

Construction and validation of an international reputation index: the European case

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The purpose of this paper is to create an index to measure the reputation of countries that belong to the European Union. Data for 28 countries has been taken from the Eurostat database and the method used is principal component analysis. The index is a combination of five different dimensions: (1) Economy, (2) Social Welfare, (3) Environment, (4) Digitalization and (5) Sports and Health, along with thirty-two distinct factors. The top scores in this index are Germany, United Kingdom or Sweden with high values in Economy or Environment. On the other side, we find Greece, Croatia or Cyprus, with a low process of digitalization. The International Reputation Index could be used to assist public policies designed to improve reputation in countries where it is needed.

Keywords:

international reputation index,
principal component analysis,
reputation ranking

Introduction

In an increasingly globalised world, a country's reputation is a very important aspect in many dimensions. Reputation serves an important role when nations compete for foreign investments, tourism, and trade, and it is also a critical element in public relations and diplomacy (Yang et al. 2008). In fact, currently, countries are ever more concerned about their reputation and aim to energetically manage and measure it, to gain a competitive advantage (Passow et al. 2005). The number of countries that consider their reputation, image, and brand as serious strengths and as supports for their success in the long term is increasing.

The current globalisation process has caused countries to be fully aware of the way they are depicted because of the significant competition among nations in every industry, market, and aspect of a consumer society (Stock 2009, Saunders 2008,

Avraham–Ketter 2008, Dinnie 2007, Skinner–Kubacki 2007, Anholt 2002, 2007, Olins 2002). A nation's image is important for many reasons, such as self-perception and economic and political reasons, both intra- and internationally (Avraham–Ketter 2008, Dinnie 2007, Anholt 2006, 2005, Fan 2006, Gertner–Kotler 2004, Gilmore 2002). A country's reputational capital could impact its capacity to shape alliances and agreements with other countries (Nye 2004), to affect consumer perceptions and purchase choices among international and national brands (Papadopoulos–Heslop 1993, Jeffe–Nebenzahl 2001), and to attract international investments and tourism (Kotler–Gertner 2002, Tapachai–Waryszak 2000). The status of a country's reputation has convinced policymakers, governments, and society to take significant steps to market their brand and image.

It is always beneficial to improve current measurements that can serve as good assessments of the position of different countries, and based on these measurements, to be able to make different decisions. The importance of an index of such international magnitude will drive how countries allocate resources to improve their 'brand', which, when looking at the different elements that can be affected by a reputation index, can be a determinant in the decisions of a large percentage of the world population. This compels governments to form teams focused on selling the different positive aspects of a country, as well as to improve the different qualities that people are seeking, without forgetting their citizens, who will act as a reference of opinion regarding the various changes accomplished. Therefore, each country's inhabitants will be responsible for measuring the value of those changes.

There are several measurements assessing the image or reputation of countries worldwide, such as the following indexes: Nation Brand Molecule (Rojas-Mendez 2013), Country Brand Strength (Fetscherin 2010), Nation Brands (Anholt 2005), and Fombrun-RI Country Reputation (Passow et al. 2005). Other institutionalised indexes are the Good Country Index, Global Competitiveness Index, and Country Reprtrak, among others.

We propose a new index to analyse a nation's reputation. Using information on the 28 nations in the European Union, we compute, via a principal components analysis, this International Reputation Index as a mixture of 32 factors grouped in 5 dimensions: Economy, Social Welfare, Environment, Digitalisation, and Sports and Health.

Results show that the top scores in this index (with 2016 data) are Germany, United Kingdom and Sweden. Contrasting these results to other rankings, Country Reprtrak 2016 has as a top 3 comprised of Sweden, Canada and Switzerland. On another hand, the Global Competitiveness Index 2016–2017 has the following top 3: Switzerland, Singapore and United States. The Nation Brand Index for 2017 positions Germany, France and United Kingdom as their top 3, which also equates our results. Finally, the Good Country Index presents Netherlands, Switzerland and Denmark as their top 3.

The rest of this paper is ordered as follows. Section 2 defines the framework utilized for the consideration of the 5 dimensions of the International Reputation Index. Next, section 3 describes the variables used to compute the index. Section 4 presents the methodology used to calculate the index and the following ranking. Section 5 describes results while the final section concludes this paper.

Background

Traditionally, being an economic superpower or having a strong military would have sufficed to ensure a nation's survival and its position on the world stage. However, international relations have experienced a substantial shift and, although these factors are still important, they are not the only ones that establish a country's status and influence.

Country officials and administrations are constantly using branding methods to improve their nation's image worldwide and to create a competitive advantage over other countries. Managing a country's reputation through country branding has gained popularity among both researchers and practitioners (Che-Ha et al. 2016, Pike–Page 2014, Herstein 2012). Different terms have been used to describe this phenomenon, such as destination branding, place marketing, and country or nation branding (Passow et al. 2005).

One of the main reasons to use nation branding methods is rooted in the belief that a robust country brand can yield better results in a nation's sustainable development (Fetscherin 2010, Kleppe–Mossberg 2006). A good global image can improve weak international credibility, increase the nation's political impact, stimulate stronger international agreements and negotiations (Yan 2008), and attract consumers, visitors, businesses, and investors – among other groups – to the country (Morgan et al. 2011, Gudjonsson 2005).

According to Kang and Yang (2010), a nation's reputation refers to the perceptions of a country that are shared by both national and international audiences, based on their own personal experiences with the country, and based on data collected from that nation. Furthermore, Kleppe et al. (2002) state that a nation's image always lies between a personal image, unique to every person, and a public image based on what characteristics, news, and policies of the country are publicly shared. This public image is what can be called reputation (Bromley 1993). Yang et al. (2008) presented through 2 types of individual experience: personal experience and second-hand experience.

On one hand, several researchers have found that individual experience has favourable effects on the awareness of a reputational entity (Yang 2007a, b, Yang–Grunig 2005, Fombrun–van Riel 2003, Grunig–Hung 2002). This increasing awareness could positively affect reputation as a relevant factor when people evaluate a country (Fombrun–van Riel 2003, Deephouse 2000). On another hand, and accord-

ing to Kunczik (1997), people assess multiple aspects of a country, including the nation's economy, people, politics, news, or culture, without a direct experience of these aspects. Instead, their decision-making processes are often done through images of a country.

To achieve a high reputation, nations need to be competitive enough to retain and enhance their resources and to be viewed by their citizens as a place that is able to fulfil their desires and that can provide them with opportunities to improve their skills and enjoy their interests (Morgan et al. 2012, Blichfeldt 2005, Kotler 2004).

National reputation and its impact on a country and its citizens can be examined from two main viewpoints: public diplomacy and nation branding (Yang et al. 2008).

First, from the perspective of public diplomacy, national reputation can be a significant element in international agreements and in achieving a strategic position (Kruckeberg–Vujnovic 2005, Melissen 2005), by developing and enhancing what Nye (2004) calls soft power. The latter is the diplomatic ability obtained through the appeal of a nation's policies, how it treats its citizens, and its collective culture, which can be improved by effective country reputation management. A country's reputation and its relationship with other nations and international stakeholders are, undoubtedly, tools to exercise power, playing a significant role in both public and foreign policy (Wang 2006a, b).

Second, in terms of nation branding, a prominent nation image significantly impacts consumers' perception and willingness to pay for products made in a country. According to Stock (2009), countries should manage their brands to appeal to tourists, to attract foreign investment and talented residents, and to add value to the products it manufactures. Lee (2009) offers a comprehensive literature review on nation branding.

Researchers have analysed several dimensions of nation branding using indexes and models. For example, De Vicente (2004) used four dimensions to analyse country branding: tourism, public diplomacy, export promotion, and investment promotion activities. On the other hand, Gudjonsson (2005) used the following four dimensions: people and culture; politics, structure, government, and policies; economy, industries, companies, and brands; and, geography.

One of the most well-known indexes is the Nation Brands Index (Anholt 2005), which uses six dimensions: exports, governance, investment and immigration, culture and heritage, people, and tourism. Building on Anholt's (2005) research, Johansson (2005) presents an index comprising six dimensions: exports, government policy, citizens, investment and talent, cultural exports, and tourist experience. Amine and Chao (2005) also build on Anholt's (2005) work, presenting the National Brand Pentagon, which focuses on tourism, export brands, foreign policy, investment, and culture.

The Fombrun-RI Country Reputation Index measures 6 dimensions to assess country branding: emotional, physical, financial, leadership, cultural, and social (Passow et al. 2005).

Fetscherin (2010) presented the Country Brand Strength Index, which attempted to measure some aspects of a country's brand strength. It uses five dimensions: Exports, Tourism, Foreign Direct Investment, Immigration, and Government Environment. Finally, Rojas-Méndez (2013) presented Nation Brand Molecule, which comprises seven dimensions: Economy, Geography and Nature, Tourism, Culture and Heritage, Society, Science and Technology, and Government.

Currently, there exist two very important indices that attempt to measure different countries' reputations: Country Reprtrak and The Global Competitiveness Report.

Country Reprtrak is an index computed annually, which, through a series of factors, generates a classification of the different 55 countries that it aims to assess. To obtain the data for the ranking, interviews regarding the different factors are conducted with people from 23 different countries. The factors examined are grouped in three groups: Quality of life, Institutional quality, and Level of development. All the factors have different weights in the index, by which they are multiplied to correctly weight the groups. This index aims to classify the attractive national qualities of each country. The way it measures perceptions of the country is through an indicator. This indicator seeks to capture the interviewees' perceptions of the countries they are asked about. The indicator is based on the respect, trust, and admiration the interviewee has for the different countries. One of the major problems of this index is the manner of obtaining the data, which does not seem to be the most appropriate in terms of reliability; since approximately 56,000 different people are interviewed, subjectivity characterizes the perceptions and, therefore, overall, the data will not be reliable. Further, the number of factors is relatively small for measuring a country's different aspects, and, additionally, the factors chosen result in different aspects not being measured. Therefore, this is an index based on perceptions, which seeks to analyse 55 different countries in a generalised manner. The subjectivity of this index results in the data not fully meeting different investors' reliability requirements.

The Global Competitiveness Report is a very prestigious index, computed by the companies at the World Economic Forum. This index gathers data from 138 economies and seeks to measure both their productivity and prosperity. The factors used in this index, are completely different than those of Country Reprtrak. They belong to three different groups, according to the type of economy that the factor affects. In total, the index uses 12 factors to measure the most important aspects of a country. This index focuses on the economic area of the countries, which involves different types of data and, therefore, constitutes a great reference for investors, if they want to analyse each country's economic aspects. The index shows the different economic aspects of 138 countries. It is published by a prestigious company investi-

gating countries' economic aspects, and can provide a large utility as a great reference for investors trying to determine a country's economic vision. However, it does not cover different aspects such as digitalisation, the environment, and the policies a government imposes on its citizens. This makes this index incomplete as an indicator, since an investor seeks the greatest possible information on a country, looking for factors that cover the maximum number of aspects of that country.

Below, we present our index, which comprises five dimensions.

Data

Our index is based on 32 different factors grouped in 5 dimensions.

Through the Economy dimension, the index seeks to encapsulate all the elements associated with the way a nation manages its resources (Rojas-Mendez 2013). On one hand, tourism is usually the most marketed facet of a country's image (Anholt 2005). On the other hand, news about economic health and policies are significant communication tools for positioning national and international brands (Gudjonsson 2005). Brands that are exported are an influential aspect of a country's brand. Positioning a national brand creates a positive association in consumers, representing a nation's uniqueness and its attractive characteristics. Exported brands reflect the area in which the country is well-known (Che-Ha et al. 2016).

The Social Welfare dimension seeks to bring together several aspects of the lifestyle of a country's citizens, the type of government at a given time, and the benefits this government provides to its citizens (Gotelli 2017). We also measured the educational system, since it can serve as a reference for the future performance of a country (Miranda 2008, Bara 2018). The characteristics of the people and the environment in which they live are some of the most significant parts of a nation's image, brand and reputation. It is essential to study the country's character, customs, and culture and to understand how they can be used to improve the country's brand (Gudjonsson 2005).

The Environment dimension seeks to combine the different aspects that reflect the country's commitment to the environment (Hernández-Contreras 2018). Some of the most influential elements of a nation's characteristics and how these are perceived are its climate, the way it protects the environment, and how cities are portrayed in the world and how they are run (Gudjonsson 2005). A nation can attempt to solve its environmental issues by obtaining assistance and consideration at a global stage. Nations advancing their social responsibility by adhering to environmental causes and using moral and social advertising can attract global attention and aid (Che-Ha et al. 2016).

The Digitalisation dimension seeks to combine both the ability of citizens to have a more digitalised lifestyle and a country's existing facilities for accessing the

internet (Blaya et al. 2017). This dimension allows measuring a country's predisposition towards and adaptation to new technologies.

The last dimension is called Sports and Health and seeks to represent how active and healthy a country's citizens are (Requena 2017). Human capital is one of the most influential communication device in branding a country. Citizens become national ambassadors and produce an image for their country – positive or negative – especially famous individuals, such as celebrities, politicians, and international athletes. This can impact societal sensitivities towards a country by improving its favourable image (Che-Ha et al. 2016).

The data platform from which we have been able to obtain the data for each of the factors is EUROSTAT (2016); we also employed some data from OECD (2016).

Economy

This dimension comprises 10 factors related to a country's economy: *GDP*; *Moody rating*; *Imports and Exports*; the Harmonized Index of Consumer Prices (*HICP*), to measure the reliability of the economy; *Air transport of goods*, measured as tons of cargo carried by aircraft; *Air transport services*, measured as the number of passengers being transported; *Domestic Material Consumption (DMC)*; *Housing prices*; *Government earnings*, measured as a percentage of GDP; and, *Government Debt*, measured as a percentage of GDP.

Social Welfare

This dimension groups 11 factors related to a country's social welfare: *Employment rate*; *Transport and infrastructure*, measured as investment in public transport; *Retirement support*, measured as the employment rate of people between 55 and 65 years old; *Population projection for 2020-2040*; *Social protection*, measured as governmental expenses on social protection programs; *Social exclusion and poverty risk*, measured as the increase, from 2008 to 2016, in the population affected by poverty or social exclusion problems; *Research and development*, measured as a percentage of the government's total investment in research and development; *e-government*, measured as the ability of citizens to interact with public authorities through the internet; *Education*, measured as the percentage of the population with only a secondary education; *Average wage of workers*; and, *Ratio of pension to salary*.

Environment

This dimension is composed of 3 variables related to energy consumption and environmental protection: *Sustainable energy*, measured by the 2016 Trilema Index value;

Environment protection, measured as CO₂ emissions of new cars; and, *Consumption of renewable energy*, measured as the percentage of renewable energy consumed compared to the total energy consumed.

Digitalisation

This dimension is formed by 4 variables related to digitalisation: *Employees in the technology sector*, measured as the percentage of all employees in the country who work in media or high-tech businesses; *Employees who work in science or technology*, measured as the percentage of employees working in a science or technology field; *E-commerce*, measured as the percentage of individuals between 16 and 74 years old who use the internet to purchase goods and services; *Skills within the digital world*, measured as the percentage of people with sufficient digital skills to handle societal situations.

Sports and Health

Finally, this dimension combines 4 factors related to health and sports: *Sports Expenditure*, measured as sports' sector costs; *Work in sports*, measured as the employment rate within the sports sector; *Health expenditure*, measured as the percentage of GDP allocated to the health sector; and, *Life expectancy*, measured as women's life expectancy.

Methodology

In the construction of all kinds of indices, an analysis is conducted, through which the researcher decides what weights to assign to each factor in the index. To do this, he or she must take into account the number of factors used in the index (Delbianco 2019, Valkó et al. 2017). In our case, the index consists of 32 factors, comprising the different dimensions. The 32 factors to analyse are grouped in five different dimensions, shown in Table 1 below.

Table 1

Factors of the Reputational Ranking of countries in the European Union

Dimension	Number	Factor	Meaning
Economy	1	GDP	Country GDP
	2	Moody's Rating	Company that rates the economy of the different countries
	3	Outside marketing	Imports and exports
	4	Reliability of the economy	HICP factor for comparisons with inflation
	5	Air transport of goods	Tons of cargo carried by aircraft
	6	Air transport services	Number of passengers carried by companies
	7	Productivity of treated materials	Size of governmental subsidies per kg of matter (Euros)
	8	Housing prices	Housing price increase compared to 2015
	9	Government earnings	Percentage of GDP
	10	Government debt	Government debt as a percentage of GDP
Social Welfare	11	Employment rate	Employment rate
	12	Transport and infrastructure	Percentage of public transport use
	13	Employment rate of people aged 55–65	Ability of companies to support workers near their retirement
	14	Population projection	Projected population change from 2020 to 2040, based on the changes in cities' populations
	15	Social protection	Number of social protection beneficiaries in millions
	16	Risk of poverty or social exclusion	Change compared to 2008
	17	Research and development	Percentage of the government's total budget, and percentage of government investment
	18	E-government	Citizens' ability to interact with public authorities through the internet
	19	Population with only secondary education	Percentage of young people who do not continue their studies after secondary school
	20	Average wage of workers	Average wage
	21	Ratio of pension to salary	Relationship between the salary of a pensioner compared to his or her salary before retirement
Environment	22	Sustainable energy	2016 Trilema Index
	23	Environmental protection	Emissions of new cars
	24	Consumption of renewable energy	2020 goal: percentage of renewable energy in the consumed total
Digitalisation	25	Employees in the technology sector	Percentage of all employees in the country who work in media or high-tech
	26	Employees working in science or technology	Percentage of employees working in science or technology
	27	E-commerce	Percentage of individuals between 16 and 74 years old who use the internet to purchase goods and services
	28	Skills in the digital world	Percentage of people with sufficient skills to handle within the world of basic digital
Sports and Health	29	Sports Expenditure	Costs in the sport' sector; growth compared to 2015
	30	Employment in sports	Result of survey conducted to determine the employment within the sport sector
	31	Health expenditure	Percentage of GDP allocated to the health sector
	32	Life expectancy	Women's life expectancy

For the construction of the International Reputation Index, a Principal Component Analysis (hereinafter referred to as PCA) will be used to choose the variables and weights, according to the methodology described in the OECD handbook (OECD 2008). PCA is a statistical technique that allows the extraction of significant information from a multivariate table and its subsequent representation as a set of main components. These components are a linear combination of the original variables and are constructed according to their order of importance in terms of the total variability they capture from the sample. It is a widely used method in the literature (e.g. Fernandez-Crehuet et al. 2019, 2017, 2016, Jemmali–Sullivan 2014, Bellido et al. 2011).

The objectives of this method are:

- a) to reduce the dimensionality of multivariate data through a number of main components that are fewer than the number of original variables
- b) to eliminate redundant information by reducing the impact of information redundancy, by not taking into account the accumulation of covariance among the primitive variables
- c) to capture, in the new components, part of the total variance, with a minimum loss of information, ensuring the maximum discriminating power between them.

One of the requirements for a correct application of PCA is that variables must be measured on the same scale. There are several methods for normalising data, which include the use of the range of observations, standardisation, distance from or to a reference, or indicators for below or above the mean (OECD 2008). We select standardisation as our method of normalisation, which uses each variable's z-scores. Using the mean (μ) and standard deviation (σ) of each variable, we find the z-score value through the formula $z = \frac{X - \mu}{\sigma}$ (where 'X' is the value of the variable).

Following Spector (1992), we set the minimum number of variables per dimension to 3, taking into account that 3 elements per category must be regarded as a minimum and not as optimal. All the established groups have at least 3 elements, so this requirement is adhered to.

To assign weights to the variables, we identify the main components for every dimension. To choose the number of components, we apply several criteria, based on OECD (2008):

1. Components whose individual values (or self-values) are greater than 1.
2. Components that individually explain more than 10% of the variance.
3. Components presenting an accumulated explained variance greater than 60% of the total explained variance.

The number of dimensions is 5 (Economy, Social Welfare, Environment, Digitisation, and Sports and Health).

Second, the factor loads given by PCA (through the matrix of rotated components) are used to allocate the variables to each component, by the highest absolute value of the factor load.

Third, following OECD (2008) in the calculation of the index, a matrix is constructed with the squared factor load values. Then, all factors are added to the square of each component and the squared factor loads are divided by the sum. This results in the indicator's percentage of the total unit variance.

As a final step, using the proportion of variation that each component can account for, we correct the squared factor loads of the variables, thus obtaining the final variable weights.

The International Multidimensional Reputation Index

If we look at the relationship between the International Multidimensional Reputation Index and its five components, we observe that the five components are positively related with reputation, which means that a higher level of economy, social welfare, environment, digitalisation and sports and health conditions of a country are all factors related to a better reputation. To compare the different dimensions, different factors have been gathered for each dimension, all of which are normally distributed. We have used the weights obtained from PCA. Furthermore, countries ranking high on our index are also highly ranked in all the components of the index, whereas countries ranking low are also low-ranked in all the components of the index.

Tables A.1, A.3, A.5, A.7, and A.9 in the Appendix present the PCA results on each variable contained within the dimensions of *Economy*, *Social Welfare*, *Environment*, *Digitalisation*, and *Sports and Health*. For the *Economy* dimension (Table A.1), we chose the 4 components with eigenvalues larger than 1. The variation explained by each component exceeds 10% and the components jointly explain 79.8% of the variation. For the *Social Welfare* dimension (Table A.3), we chose the first 3 components, following the same logic as for the last dimension. They are jointly able to explain 64.2% of the variation. For the *Environment* dimension (Table A.5), we chose the first 2 components, able to explain 85.7% of the variation. For the *Digitalisation* dimension (Table A.7), we chose the first 2 components, explaining 92.9% of the variation. For the *Sports and Health* dimension (Table A.9), we chose the first component, as its eigenvalue is larger than unity and it explains more than 10% of the variation, namely, 53.2%.

Factor loadings for the dimensions of *Economy*, *Social Welfare*, *Environment*, *Digitalisation*, and *Sports and Health* are shown in tables A.2, A.4, A.6, A.8, and A.10, respectively. We select the highest factor loading of each variable, and assign the variables to the components as follows: for the *Economy* dimension (Table A.2), the variables *Air transport of goods*, *Air transport services*, and *DMC* are assigned to Component 1;

GDP, *HICP* and *Government earnings* are assigned to Component 2; *Moody rating* and *Government debt* are assigned to Component 3; and, *Imports and exports* and *Housing prices* are assigned to Component 4. For the *Social welfare* dimension (Table A.4), *Employment rate*, *Retirement support*, *Population projection*, *Social exclusion*, *Research and development*, *e-government*, and *Average wage of workers* are assigned to Component 1; *Transport and infrastructure*, *Social protection*, and *ratio of pension to salary* are assigned to Component 2; and, *Education* on its own is assigned to Component 3. For the *Environment* dimension, *Sustainable energy* and *Consumption of renewable energy* are assigned to Component 1 and *Environment protection* is assigned to Component 2. For the *Digitalisation* dimension, only *Employees in tech* is assigned to Component 2 whereas the rest of the variables are assigned to Component 1. Finally, for the *Sports and Health* dimension, all the variables are assigned to Component 1.

Table 2 shows the computation results of the index and the corresponding ranking, sorted from best to worst. In the computation, we use equal weights for every dimension.

As can be seen, in 2016, the greatest value of the reputation index is attained by Germany. Immediately below Germany are the United Kingdom and Sweden.

Contrasting these results to rankings by other indices, Country Reptrak 2016 exhibits a top 3 comprising Sweden, Canada, and Switzerland. On the other hand, the Global Competitiveness Index 2016-2017 has the following top 3: Switzerland, Singapore, and United States. The Nation Brand Index for 2017 places Germany, France, and the United Kingdom as the top 3, which is very similar to our results. Finally, the Good Country Index presents Netherlands, Switzerland, and Denmark as their top 3.

Table 2

Reputational Ranking of countries in the European Union

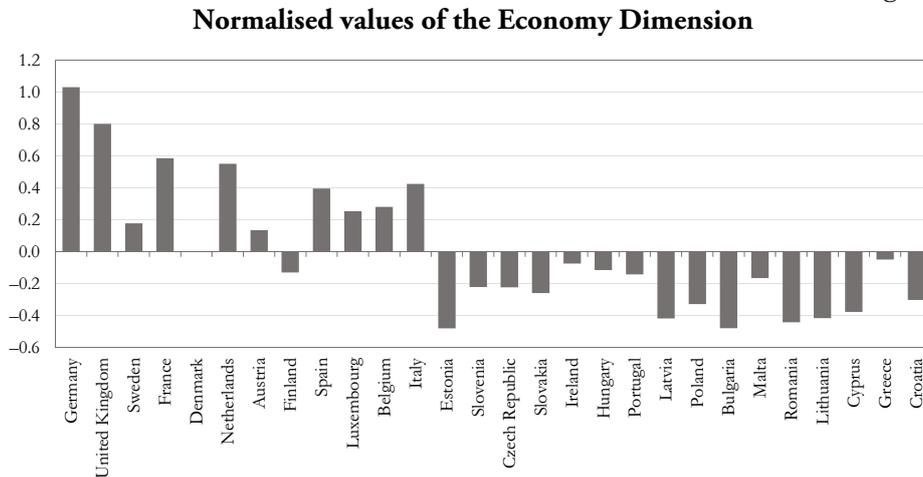
Country/ Dimension	Ranking	Economy	Social Welfare	Environment	Digitalisation	Sports and Health
Germany	1	1.030884302	0.505692367	0.536440085	0.990352535	1.786393785
United Kingdom	2	0.800413149	0.48533515	0.027313935	0.77068309	2.012473994
Sweden	3	0.177551005	0.379155592	1.523706603	0.77861922	1.027436059
France	4	0.585961167	0.403212836	-0.024448712	0.266648827	1.276104074
Denmark	5	0.002781916	0.348880165	0.189819579	0.981752157	0.621194704
Netherlands	6	0.55065989	0.429904449	-0.439774747	0.677240675	0.779751604
Austria	7	0.133869566	0.154196611	0.740138685	0.425769751	0.375223885
Finland	8	-0.131281627	0.187412021	0.890047323	0.746205359	0.100191168
Spain	9	0.395453512	0.575554821	-0.091687616	-0.263856126	0.598632834
Luxembourg	10	0.253528826	0.43458398	-0.409780548	0.807918628	-0.551199974
Belgium	11	0.280448939	-0.028167702	-0.486784555	0.261914379	0.424344744
Italy	12	0.42323276	0.442292905	-0.294173511	-0.584146575	0.42567827
Estonia	13	-0.481082225	0.121934903	0.461654912	0.14210659	-0.71084786
Slovenia	14	-0.22148916	-0.524939821	0.302634636	0.261775914	-0.316612912
Czech Republic	15	-0.223197154	-0.256798692	-0.182809553	0.348799077	-0.245237506
Slovakia	16	-0.261055209	-0.318984473	0.098761964	0.3087528	-0.529397795
Ireland	17	-0.074071713	-0.062336155	-0.481332824	0.117755229	-0.400344114
Hungary	18	-0.116209437	-0.137182878	-0.046122936	-0.031664001	-0.600545014
Portugal	19	-0.143135795	0.333078026	-0.194669195	-0.745759557	-0.202795745
Latvia	20	-0.418424416	-0.293488329	0.963425842	-0.500934196	-1.285982405
Poland	21	-0.328567234	-0.509491957	-0.187209727	-0.293219569	-0.626290517
Bulgaria	22	-0.479063772	-0.553096453	-0.21659734	-1.189275012	0.189134239
Malta	23	-0.166074997	-0.127231212	-1.096295406	-0.393053444	-0.53914327
Romania	24	-0.442781271	-0.202598986	0.028630886	-1.27469392	-0.441601517
Lithuania	25	-0.418033096	-0.527190204	0.226318515	-0.440443855	-1.234220477
Cyprus	26	-0.37747352	-0.302310191	-0.476551534	-0.718187215	-0.649970457
Greece	27	-0.050437155	-0.182857789	-0.856397686	-0.90053484	-0.612985277
Croatia	28	-0.302407253	-0.774558985	-0.504257075	-0.550525922	-0.66938452

The analysis by dimension is as follows:

Economy

In the economic dimension, which combines 10 different factors, such as GDP, Imports and exports, Government earnings, and Debt, the country in the top position is Germany, whose value is above the average, compared to the other 27 countries. What is interesting and can be seen in Figure 1 is that Sweden, a country that appears third in the overall ranking, exhibits a low – although positive – value. The same happens with Denmark, with a value almost equal to 0. On the other hand, the country lowest in the dimension of economy is Estonia. This country is far below the average of the other countries; therefore, to raise its value in this dimension, it will need to change different aspects of its economy.

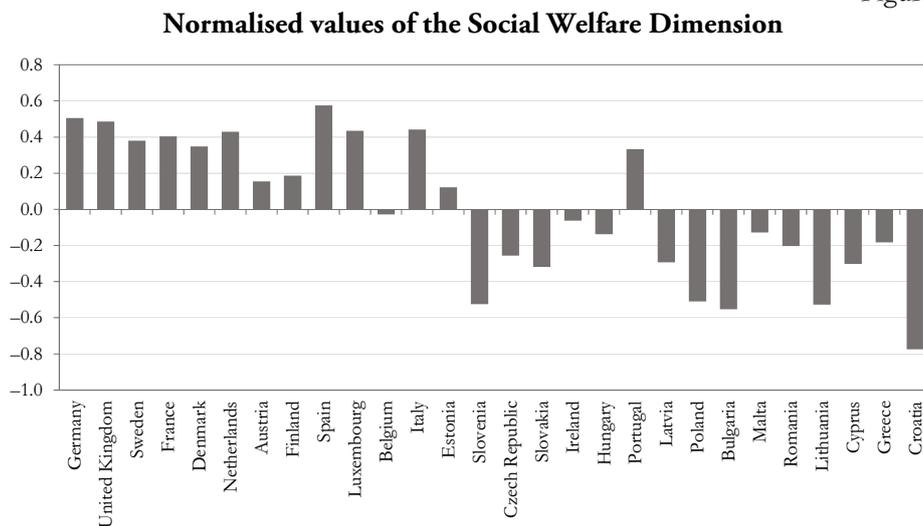
Figure 1



Social Welfare

Within the dimension of social well-being, we found a total of 11 factors, which seek to combine the important aspects of a country's system of government, and other important aspects of its citizens' lifestyle. Variables included in this dimension ranged from *Employment rate* and *Transport and infrastructure* to *Social protection* and *Education*. In this dimension, the country at the top position is Spain, followed by Germany. As regards the negative values in this dimension, the most negative value is exhibited by Croatia, which is at the bottom of the overall ranking.

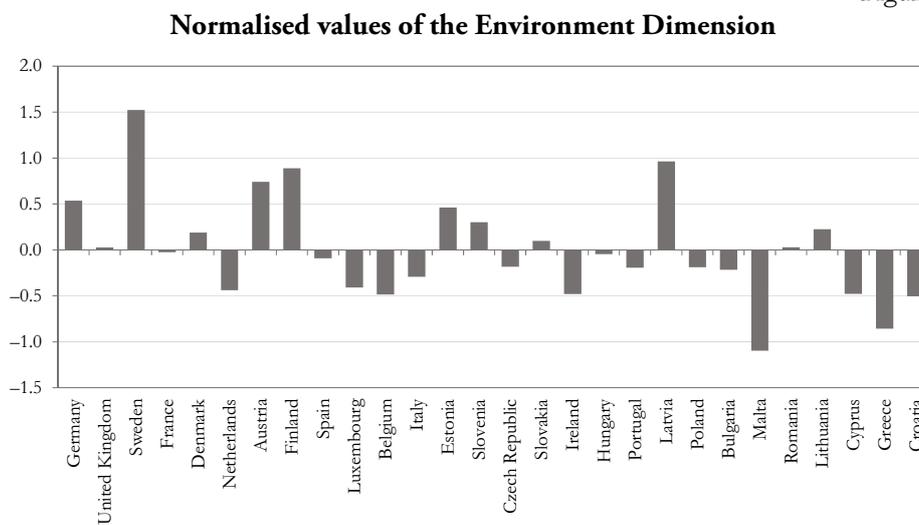
Figure 2



Environment

The environment sector seeks to combine three different factors on energy and sustainability, as well as on the commitment to protecting the environment. The highest positive value of this index is attained by Sweden, due to its large commitment to renewable energies and their high ranking based on the 2016 Trilemma Index. On the other side of the index values lies Malta, which obtained a very low value in the index.

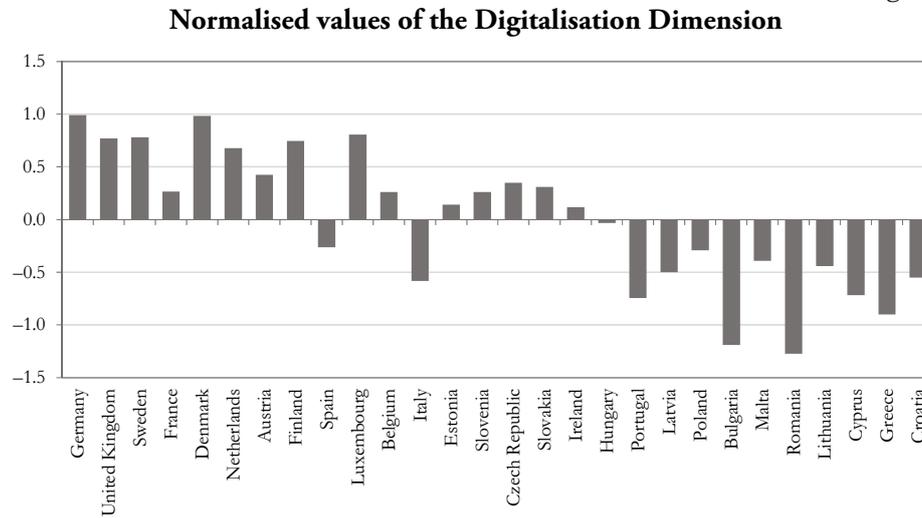
Figure 3



Digitalisation

In the field of technology, which intends to combine a country’s technological capabilities, the country with the most prominent score is Germany. This country is a large economic force but also has a very strong technology sector, as a result of the number of employees working in this sector. In contrast, Romania is the worst country in this dimension, due to its citizens’ low level of digital knowledge.

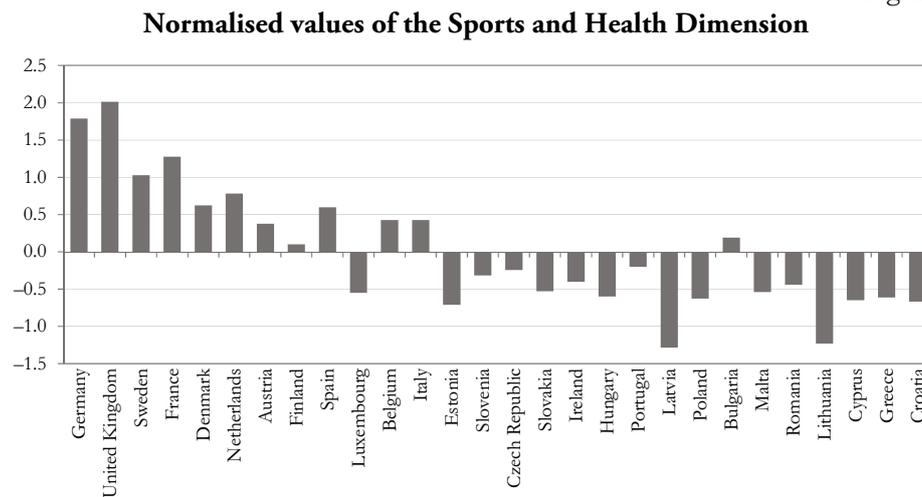
Figure 4



Sports and Health

This is the last, but not a less important dimension of our index; it measures the citizens' sports activity and the health level using 4 different factors. In this dimension, we attempt to combine the different capabilities of the government in the field of health, as well as a society's interest in sports. Here, due to its citizens' great interest in sports, the United Kingdom has the highest value, at a large difference from the second-ranked country. On the other hand, Latvia is in the last position in this dimension, due to large weaknesses in the factors reflecting citizen health.

Figure 5



Conclusion

A country's reputation is a very important aspect in many areas. The current globalisation process has resulted in countries being fully aware of the way they are depicted because of the significant competition among nations in every industry, market, and aspect of a consumer society. A nation's image is important for many reasons, such as self-perception, and economic and political reasons, both intra-nationally and internationally.

We propose the International Multidimensional Reputational Index as an instrument to measure the problems and possibilities countries have for improving their reputation. Thus, the creation of an index for comparing countries, and for discerning the differences among them in a range of factors, should be of great interest to politicians, employers, and individuals.

In this study, we adopt a global perspective, using a set of variables measured at the country level to evaluate the conditions for a country to have a high reputation in Europe. The index is a combination of five dimensions: Economy, Social Welfare, Environment, Digitalisation, and Sports and Health.

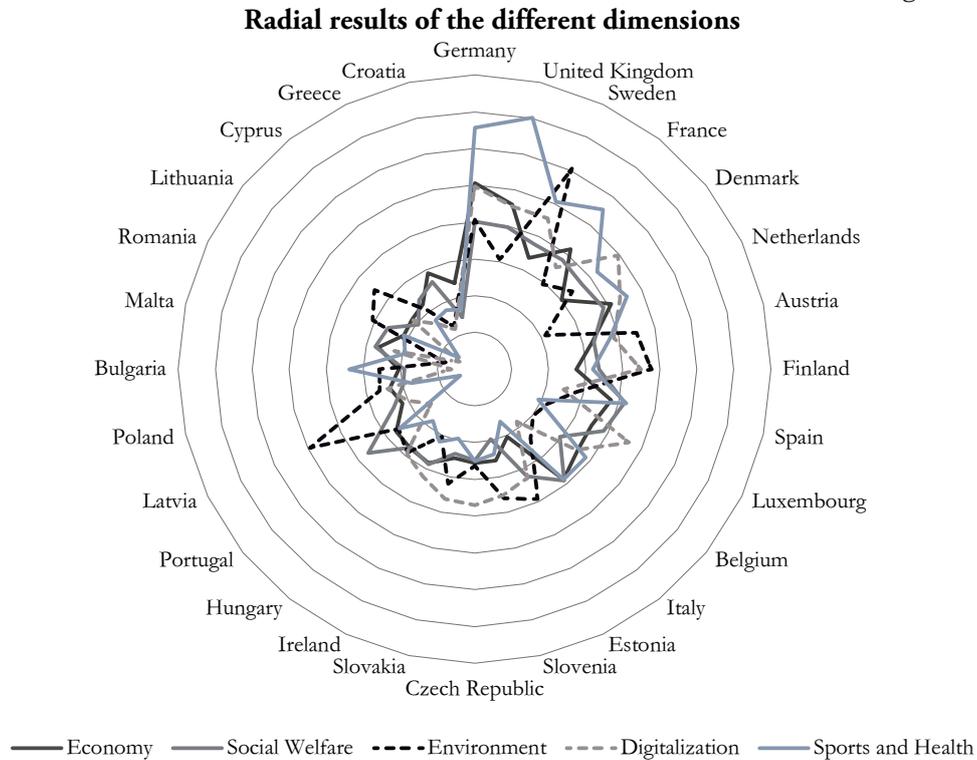
The purpose of the formulation of this index was the measurement of the reputation of the different countries in the European Union. To do this, using data from twenty-eight European countries, we chose 32 different factors, included in five dimensions, which seek to combine the most important aspects of a country's reputation.

The results show that, using our index, the top scores (based on 2016 data) are attained by Germany, the United Kingdom, and Sweden. On the other end of the spectrum, Cyprus, Greece, and Croatia are ranked in the last positions according to our index. Comparing our results to rankings based on other indices, we find there is some agreement. The fact that our index includes more dimensions may prove helpful for international comparisons.

In Figure 6, we can see the countries with the best reputation in each dimension.

To improve its position in the index, each country should decide whether to build on and advertise its strengths as compared to the other 27 European Union member-states, or to act in a different way, focusing on its weaknesses and taking measures to improve them.

Figure 6



We also demonstrate that there are significant country differences in the scores on the different dimensions of the index, indicating that reputation can be improved using a range of policy instruments. To the extent that more data becomes available, the index can be included in further analyses, which would improve our understanding of the concept of a country's reputation.

APPENDIX

Table A.1

Eigenvalues and variance explained by components in the Economy dimension

Com- ponent	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.57240927	35.7240927	35.7240927	3.57240927	35.7240927	35.7240927
2	1.71605413	17.1605413	52.8846341	1.71605413	17.1605413	52.8846341
3	1.53308194	15.3308194	68.2154535	1.53308194	15.3308194	68.2154535
4	1.16357509	11.6357509	79.8512044	1.16357509	11.6357509	79.8512044
5	0.82371219	8.23712189	88.0883263			
6	0.52180501	5.21805007	93.3063763			
7	0.32592519	3.25925188	96.5656282			
8	0.18786959	1.87869591	98.4443241			
9	0.0878282	0.87828202	99.3226062			
10	0.06773938	0.67739385	100			

Table A.2

Rotated factor loadings for variables in the Economy dimension

Denomination	Component			
	1	2	3	4
GDP	-0.110	-0.878	0.237	-0.047
Moody rating	0.400	0.359	0.747	0.136
Imports and Exports	0.080	-0.055	0.223	0.779
HICP	0.341	0.586	0.398	-0.259
Air transport of goods	0.816	0.133	0.162	0.416
Air transport services	0.919	0.082	-0.139	0.066
DMC	0.817	0.128	0.055	0.040
Housing prices	-0.188	-0.172	0.223	-0.778
Government earnings	0.064	0.900	0.068	0.155
Government debt	0.283	0.366	-0.837	0.011

Table A.3

**Eigenvalues and variance explained by components
in the Social Welfare dimension**

Com- ponent	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.44638813	31.3308012	31.3308012	3.44638813	31.3308012	31.3308012
2	2.09190846	19.0173497	50.3481508	2.09190846	19.0173497	50.3481508
3	1.52437284	13.8579349	64.2060857	1.52437284	13.8579349	64.2060857
4	0.97619953	8.8745412	73.0806269			
5	0.87384086	7.94400781	81.0246347			
6	0.71577453	6.50704123	87.531676			
7	0.45609976	4.14636147	91.6780374			
8	0.34484199	3.13492719	94.8129646			
9	0.26187281	2.38066189	97.1936265			
10	0.17191957	1.56290519	98.7565317			

Table A.4

Rotated factor loadings for variables in the Social Welfare dimension

Denomination	Component		
	1	2	3
Employment rate	0.799	-0.155	0.332
Transport and infrastructure	-0.218	0.667	0.351
Retirement support	0.6	-0.47	0.026
Population projection	0.618	0.066	0.056
Social protection	0.229	0.692	-0.444
Social exclusion	0.489	0.323	0.258
Research and development	0.666	0.031	-0.318
e-government	0.766	-0.249	-0.358
Education	0.028	0.139	0.927
Average wage of workers	0.788	0.354	-0.203
Ratio pension-salary	0.068	0.748	0.115

Table A.5

Eigenvalues and variance explained by components in the Environment dimension

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.51696768	50.5655895	50.5655895	1.51696768	50.5655895	50.5655895
2	1.05496051	35.1653502	85.7309397	1.05496051	35.1653502	85.7309397
3	0.42807181	14.2690603	100			

Table A.6

Rotated factor loadings for variables in the Environment dimension

Denomination	Component	
	1	2
Sustainable energy	0.77280712	-0.44702538
Environment protection	-0.005	0.95971148
Consumption of renewable energy	0.90660972	0.17846768

Table A.7

Eigenvalues and variance explained by components in the Digitalisation dimension

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.65143444	66.285861	66.285861	2.65143444	66.285861	66.285861
2	1.06414293	26.6035733	92.8894342	1.06414293	26.6035733	92.8894342
3	0.19930761	4.98269037	97.8721246			
4	0.08511502	2.12787541	100			

Table A.8

Rotated factor loadings for variables in the Digitalisation dimension

Denomination	Component	
	1	2
Employees in tech	-0.37	0.992
Employees in science	0.882	-0.327
e-commerce	0.969	0.091
Digital skills	0.947	0.002

Table A.9

**Eigenvalues and variance explained by components
in the Sports and Health dimension**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.12625907	53.1564768	53.1564768	2.12625907	53.1564768	53.1564768
2	0.88743001	22.1857502	75.342227			
3	0.5426444	13.5661101	88.908337			
4	0.44366652	11.091663	100			

Table A.10

Rotated factor loadings for variables in the Sports and Health dimension

Denomination	Component 1
Sport expenditure	0.891
Work in sport	0.773
Health expenditure	0.141
Life expectancy	0.289

Acknowledgement

This paper was partially written while José María Fernández-Crehuet was Visiting Fellow at Harvard University, to which he would like to express his thanks for the hospitality and facilities provided. This paper has benefited from funding from Fondecyt, Chile (Grant 11180337).

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