
I05. Indexed Quality Papers Published *1..........................	8	0.12700
I06. Universities in International Research Rankings *1....	8	0.00057
I07. OECD PISA Test Results *2	13	494
I08. Lifelong learning *3...	7	15.7
I09. Healthy Life Expectancy *4	11	71.4
I10. At Birth Mortality Rate *3..	17	3.5

	Rank	Value
I11. Global Competitiveness Index *5	5	5.43
I12. Gross Domestic Product *6	10	46,296.98
I13. Gini Index *3	18	31.6
I14. People at Risk of Poverty and Social Exclusion *3 ...	14	24.1
I15. Environmental Wellbeing Results *5	11	4.10
I16. Ecological Footprint *7...	13	4.94
I17. Global Innovation Index *5	1	64.42
I18. Ease of Doing Business Results *8............................	2	82.46
I19. Quality of Life *5	9	7.3
I20. Job Satisfaction *5	21	7.0
I21. Unemployment Rate *3...	6	6.3

*1 per 1,000 inhabitants; *2 math score; *3 percentage; *4 age; *5 score; *6 US dollars; *7 gha pc; *8 distance to frontier

Analysis

The United Kingdom belongs to the top 10 countries in 11 out of 21 EQS indicators, and does get its top relative positions (top 5) regarding Global Innovation Index, Ease of Doing Business Results and Organizations Recognized by Quality Awards, and the worst ones (17th to 21st) correspond to Birth Mortality Rate, Gini Index and Job Satisfaction.

ANNEXES

ANNEX 1: DATA SOURCES AND INDICATOR DETAILS

The data used in this report is the most current available information on June 30th of 2016, coming from the different databases considered. In the following table we will provide a detailed description for each indicator, including computations made and the corresponding data sources.

Indicator		Definition	Year	Interpretation
Organizations	Number of ISO 9001 Certified Organizations	Number of valid ISO 9001 certificates divided by each country's total population (all residents)	2014	This indicator reflects how many companies are committed with quality standards, specifically ISO 9001, which is an international reference for certification of quality management systems. This number is the response of an annual study that is dependent on certification bodies' feedback and stimulus.
		Source: International Organization for Standardization (ISO), http://www.iso.org/iso/iso-survey		
	Number of Organizations Recognized by Quality Awards	Total number of organizations that have an updated recognition according to the EFQM Model of Excellence divided by each country's total population (all residents)	2016	This indicator shows how many companies are committed with the recognized use of the EFQM model of excellence.
		Source: European Foundation for Quality Management (EFQM), http://www.shop.efqm.org/recognition-database/		
Professionals	Number of International Academy for Quality Members	Total number of IAQ members (including the different types of IAQ membership) divided by each country's total population (all residents)	2016	This indicator highlights the number of recognized quality professionals, at thelevel of the International Academy for Quality, a well known worldwide leading organization.
		Source: International Academy for Quality (IAQ), http://www.iaqweb.net/membership/members-list/		
	Number of Certified Quality Professionals	Total number of certified quality professionals recognized as such by the following organizations: International Register of Certified Auditors (IRCA), American Society for Quality (ASQ), European Organization for Quality (EOQ), and European Foundation for Quality Management (EFQM) divided by each country's total population (all residents)	2016	This indicator shows the number of individuals that hold certificates provided by recognized international organizations (IRCA, ASQ, EOQ and EFQM).
		Source: International Register of Certified Auditors (IRCA), https://www.quality.org/content/find-irca-auditor; American Society for Quality (ASQ), https://asq.org/; European Organization for Quality (EOQ), http://www.eoq.org/the_eoq_personnel_registration_unit_eoq_pru/search_for_eoq_certificate_holders.html; and European Foundation for Quality Management (EFQM), http://www.shop.efqm.org/participants-database/;%20http:/www.efqm.eu/what-we-do/training		

		The sum of indexed quality papers published in Scopus and ISI that have keywords in their abstract, title or keywords that were considered to be related with quality research activities divided by each country's total population (all residents)	2006 to 2015	This indicator mirrors the research on quality field in each country through international scientific publications that are indexed to important scientific journals, reflecting their quality, and have at least one of the following keywords: quality management, quality improvement, quality engineering, quality culture, quality tools, quality goals, quality function deployment, design for six sigma, six sigma, process improvement, statistical process control, statistical quality control, design of experiments or total quality management.
Research	Number of Indexed Quality Papers Published			
		Source: Scopus, https://www.scopus.com/search/form.uri; Web of Knowlegde (ISI), http://apps.webofknowledge.com/		
	Number of Universities in International Research Rankings	The number of universities that do show up in the Shanghai ranking top 500 higher education institutions divided by each country's total population (all residents)	2015	This indicator provides an overview of quality in higher education and particularly of research conducted in each country, according to how universities are ranked and belong to the top 500 performances.
		Source: Shanghai Ranjing, http://www.shanghairanking.com/		
Education	OECD PISA Test Results	Mathematics score in the PISA results (a test aimed at evaluating the knowledge and skills of 15 years old students, carried out by OECD)	2012 *	This indicator allows to understand how young people are prepared to face the challenges ahead and provides a measurement of quality education performance achieved in each country.
		Source: Organisation for Economic Co-operation and Development, http://www.oecd.org/pisa/keyfindings/		
	Lifelong Learning	The percentage of people (higher education students and adults) between 25 and 64 years of age that received education or training in the four weeks before the Eurobarometer survey was conducted	2015	This indicator shows how often people (after completion of formal education) participate in learning activities and training programs throughout life, becoming better prepared to handle knowledge society challenges and opportunities.
		Source: Eurostat, http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=tsdsc440		
Health	Healthy Life Expectancy	The expected number of years of life, under healthy conditions, without diseases and/or injuries that result in incapacity or less health	2015	This indicator monitors the health conditions of the population, taking into account quality of life issues and reflecting also quality in healthcare across the different countries.
		Source: World Heath Organization (WHO), http://apps.who.int/gho/data/node.main.HALE		
	At Birth Mortality Rates	The number of deaths of infants (under one year of age) per 1000 live births	2015	This indicator is a good characterizer for each society health's state, focused on the well-being and practices at a specific group (newborns), and reflecting also quality in healthcare across the different countries.
		Source: World Bank, http://data.worldbank.org/indicator/SP.DYN.IMRT.IN		

Competitiveness	Global Competitiveness Index	The Global Competitiveness Index scores according to the World Economic Forum (WEF), after taking into account several dimensions and metrics that are combined together	2015 – 2016	This indicator shows how a country is being able to be more or less competitive, when compared with others, according to the WEF reports and rankings.
		Source: World Economic Forum (WEF), http://reports.weforum.org/global-competitiveness-report-2015-2016/		
	Gross Domestic Product	A macroeconomic indicator that measures the expenditure on final goods and services provided by all resident producers	2014 *	This indicator reflects the economic performance of a country, in terms of wealth produced per capita.
		Source: World Bank, http://data.worldbank.org/indicator/NY.GDP.MKTP.CD		
Social Cohesion	Gini Index	The degrees of inequality and dispersion of the distribution of income across families and individuals	2014	This indicator measures the income distribution and inequalities across people and families at any given country.
		Source: Eurostat, http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_di12		
	People at Risk of Poverty and Social Exclusion	The percentage of persons that are in risk of poverty and social exclusion according to a multidimensional approach that takes into account several dimensions	2014	The three dimensions considered in the risk of poverty and social exclusion are monetary poverty, material deprivation and low work intensity, reflecting societal quality from the point of view of social cohesion and capability to provide minimum quality of life standards to all people.
		Source: Eurostat, http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=t2020_50		
Sustainability	Environmental Wellbeing Results	An aggregated evaluation of overall environmental performance through the analysis of environmental indicators and the ecosystem in which we live in.	2014	This indicator is one of the dimensions monitored by SSF, dealing with the levels of sustainability for countries around the world.
		Source: Sustainable Society Foundation (SSF), http://www.ssfindex.com/		
	Ecological Footprint	The demand on nature regarding how much area of resources are being used	2012 *	This indicator measures the demand on nature and it provides an overall perspective about sustainability from a resources perspective and the human impact on Earth. The ecological footprint is intrinsically related with the biocapacity to regenerate what is being demanded from the Earth.
		Source: Footprint Network, http://www.footprintnetwork.org/en/index.php/GFN		

Innovation and entrepreneurship	Global Innovation Index	The overall innovation performance (including both drivers and results, as well as innovation as applied to organizations, products, services and processes) measured by the GII ranking	2015	This indicator helps to understand how countries are dealing in terms of innovation challenges and performances, taking into account that Innovation is straightly related with new methods, products, processes and services, aimed at creating value through adaptation and anticipation of changes.
		Source: Global Innovation Index (GII), https://www.globalinnovationindex.org/about-gii#reports		
	Ease of Doing Business Results	The regulatory environment and bureaucracy according to several metrics that allow to measure efficiency in company creation and development, leading to an international ranking driven by how difficult or easy it is to do business	2016	This indicator is provided by the World Bank and allows to compare countries according to business regulations, laws and environments, de fining how easy or difficult it easy for doing business and how business friendly countries end up being.
		Source: World Bank, http://www.doingbusiness.org/reports/global-reports/doing-business-2016		
Satisfaction	Quality of Life	The perceived quality of life satisfaction, as expressed by citizens, in terms of their overall levels of satisfaction reached	2013	This indicator provides a way to understand how people assess and evaluate their life in several domains, resulting in a perceived wellbeing result, translating quality of life into overall life satisfaction scores obtained from surveys. .
		Source: Eurostat, http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_pw01&lang=en		
	Job Satisfaction	The perceived satisfaction with job for all the persons surveyed	2013	This indicator assesses the satisfaction with job of each person that was surveyed, according to their individual situation and preferences.
		Source: Eurostat, http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_pw01&lang=en		
	Unemployment Rate	The percentage of total labor force that is unemployed but actively looking for a paid job and ready to work within the scope of the population that is in working-age	2014	Unemployment is also usually related with low levels for perceived quality of life satisfaction, and corresponds to not making the best use of available human capital at any given country.
		Source: World Bank, http://data.worldbank.org/indicator/SL.UEM.TOTL.ZS		
World Population		A country's total population (all residentes)	2014	The population associated wth each country, according to the World Bank statistics.
		Source: World Bank, http://data.worldbank.org/indicator/SP.POP.TOTL		

* For Malta, the years used were 2010 for OECD PISA Test Results, 2013 for the Gross Domestic Product and 2008 for Ecological Footprint.

ANNEX 2: EQS SCALED DATA

ENABLERS DIMENSIONS

	Organizations		Professionals		Research		Education		Health	
	ISO 9001 Certified Organizations	Recognized Organizations	IAQ Members	Certified Quality Professionals	Indexed Quality Papers	Universities in International Rankings	PISA Results	Lifelong Learning	Healthy Life Expectancy	Birth Mortality Rate
	(per 1,000 inhabitants)	(per 1,000 inhabitants)	(per 1,000 inhabitants)	(per 1,000 inhabitants)	(per 1,000 inhabitants)	(per 1,000 inhabitants)	(math score)	(percentage)	(age)	(percentage)
	I 01	I 02	I 03	I 04	I 05	I 06	I 07	I 08	I 09	I 10
Austria	0.49364	0.01453	0.00012	0.09608	0.12561	0.00070	506	14.4	72.0	2.9
Belgium	0.32659	0.00624	0.00000	0.02441	0.12240	0.00062	515	6.9	71.1	3.3
Bulgaria	0.79320	0.00014	0.00000	0.00678	0.01564	0.00000	439	2.0	66.4	9.3
Croatia	0.66228	0.00000	0.00000	0.00590	0.10122	0.00000	471	3.1	69.4	3.6
Cyprus	0.23924	0.00607	0.00000	0.01560	0.06761	0.00000	440	7.5	71.3	2.5
Czech Republic	1.25864	0.00095	0.00000	0.03359	0.04900	0.00010	499	8.5	69.4	2.8
Denmark	0.30002	0.00142	0.00018	0.00479	0.15249	0.00089	500	31.3	71.2	2.9
Estonia	0.78256	0.00076	0.00000	0.01675	0.07308	0.00000	521	12.4	68.9	2.3
Finland	0.48485	0.00494	0.00092	0.01611	0.14825	0.00110	519	25.4	71.0	1.9
France	0.43986	0.00189	0.00002	0.01281	0.04966	0.00033	495	18.6	72.6	3.5
Germany	0.68443	0.00340	0.00007	0.08985	0.09220	0.00048	514	8.1	71.3	3.1
Greece	0.49700	0.00557	0.00018	0.00675	0.07839	0.00018	453	3.3	71.9	3.6
Hungary	0.70252	0.00679	0.00030	0.00456	0.03113	0.00020	477	7.1	67.4	5.3
Ireland	0.44811	0.00672	0.00022	0.20357	0.18015	0.00065	501	6.5	71.5	3.0
Italy	2.75465	0.00143	0.00003	0.00489	0.05126	0.00033	485	7.3	72.8	2.9
Latvia	0.50293	0.00000	0.00000	0.00703	0.04874	0.00000	491	5.7	67.1	6.9
Lithuania	0.41580	0.00034	0.00000	0.00171	0.06691	0.00000	479	5.8	66.0	3.3
Luxembourg	0.26975	0.00899	0.00000	0.06834	0.15825	0.00000	490	18.0	71.8	1.5
Malta	1.09030	0.00000	0.00000	0.01638	0.06785	0.00000	463	7.2	71.7	5.1
Netherlands	0.61902	0.00071	0.00012	0.01448	0.16417	0.00071	523	18.9	72.2	3.2
Poland	0.25287	0.00029	0.00000	0.00774	0.02190	0.00005	518	3.5	68.7	4.5
Portugal	0.77000	0.00385	0.00029	0.00846	0.11734	0.00029	487	9.7	71.4	3.0
Romania	0.95359	0.00000	0.00005	0.03917	0.05997	0.00000	445	1.3	66.8	9.7
Slovakia	0.84968	0.00055	0.00000	0.01126	0.04669	0.00000	482	3.1	68.1	5.8
Slovenia	0.81078	0.01067	0.00000	0.04364	0.15517	0.00000	501	11.9	71.1	2.1
Spain	0.77589	0.02715	0.00000	0.01892	0.08307	0.00028	484	9.9	72.4	3.5
Sweden	0.51581	0.00000	0.00052	0.01032	0.17854	0.00114	478	29.4	72.0	2.4
United Kingdom	0.62316	0.00842	0.00003	0.01857	0.12700	0.00057	494	15.7	71.4	3.5

RESULTS DIMENSIONS

	Competitiveness		Social Cohesion		Sustainability		Innovation and Entrepreneurship		Satisfaction		
	Global Competitiveness Index	Gross Domestic Product	Gini Index	Risk of Poverty and Social Exclusion	Environmental Wellbeing	Ecological Footprint	Global Innovation Index	Ease of Doing Business	Quality of Life	Job Satisfaction	Unemployment Rate
	(score)	(US dollars)	(percentage)	(percentage)	(score)	(gha pc)	(score)	(distance to frontier)	(score)	(score)	(percentage)
	I 11	I 12	I 13	I 14	I 15	I 16	I 17	I 18	I 19	I 20	I 21
Austria	5.12	51122.43	27.6	19.2	3.93	6.06	54.07	78.38	7.8	8.0	5.0
Belgium	5.20	47327.62	25.9	21.2	2.28	7.44	50.91	72.50	7.6	7.5	8.5
Bulgaria	4.32	7851.27	35.4	40.1	4.33	3.32	42.16	73.72	4.8	6.0	11.6
Croatia	4.07	13475.26	30.2	29.3	4.85	3.92	41.70	72.71	6.3	7.0	16.7
Cyprus	4.23	27194.39	34.8	27.4	3.94	4.20	43.51	71.78	6.2	7.2	15.6
Czech Republic	4.69	19502.42	25.1	14.8	3.04	5.19	51.32	73.95	6.9	7.4	6.2
Denmark	5.33	60718.39	27.7	17.9	3.75	5.51	57.70	84.40	8.0	8.1	6.6
Estonia	4.74	20147.78	35.6	26.0	2.68	6.86	52.81	79.49	6.5	7.3	7.7
Finland	5.45	49842.71	25.6	17.3	3.26	5.87	59.97	81.05	8.0	8.1	8.6
France	5.13	42725.74	29.2	18.5	3.40	5.14	53.59	75.96	7.1	7.2	9.9
Germany	5.53	47773.94	30.7	20.6	3.13	5.30	57.05	79.87	7.3	6.9	5.0
Greece	4.02	21672.67	34.5	36.0	3.80	4.38	40.28	68.38	6.2	6.1	26.3
Hungary	4.25	14026.57	28.6	31.8	4.69	2.92	43.00	72.57	6.1	7.1	7.8
Ireland	5.11	54339.32	30.8	27.6	3.39	5.57	59.13	79.15	7.4	7.2	11.6
Italy	4.46	35222.76	32.4	28.3	4.29	4.61	46.40	72.07	6.7	7.0	12.5
Latvia	4.45	15692.19	35.5	32.7	4.63	6.29	45.51	78.06	6.5	7.3	10.0
Lithuania	4.55	16489.73	35.0	27.3	4.30	5.83	42.26	78.88	6.7	7.5	11.3
Luxembourg	5.20	116612.88	28.7	19.0	2.53	15.82	59.02	68.31	7.5	7.5	6.1
Malta	4.39	22776.19	27.7	23.8	3.84	4.38	50.48	63.70	7.1	7.5	5.9
Netherlands	5.50	52138.68	26.2	16.5	2.34	5.28	61.58	75.94	7.8	7.7	6.9
Poland	4.49	14336.80	30.8	24.7	3.81	4.44	40.16	76.45	7.3	7.3	9.2
Portugal	4.52	22124.37	34.5	27.5	4.61	3.88	46.61	77.57	6.2	7.0	14.2
Romania	4.32	10000.00	34.7	39.5	5.38	2.71	38.20	73.78	7.2	7.1	7.0
Slovakia	4.22	18500.66	26.1	18.4	4.59	4.06	42.99	75.62	7.0	7.2	13.3
Slovenia	4.28	24001.90	25.0	20.4	4.33	5.81	48.49	75.62	7.0	7.3	9.5
Spain	4.59	29721.60	34.7	29.2	4.01	3.67	49.07	74.86	6.9	6.9	24.7
Sweden	5.43	58898.93	25.4	16.9	3.57	7.25	62.40	81.72	8.0	7.7	8.0
United Kingdom	5.43	46296.98	31.6	24.1	4.10	4.94	62.42	82.46	7.3	7.0	6.3

ANNEX 3: EQS TABLE OF RANKED DATA

The following table presents the ranking positions (usually 1 to 28) achieved by each of the 28 European Union countries (table lines), according to the corresponding 21 EQS indicators (table columns). Whenever ties were obtained, the best ranking position was shared for all the tied countries (e.g. since there are 14 European Union countries having IAQ members, all countries without any IAQ members were assigned position 15th in the corresponding indicator (I03)).

	I 01	I 02	I 03	I 04	I 05	I 06	I 07	I 08	I 09	I 10	I 11	I 12	I 13	I 14	I 15	I 16	I 17	I 18	I 19	I 20	I 21
Austria	19	2	9	2	9	5	7	8	5	9	10	6	8	9	14	23	9	9	4	3	1
Belgium	24	8	15	8	10	7	5	19	16	15	7	9	5	12	28	27	13	23	6	6	13
Bulgaria	7	23	15	22	28	18	28	27	27	27	22	28	26	28	7	3	24	20	28	28	20
Croatia	13	24	15	24	12	18	23	25	19	20	27	26	14	23	2	6	25	21	23	21	26
Cyprus	28	9	15	14	18	18	27	15	13	6	25	14	24	18	13	8	20	25	24	15	25
Czech Republic	2	17	15	7	23	16	11	13	19	7	13	20	2	1	24	15	12	18	17	10	5
Denmark	25	16	7	26	6	3	10	1	15	9	6	2	9	5	18	18	7	1	1	1	7
Estonia	8	18	15	11	16	18	2	9	21	4	12	19	28	16	25	25	11	6	21	11	10
Finland	20	11	1	13	7	2	3	3	18	2	3	7	4	4	22	22	4	4	1	1	14
France	22	14	14	16	22	10	12	5	2	17	9	11	13	7	20	14	10	13	13	15	17
Germany	12	13	10	3	13	9	6	14	13	13	1	8	15	11	23	17	8	5	9	25	1
Greece	18	10	6	23	15	15	25	24	7	20	28	18	20	26	17	9	26	26	24	27	28
Hungary	11	6	3	27	26	14	22	18	24	24	24	25	11	24	3	2	21	22	27	19	11
Ireland	21	7	5	1	1	6	8	20	10	10	11	4	16	20	21	19	5	7	8	15	20
Italy	1	15	12	25	21	11	17	16	1	9	18	12	19	21	10	12	18	24	19	21	22
Latvia	17	24	15	21	24	18	14	22	25	26	19	23	27	25	4	24	19	10	21	11	18
Lithuania	23	21	15	28	19	18	20	21	28	15	15	22	25	17	9	21	23	8	19	6	19
Luxembourg	26	4	15	4	4	18	15	6	8	1	8	1	12	8	26	28	6	27	7	6	4
Malta	3	24	15	12	17	18	24	17	9	23	20	16	9	13	15	9	14	28	13	6	3
Netherlands	15	19	8	15	3	4	1	4	4	14	2	5	7	2	27	16	3	14	4	4	8
Poland	27	22	15	20	27	17	4	23	22	22	17	24	16	15	16	11	27	12	9	11	15
Portugal	10	12	4	19	11	12	16	12	11	10	16	17	20	19	5	5	17	11	24	21	24
Romania	4	24	11	6	20	18	26	28	26	28	21	27	22	27	1	1	28	19	12	19	9
Slovakia	5	20	15	17	25	18	19	25	23	25	26	21	6	6	6	7	22	15	15	15	23
Slovenia	6	3	15	5	5	18	8	10	16	3	23	15	1	10	8	20	16	15	15	11	16
Spain	9	1	15	9	14	13	18	11	3	17	14	13	22	22	12	4	15	17	17	25	27
Sweden	16	24	2	18	2	1	21	2	5	5	4	3	3	3	19	26	2	3	1	4	12
United Kingdom	14	5	13	10	8	8	13	7	11	17	5	10	18	14	11	13	1	2	9	21	6

ANNEX 4: QUALITY EXPERTS THAT REPLIED TO SURVEY

Expert Name	Affiliation
António Ramos Pires	Portuguese Association for Quality
Austin S. Lin	Feigenbaum Medal
Barbara J. Santiano	Feigenbaum Medal
Chris D. FitzGibbon	Feigenbaum Medal
Daniel John Zrymiak	Feigenbaum Medal
Denis Leonard	Feigenbaum Medal
Elizabeth A.F. Cudney	Feigenbaum Medal
Eric Hayler	American Society for Quality
Greg Watson	International Academy for Quality
Jamison V. Kovach	Feigenbaum Medal
Janak Mehta	International Academy for Quality
Jeroen de Mast	Feigenbaum Medal
Lars Sörqvist	International Academy for Quality
Pal Molnar	International Academy for Quality
Parasuraman	International Academy for Quality
Pat La Londe	American Society for Quality
Rajesh Jugulum	Feigenbaum Medal
Sarsfield Cabral	University of Porto
Torolf Paulshus	European Organization for Quality