Country's International Reputation Index

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Abstract

Nowadays it is very common to make decisions about our actions and behaviors based on a series of perceptions, which have been created according to a series of variables, and in many cases their deep knowledge is unnecessary. The purpose of this paper is to create an index to measure the reputation of a country based on a financial markets perspective to see how attractive a country is for foreign investors by neutral, constant, and officials measurement criteria. Data for 28 countries have been taken from several official databases and the method used is principal component analysis. The index is a combination of four different dimensions: (1) markets and trade, (2) national accounts, (3) labor market, (4) living conditions and security, along with 23 distinct factors. The top scores in this index are the United Kingdom, Germany, and Sweden, compared to Bulgaria, Croatia, and Greece, which are at the bottom of the table. In general, the best ranked countries receive high scores in all four dimensions, while the worst ranked countries tend to receive low scores in all four dimensions analyzed. Country's international reputation index could be used to assist public policies designed to improve reputation in countries where it is needed. The study and analysis of this index will make it possible to measure the evolution of the factors that affect the country, both positively and negatively, in order to identify both strengths and weaknesses in order to improve the latter. This paper is the first to explore the dimensions comprising the international reputation construct at a multinational scope in Europe from an empirical analysis using official datasets. Although other indexes have been widely used for many country-branding projects, they only show what is being measured by interviews or panel of experts but not by neutral, constant and officials measurement criteria, and therefore this paper fills the gap that exists in the current state-of-the-art.

Keywords Country reputation index · Principal component analysis · Reputation ranking

Introduction

In an increasingly globalized world, the reputation of a country 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 (Newburry 2019; Yang et al. 2008). In fact, countries nowadays are ever

more worried with their reputation and aim at energetically managing and measuring it to gain competitive advantage (Fombrun et al. 2015; Passow et al. 2005). The number of countries that consider their reputation, image, and brand as serious strengths and support for their success in the long-term is increasing (Alizadeh et al. 2014a, b).

The current globalization process has caused countries to be fully aware on the way they are depicted because of a significant competition between nations in every industry, market, and aspect of society as consumers (Kelley 2019; Stock 2009; Saunders 2008; Avraham and Ketter 2008; Dinnie 2007; Skinner and Kubacki 2007; Anholt 2007; Olins 2002). A nation image is important for many reasons, such as self-perception, economic and political reasons within borders and among countries (Avraham and Ketter 2008; Dinnie 2007; Anholt 2005a, b, 2006; Fan 2006; Gertner and Kotler 2004; Gilmore 2002). A country's reputational capital could impact the nation's capacity to shape alliances and agreements between countries (Nye 2004), to affect

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consumer perceptions and purchase choices among international and national brands (Papadopoulos and Heslop 1993; Jeffe and Nebenzahl 2001), and to attract international investments and tourism (Kotler and Gertner 2002; Tapachai and Waryszak 2000). The status of a country's reputation has convinced policymakers, governments, and society to take significant steps to market their brands and images.

It is always beneficial to improve current measurements to serve as good assessments of the position of different countries, and with this, 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 can come to be determinant in the decisions of a large percentage of the world population when looking at different elements that can be affected by a reputation index. This pushes governments to form teams focused on selling the different positive aspects that the country possesses, as well as to improve different elements that people are seeking, without forgetting the citizens of each country, who will be the reference of opinion to the various changes produced. Therefore, the inhabitants of each country will be responsible for measuring the value of those changes (Fernandez-Crehuet et al. 2019b; Alizadeh et al. 2014a, b).

There are several indicators and rankings of countries, regions, and cities in all areas (Belloso 2010): *competitiveness and economic development* (Global Competitiveness Index CGI by the World Economic Forum), *living standard* (Human Development Index HDI by the United Nations), *appeal for business and foreign investment* (Trust Index by AT Kearney), *talent and human capital*, *tourist appeal* (Travel and Tourism Competitive Index TTCI by the World Economic Forum), *international recognition*, *image*, *dangers* (like those by the World Health Organization), *corruption* (Corruption Perception Index CPI by Transparency International), contribution to the common good (Good Country Index by Anholt and Govers), etc.

According to the authors, these indices and rankings come from different, more or less scientific or academic sources and are based on several criteria. They all have a different impact on both media and the public opinion, for instance for decision-taking, according to who makes the index or ranking and its methodological solidity. Also, indices can be categorized according to what they measure, the actual situation of a country or the perception different audiences from various areas have of it.

In the specific case of the reputation or image of a country (brand), a nation's ranking can be affected according to the position it takes in certain indices or classification tables, especially those with a high degree of notoriety among media and decision-takers, no matter the organization or agency making the ranking and its quality or methodological or scientific stringency that may possibly distort reality (Belloso 2010).

There are several measurements that assess the image or reputation of countries around the world such as the indexes: Nation Brand Molecule (Rojas-Méndez 2013); Country Brand Strength (Fetscherin 2010), Country Brand (Future-Brand 2007), Nation Brands (Anholt 2005a, b), Country Reptrak (Reputation Institute n.d.), and the Fombrun-RI Country Reputation (Passow et al. 2005).

These reputation measurements may share variables and dimensions—such as GNI per capita, health and education—with other indexes and rankings (e.g., Human Development Index and Global Competitiveness Index); however, they focus on dimensions not covered by other measurements, and create a comprehensive framework from which to objectively analyze reputation as a separate issue from the topics discussed above.

In order to assess existing country indices and rankings, we can classify them according to criteria such as their scope (competitiveness, quality of life, human capital, image, connectivity, etc.), source (academia, consulting, media, industry, international organization), methodology (quantitative, qualitative, mixed), methodological quality or stringency in its elaboration and finally its media, academic and social impact. It is important to know about the existence, quality and impact of the different indices and rankings as it allows to set up specific strategies and actions to have an impact on them.

Currently, there are three indices really important that are trying to measure the reputations of different countries. These rates are Country Reptrak, Country Brand, and Anholt GfK Nation Brand.

The Country Reptrak is an index that is made annually, which, by means of a series of factors, a classification of the different 55 countries, which aims to encompass this index. To get the data for the completion of the ranking, we carried out an interview of the different factors chosen to different people, belonging to 23 different countries. The factors that are examined are grouped in three different groups: Quality of life, Institutional quality, Level of development. All these factors have different weight in the index, by which, they will be multiplied in order to weight correctly these factors. With this index, it seeks to classify the attractive national of each country. The way of measuring perceptions of the country is by means of an indicator. This indicator seeks to capture the perceptions of different interviewees of the countries of which they are interrogated. The indicator is based on respect, trust, and admiration that has on the different countries the interviewee. One of the big problems of this index is the manner of obtaining the data, which does not seem to be the most appropriate in terms of reliability because, being different people interviewed, around 56,000 people, subjectivity reigns in the perceptions and, therefore, the data will not be altogether reliable. Also, the number of factors is relatively small for measuring different aspects

of a country, as well as the different factors chosen leave different aspects without collecting. Therefore, this index is based on perceptions, which seeks to give a little analysis in generalized manner different 55 countries that are trying to. The subjectivity of the same, make the data do not meet reliability full for different investors (Fernandez-Crehuet et al. 2019b).

The Country Brand, created in 2005, builds a ranking of 118 countries which arises from conducting surveys to 3600 opinion leaders, as well as a panel of experts in public policy, globalization and media-related disciplines in 18 countries (FutureBrand 2012). According to FutureBrand (2007), traditional marketing approaches applied to products cannot be implemented in countries. The score given by each respondent to a country is constructed through a Hierarchical Decision Model (HDM). This model inquires the respondents about the variables of knowledge, familiarity, preference, consideration, and propensity to visit and recommend. FutureBrand (2015) places special emphasis on the associations that each respondent has in relation to the dimensions: Value System, Quality of Life, Business Potential, Heritage and Culture and Tourism. Variables, such as attractiveness, geography, infrastructure, authenticity among others, allow countries to be located where they are strongest or represent a competitive advantage (Fombrun et al. 2015; FutureBrand 2012).

The Anholt GfK Nation Brands Index (Anholt 2005a) is carried out in more than 35 countries of the world with the objective of knowing the perception of the products, the population, the culture, the governments, the economy and the tourism of the countries (Anholt and GfK Custom Research nd).

The Anholt methodology is based on the design of a survey that integrates different variables and in turn allows comparative analysis of one country with another; consequently, the Nation Brands Index is given the knowledge of the country brands depending on the image perceived by millions of people from different parts of the world. Countries must distinguish their reputations from one another and avoid generalist identities (Anholt 2008).

According to Zenker and Martin (2011), the measures adopted in the positioning of the brand influence but do not control the perception that the public has about a certain country. Following this, Laxe and Palmero (2009) state that the most important consideration in the country brand is to maintain the reputation of the brand, that is, the objective is to communicate real and consistent facts of the image that a country projects. Reputation has established itself as a source to generate positioning.

The Anholt GfK Nation Brands Index measures six different dimensions and that allows countries to have a notion of what is really important when evaluating a country as a brand and in this way to improve the reputation of the

country and its profile vis-à-vis consumers: exports, governance, investment and immigration, cultural and heritage, people, and tourism (Denman 2012; GfK Roper Public Affairs & Media 2009).

Constructing over Anholt's research, Johansson (2005) presents an index comprised by six dimensions: exports, government policy, citizens, investment and talent, cultural exports, and tourist experience. Amine and Chao (2005) also built over Anholt's work, presenting the National Brand Pentagon focusing on tourism, export brands, foreign policy, investment, and culture.

If we understand reputation as the beliefs or opinions that are generally held about someone or something, our main contribution is the creation of an index that is the first to explore the dimensions comprising the international reputation construct at a multinational scope in Europe from an empirical analysis using official datasets. Although other indexes have been widely used for many country-branding projects, they only show what is being measured by interviews or panel of experts but not by neutral, constant, and official measurement criteria (from emotional dimensions to rational dimensions), and therefore this paper fills the gap that exists in the current state-of-the-art.

Under certain frameworks, reputation is understood as a result of judgments, subjective perceptions, and evaluations held by a particular audience (Lange et al. 2011). We can understand the reputation of a country as the opinion, admiration or respect that a country receives from its people. Under this framework, reputation can be built only based on opinions or surveys of people. People's opinions or value judgments build that reputation. Opinion is given prominence. In that case, there is not a connection between the reputation of a country with the actions or facts that the country has taken, or even with empirical circumstances that support the opinion of the people.

On the other hand, used as the basis of this paper, under a certain different perspective, reputation is based on assessments of the financial, social and environmental impacts over time. These reputational signals form a global impression empirically measured (Lange et al. 2011). We can understand the reputation of a country as an appreciation of the merit that the country possesses based on objective and tangible measures, and, in this case, it subjects directly to the facts that cause it. This reputation measurement would be based on neutral, empirically verifiable results with official data that offer greater accessibility and credibility for stakeholders (investors, policy makers, tourists, etc.).

Using information from 28 nations of the European Union, we compute, via principal components analysis, this Country's international reputation index as a mixture of 23 factors grouped in four dimensions: Markets and trade, National accounts, Labor market, Living conditions and security.

Results show that the top scores in this index (with 2016 data) are United Kingdom, Germany, and Sweden. Contrasting these results to other rankings, Country Reptrak 2016 has as a top 3 comprised of Sweden, Canada, and Switzerland. On another hand, the Nation Brand Index for 2016 positions United States, Germany, and United Kingdom as their top 3, which also equates our results.

The rest of this paper is ordered as follows. Section “**Background**” defines the framework utilized for the consideration of the 5 dimensions of the Country’s international reputation index. Next, section “**Data**” describes the variables used to compute the index. Section “**Methodology**” presents the methodology used to calculate the index and following ranking. Section “**Country’s International Reputation Index**” describes results while the final section concludes this paper.

Background

Traditionally, to be an economic superpower or having a strong military would have sufficed to assure the nation 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 projection.

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 by country branding has gained popularity among both researchers and practitioners (Che-Ha et al. 2016; Pike and Page 2014; Herstein 2012). Different terms have been used to call 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 deep-rooted in the belief that a robust country brand can yield better results to a nation’s sustainable development (Fetscherin 2010; Kleppe and Mossberg 2006). A good global image can improve weak international credibility, it can grow the nation’s political impact, it could stimulate stronger international agreements and negotiations (Yan 2008), and it could attract consumers, visitors, businesses, and investors to their nation (Fernandez-Crehuet et al. 2019b; Morgan et al. 2011; Gudjonsson 2005).

According to Echeverri (2014), in country brand theory, both consumer-centered, and brand-value center are identified (Anholt 2002; Fan 2010). Some authors manage to integrate considerations regarding the impressions of those who visit and have not visited a country (Pipoli 2009; Papadopoulos and Heslop 1993).

The country brand concept is born from the need of business sectors and governments to generate their own identity

in front of international markets (Gudjonsson 2005). Country brand refers to the application of sophisticated marketing combined with branding techniques to cultivate the understanding of a nation (Pike 2011).

A country strategy is understood as a State strategy aimed at capitalizing on a country’s reputation in international markets (Jain and Winner 2013). It is a set of activities that contribute to create the image of a specific place (Chaves 2011). The country brand strategy is replicated in the generation of greater internal confidence and better external performance of the country (Szondi 2010).

Traditionally, three elements make up the country brand concept: tourism, foreign investment, and exports (Harrison-Walker 2011). These variables do not represent sectors, on the contrary they have a significant role in improving the reputation of a country. According to Castrogiovanni (2007), tourism is considered by politicians and academics as a solution for the most sensitive economies and that helps preserve the natural and cultural heritage of a nation.

A country brand is not the same as a promotional strategy for the nation (Kaneva 2011). The country brand reflects a holistic vision of the image of a specific territory that must be reinforced and enriched permanently by the investment in communication from the country of origin to the rest of the world (Mihailovich 2006).

The country brand usually helps governments understand the complex value of international reputation and internal cohesion (Anholt 2005b). A country brand aims to consolidate the national imagination and align public communications, civic discourses, and social behaviors; all the above encompassed in an appropriate brand culture by an entire society (Anholt 2007). In accordance with what has been described above, the country brand allows for a place in the markets and in the minds of people (Fan 2006).

The implementation of the country brand implies actions that involve all stakeholders in a city, a region, and a country in order to engage them in the process of developing and consolidating an image with a strong internal and external projection (Madhavaram et al. 2005).

The formulation of the country brand strategy is as important as its implementation, which happens when people really experience the brand, allowing them to begin to form positive attitudes and behaviors about the country (Anholt 2007).

Anholt (2008) states that the brand of a country is subject to its reputation: Reputation that holds if a country shows positive indicators in export brands, changes in public policy, tourism and investment promotion, the presence of people from that country abroad, and public policy decisions.

The most critical challenge for a country brand is to find a strategy that is credible, relevant to the consumers’ audience, faithful to the reality and aspirations of the place, capable of covering this variety of characteristics without becoming

a boring commitment that can affect the perception of the population (Anholt 2007).

A country brand implies a philosophy of urban and regional development, which is part of a strategic planning process in which the country complements its traditional economic programs, with marketing strategies to achieve competitive advantages (Nikolova and Hassan 2013). The builders of the country brand are companies, leading brands, and referents of civil society.

A country brand is not used to reduce the gap between perception and reality, but to represent the differentiating element of one country with respect to another. Nor is it built on the characteristics of its population, but on the contrary, by the characteristics of the country (Anholt 2007).

Regarding the reputation of the country, Kang and Yang (2010) define the reputation of a nation as 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 collected data from that nation. Furthermore, Kleppe et al. (2002) state that the image of a nation is always dwelling between a personal image, peculiar to every person, and a public image based on what characteristics, news, and policies of the country are publicly shared. These public images are what can be called reputation (Bromley 1993). Yang et al. (2008) comprised current frameworks in 2 types of individual experience: personal experience, and second-hand experience.

On one hand, several researchers have found favorable effects of individual experience in the awareness of a reputational entity (Yang, 2007a, b; Yang and Grunig 2005; Fombrun and van Riel 2003; Grunig and Hung 2002). This increasing awareness could positively affect the reputation as a relevant factor when people value a country (Fombrun and van Riel 2003; Deephouse 2000). On another hand, and according to Kunczik (1997), people assess multiple aspects of a country, including the nation's economy, people, politics, news or culture, without direct experience of these places. Instead, their decision-making processes are done often 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 fitted to fulfill their desires and have opportunities to improve their skills and enjoy their interests (Morgan et al. 2012; Blichfeldt 2005; Kotler 2004).

National reputation and its impact over the country and its citizens can be examined from two main points of view: public diplomacy and nation branding (Yang et al. 2008).

First, from the perspective of public diplomacy, national reputation can be a significant element on international agreements and on achieving a strategic position (Kruckeberg and Vujnovic 2005; Melissen 2005), by developing and enhancing what Nye (2004) calls soft power, i.e., the

diplomatic ability obtained through the appeal of a nation's policies, how it treats its citizen, and their 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 without a doubt tools to exercise power, having a significant role both in public policy and in foreign policy (Wang, 2006a, b).

Second, in terms of nation branding, a high nation image yields a significant impact on consumers' perception and willingness to pay for products made in the 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 produced in the country. Lee (2009) offers a comprehensive literature review on nation branding (Fernandez-Crehuet et al. 2019b).

We propose a new index to analyze a nation's reputation based on a financial markets perspective by neutral, constant, and officials measurement criteria using what we believe to be a comprehensive framework of national-level variables, which allow objective international comparisons. It is comprised by 4 dimensions using dimensions that have not been analyzed together in a common framework.

Data

We focus on the 28 European Union countries: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom. Thus, for each variable included in the index we have twenty-eight values per country.

For our empirical analysis, we use the following datasets: (1) *Datosmacro* 2016; (2) *European Central Bank* (ECB) 2016; (3) *World Bank Group* 2016; (4) *Eurostat Statistics* 2016; (5) *Doing Business* 2016; (6) *The 2016 European Working Conditions Survey* (EWCS); (7) *The 2016 European Quality of Life Survey* (EQLS), and (8) *Transparency International* 2016.

Datosmacro is a website of the newspaper Expansion that was created with the aim of bringing together the main economic variables of the world. This page contains historical data on the main factors of the macroeconomics published by each country, as well as indicators that refer to society. Its sources are the official bodies of the countries to which the data correspond.

The "statistics" section of the ECB's website provides data on the euro area countries and the national central banks of each country. The main objective is to offer the possibility to compare the data of the different countries in a graphical way.

The *World Bank Group* is a global association of 189 countries. It is made up of five institutions that fight for poverty and seek to generate prosperity in developing countries. Its website has free access to data on the development of the world.

Eurostat is the statistical office of the European Union in Luxembourg. Its function is to provide the European Union with statistics comparing the situation in which the different regions and countries that make up the European Union find themselves. Eurostat provides a wide range of data related to different areas such as government, business, and education.

Doing Business is a project launched for the first time in 2002, which analyzes and compares the standards that regulate the activities of local small and medium-sized enterprises during their life cycle, in 190 different economies. In addition to stimulating competition among the economies under analysis, it offers measurable indices to stimulate changes or reforms.

The EWCS survey was developed by Eurofound, and provides information on both working conditions and quality. Since 1990, it has helped to create trends in working conditions in Europe. It examines a variety of work issues including work status, hours, organization, learning, risk factors, work–life balance, earnings and financial security, and work and health. The EQLS survey was also developed by Eurofound, providing a unique insight into the current quality of life in European countries. The indicators it uses are both subjective and objective, leading to a trend in three different areas: quality of life, quality of society, and public services.

Finally, *Transparency International* is the only global non-governmental organization dedicated to fighting corruption in the private sector, civil society, and governments. This organization covers several areas of corruption both within countries and in economic, political, and social policies. The aim is to understand and confront the two faces of corruption: the one who does it and the one who allows it. In addition, it conducts awareness-raising campaigns on the effects of corruption.

The *markets and trade* dimension include factors present in the day-to-day life of European stock exchanges, which reflect the daily situation of each of them (Papadopoulos et al. 2018). In addition, indicators in this category largely define the internationalization of a country's economy (Rojas-Méndez 2013). Also included are indicators that reflect changes in the prices of a predetermined set of goods and services. The variables selected were interest rate, exchange rate, portfolio investment, balance of payments, CPI, and HICP. The *interest rate* is among the financial risks that most affect economic agents, since its movements affect both the value and profitability of assets and the cost of liabilities, and even have an influence on future investment and financing plans (Fernández-Álvarez & García-Olalla 1992). The *exchange rate* has a direct influence on

imports or exports and investments between countries with different currencies. The market risk of an *investment portfolio* is that caused by the variation in the price of one of its financial assets. This variation is due to some variation in the risk factors such as the exchange rate or the interest rate (Gómez-Cáceres and López Zaballos 2002). The current account is part of the *balance of payments*, recording the difference between exports and imports of goods and services, thus reflecting countries' performance in the international economy. Another aspect that influences the economic cycle of a country is the variation in prices. When many jobs are destroyed, and part of the population lives under the threat of an uncertain employment future, it has a direct influence on inflation. Well, it leads to a fall in the rate of inflation, and although this may be good for consumers, as they will have more liquidity and will be able to spend more money, we must not forget the reason why there has been this reduction in prices (Che-Ha et al., 2016).

The *national accounts* group aims to reflect the most relevant aspects of a country's economic performance (Anholt 2005a, b). They describe and analyze the many types of transactions that occur in an economy in an understandable and trustworthy way. Factors that reflect a country's economy, expenditures, income, etc. are included. One of the factors included in this group is *Moody's valuation*. Rating agencies play an important role in the financial markets. With their credit ratings, they aim to reduce the information asymmetry that often exists between debt issuers and investors, thus achieving more efficient debt markets (Gudjonsson 2005).

In the *labor market* group, a series of indicators have been selected which aim to reflect the existing facilities for entering the labor market, both independently with one's own business and by carrying out work for others (Leiva 2019). This group is important because the labor market is where labor supply and demand come together, but it is also influenced by governments through laws or social institutions. Its malfunctioning can adversely affect a country's economic growth and employment (Requena 2017).

With regard to the dimension of *living conditions and security*, it should be noted that individual security is a key aspect for the well-being of individuals, including the risk that they may be victims of physical assault or any other type of crime (Gotelli 2017). On the other hand, in this group there are a series of factors that define the context in which people live according to the possibilities offered by the country (Miranda 2008; Bara 2018).

Markets and Trade

This includes factors related to money, exports and imports, as well as price changes.

The *interest rate* is expressed as a percentage of the amount of money that has been borrowed or deposited by a client, usually with reference to a period of time. This index is focused on the 28 European Union countries and as only 19 belong to the Eurozone, there are 9 countries that have different interest rates (DatosMacro 2016).

The *exchange rate* is expressed as the number of units of a currency needed to obtain one euro (World Bank 2016). In Europe there is a group of 19 countries called the Eurozone in which all have adopted the euro as their currency. Therefore, the exchange rate only is taken into account in the 10 countries that have a different currency.

The *portfolio investment* data used are expressed in dollars at current prices, and are measured as the balance of payments, i.e., portfolio investments are recorded as the difference between the inflow of equity securities, not shown as direct investments, and direct purchases of shares in local stock markets by foreign investors (World Bank 2016).

The *current account balance* is the result of subtracting imports from domestic exports measured in millions of euros (Eurostat 2016).

The *CPI*, in order to represent reality, selects a series of products to form part of the shopping basket. These are the products most consumed by the majority of the population, and the importance given to each of the items in the basket responds to household consumption trends (DatosMacro 2016).

The *HICP* is calculated taking as a reference that the year 2015 is 100 for all countries and in the following years we can see the variation with respect to this figure (Eurostat 2016).

National Accounts

This group includes variables related to the economic situation of a country.

The *Gross Domestic Product (GDP)* is measured in millions of euros but there are also some interannual variation rates (measured in %) that are usually used because they reflect the evolution of this indicator, announcing whether it grows or decreases. In this work, we have taken the GDP data measured in percentage (Eurostat 2016).

The *public deficit* is usually expressed as a percentage of the State's GDP, as this makes it easier to compare it with other countries (Eurostat 2016).

Government debt is normally expressed in terms of GDP, which is the ratio used for cross-country comparisons (DatosMacro 2016).

The *Moody's valuation*, its debt rating consists of an alphanumeric code that goes from Aaa to qualify the debt with the lowest risk to C for those with the highest risk, thus comprising 21 degrees (DatosMacro 2016).

The *corruption perception index* uses a scale from 0 to 100, with 0 being a highly corrupt country and 100 being a country with high transparency (Transparency International 2016).

The *resolution of insolvency*, the data are obtained from questionnaires made to the lawyers who are experts in insolvency in each economy, which in turn have been checked against a study of laws and regulations. This index classifies the economies of the countries that are easy to resolve insolvency using the distance to the border score, which is the distance to the economy where the best performance of the Doing Business indicators in insolvency resolution is observed (Business 2016).

Obtaining credit is obtained as the sum of two indices resulting from the groups: ease of obtaining a loan and accessibility and quality of credit information. The classification of countries is obtained by ranking the scores according to the distance to the border of each economy (Business 2016).

Labor Market

The *unemployment rate* represents the share of the population that is out of work, and is defined as the ratio of the unoccupied labor force to the total labor force (Eurostat 2016).

The *unemployment rate between the ages of 55 and 65* is calculated as the number of people in this age group without working divided by the total population between 55 and 65. This factor is measured as a percentage (Eurostat 2016).

The *ability to make ends meet* is an indicator that has been measured by conducting a survey with the question: "Can your household make ends meet? There were four possible answers to this question: (very) easily, quite easily, with some difficulty or with (a lot of) difficulty. We use the percentage of people who make ends meet easily (Eurofound 2016).

The *ease of opening a business* is measured by classifying it according to the score obtained from a distance from the border, i.e., this measure shows the distance of each economy from the "border," which is the best performance in each of the indicators of the Doing Business sample since 2005 (World Bank 2016).

Living Conditions and Security

The *homicide rate* is the number per 100.000 inhabitants in 2016, which is the latest year for which official data are available. This rate includes people who die as a result of being intentionally injured by another person, excluding deaths from road traffic injuries or unintentional injuries (Eurostat 2016).

The indicator *feeling of safety when walking in the street at night* has only been measured by the answers to the statement “I feel safe when I walk alone at night.” The possible answers were: I agree or not. The percentage has been used (Eurofound 2016).

Concern about income in old age is one of the issues that Eurofound measures to define the quality of life in a country. People must answer the question “how concerned are you that your old-age income is not sufficient?”, and the results have been compiled on the basis of the responses obtained, with 1 being of no concern at all and 10 being extremely concerned about it (Eurofound 2016).

The *pension-wage ratio* is an indicator that is measured as the ratio of the average gross individual pension for the 65 to 74 age group to the average individual earnings for the 50 to 59 age group, excluding any type of social benefit. This ratio is based on statistics on income, living conditions, and social inclusion (Eurostat 2016).

The data that have been used on *emigration* are expressed as a percentage. The number of migrants from each country has been divided by the corresponding population in that same year in order to obtain a percentage and be able to make comparisons with the rest of the territories (Eurostat 2016).

The *possibility of facing unexpected financial expenses* is measured as a percentage. To obtain the data for this index, a survey was carried out with two possible answers (Yes/No), in which the following question was asked in 2016: “Can your household meet an unexpected expense of €650? (Eurostat 2016).

Methodology

When collecting information it is most common to choose as many variables as possible. However, the greater the number of variables we select, the greater the number of correlation coefficients increases considerably, so it is difficult to visualize the relationships that may exist between the variables. In the construction of the index, it uses Principal Components Analysis (PCA) for the selection of the variables and the choice of variable weights. It is a widely used method in the literature (e.g., Fernandez-Crehuet et al. 2016, 2017, 2019a; Jemmali and Sullivan 2014; Bellido et al. 2011).

It uses the methodology described in the OECD handbook (OECD 2008), which includes the application of PCA analysis, for the construction of the Technology Achievement Index (TAI), applied to 28 countries.

The main objective of this technique is to project the input data in new directions, known as main components that absorb as much information as possible in order to eliminate those variables that provide less variability. Therefore, its purpose is not the analysis of causal relationships, but

rather the grouping of variables according to the variability it shares with other variables. The new variables are linear combinations of the previous ones, and are constructed according to the importance of each one in terms of the total variability they collect in the sample, that is to say, the first main components describe most of the variance of the data that will be greater the greater the correlation between the original data.

For the construction of any index there are numerous problems to be taken into account. The first of these is that the variables must be measured on the same scale and therefore, if they do not comply, they must be standardized, the first requirement for the application of the PCA.

In Table 1, it can be seen that the variables have very different scales (percentages, millions of euros, etc.). Therefore, the information collected by the variables must be homogenized, that is, the data must be transformed to the same scale so that they can be compared. There are several methods for the normalization of variables, and each of them has its advantages and disadvantages, in this case standardization has been used. This method converts all data to a common scale with mean zero and standard deviation one. To calculate the z values, the mean (μ) and standard deviation (σ) of each of the variables have been calculated, the standardized variables being calculated as $z = \frac{x-\mu}{\sigma}$, where “ x ” represents the value of the corresponding variable in each of the countries.

Once the variables have been normalized we have the input data matrix ready for the main components to be obtained as a linear combination of the original variables. When the new variables are obtained, those with less variability are eliminated.

Following Spector (1992), the number 3 is established as a minimum of variables per dimension, taking into account that 3 elements by category must be seen as a minimum, not as optimal. All established groups have at least 3 elements, so this restriction is met.

To assign weights to the variables, we identify the main components for every dimension. Several criteria exist to pick the amount of components, according to OECD (2008), are applied together:

- (a) Have an eigenvalues associated with the unit that is greater than the unit.
- (b) The variation explained for each component is greater than 10%.
- (c) Have a cumulative explained variance greater than 60%.

Once the main components have been selected, each variable must be associated with a main component, factor loadings are used for this purpose. Each variable is associated with the main component with the highest factor loading in absolute value. The weight of each variable is thus

Table 1 Variables used for the computation of the index

Country/ variable	Inter- est rate	Exchange rate	Portfolio invest- ment	Balance of pay- ments	CPI	HICP	GDP	Pub- lic defi- cit	Gov- ern- ment debt	Moody's valua- tion	Cor- rup- tion per- cep- tion index	Insol- vency reso- lution	Obtain- ing credit	Unem- ploy- ment rate	Unem- ploy- ment rate 55-65	Abil- ity to make ends meet	Ease open- ing a busi- ness	Hom- icide rate	Feel- ing of safety when walk- ing in the street at night	Con- cern about income in old age	Pen- sion- wage ratio	Emigration	Possibility of facing unexpected financial expenses
Belgium	0	1	-8,824,476,051	-7909	2	101.77	1.5	-2.5	105.7	4	77	84	45	7.8	45.4	48	94.48	1.96	72	6	0.48	0.81752315	25.9
Bulgaria	0	1.9558	-19,630,000	1584.6	0.1	98.68	3.9	0.0	29	9	41	58.93	70	7.6	54.5	16	84.84	1.79	56	7	0.45	0.42732629	54.2
Czech Republic	0.05	27.021	392,219,691	-1009.7	2	100.7	2.6	0.7	36.8	5	55	76.17	70	4.0	58.5	29	85.23	0.80	54	6	0.5	0.36824501	32.1
Denmark	0.05	7.4344	4,404,750,059	-3879.9	0.5	100.0	2	-0.6	37.7	1	90	84.78	70	6.2	67.8	69	92.45	0.81	85	4	0.47	0.92258077	24.5
Germany	0	1	-9,069,821,179	-40002	1.7	100.4	1.9	0.8	68.1	1	81	91.93	70	4.1	68.6	36	83.35	0.81	66	5	0.46	0.64953764	30.0
Estonia	0	1	44,196,792	-2.4	2.2	100.80	2.1	-0.3	9.4	5	70	65.28	70	6.8	65.2	23	95.06	3.19	74	6	0.45	1.04806891	31.6
Ireland	0	1	159,128,628,130	-3442	0	99.8	5.1	-0.7	72.8	7	73	80.01	70	8.4	57.2	31	94.18	1.32	77	5	0.35	1.31299714	45.3
Greece	0	1	553,786,766	-597	0	100.02	-0.2	0.5	180.8	19	44	56.28	50	23.6	36.3	5	90.7	0.79	60	8	0.63	0.98792182	53.6
Spain	0	1	14,638,407,153	-12011	1.6	99.66	3.3	-4.5	99	9	58	75.83	60	19.6	49.1	30	86.3	0.65	90	7	0.66	0.70483269	38.7
France	0	1	23,703,297,300	-44951	0.6	100.31	1.2	-3.4	96.5	3	69	76.09	50	10.1	49.8	30	93.14	1.53	78	6	0.68	0.4642633	31.8
Croatia	2.5	7.5597	17,356,403	1352.6	-1	99.37	3.2	-0.9	82.9	12	49	56.28	55	13.4	38.1	16	85.56	0.88	76	6	0.39	0.86945545	57.7
Italy	0	1	-3,316,089,228	-16458	0.5	99.9	0.9	-2.5	132	9	47	53.7	45	11.7	50.3	18	89.39	0.77	61	6	0.69	0.25890311	40.4
Cyprus	0	1	714,407,147	-463	-1	98.78	3.4	0.5	107.1	14	55	77.48	65	13.0	52.2	19	89.19	1.42	74	6	0.44	1.7554717	56.6
Latvia	0	1	-29,245,211	181	2.2	100.10	2.2	0.0	40.6	7	57	63.39	75	9.6	61.4	17	94.11	4.08	67	7	0.42	1.04491871	60.0
Lithuania	0	1	38,642,779	650	0.7	100.68	2.3	0.3	40.1	7	59	48.06	70	7.9	64.6	20	92.93	5.75	60	6	0.45	1.74249574	53.2
Luxem- bourg	0	1	139,358,019,614	324	1.1	100.04	3.1	1.6	20.8	1	81	45.45	15	6.3	39.6	54	88.43	0.89	78	4	0.88	2.33267216	21.9
Hungary	0.9	309.83	-102,657,014	-1829.6	1.8	100.45	2.2	-1.9	73.9	10	48	53.7	75	5.1	49.8	15	87.1	1.00	71	7	0.67	0.40576838	50.8
Malta	0	1	-118,127,954	224.9	0.9	100.90	5.5	1.1	57.6	7	55	38.53	10	4.7	44.1	39	78.01	0.93	79	6	0.54	1.84341108	20.8
Nether- lands	0	1	62,585,941,315	-7635	1	100.11	2.2	0.4	61.8	1	83	83.77	40	6.0	63.5	62	94.26	0.74	81	4	0.5	0.65655346	22.5
Austria	0	1	1,213,281,953	-3686	1.4	100.97	1.5	-1.6	83.6	2	75	78.89	55	6.0	49.2	37	82.82	0.49	74	4	0.62	0.74051163	22.6
Poland	1.5	4.4103	-2,655,000,000	-1397.1	0.7	99.8	2.9	-2.5	54.1	6	62	70.43	75	6.2	46.2	24	82.71	0.75	82	7	0.62	0.62275054	37.9
Portugal	0	1	-1,126,204,688	1546	0.9	100.64	1.6	-2.0	130.1	11	62	80.57	45	11.2	52.1	13	91.24	0.96	79	7	0.64	0.37009746	38.3
Romania	1.75	4.539	-220,383,340	2499.8	-1	98.93	4.8	-3.0	37.6	10	48	58.21	80	5.9	42.8	20	90.46	1.46	70	6	0.66	1.05047926	54.5
Slovenia	0	1	52,056,625	-309	0.5	99.85	3.1	-1.9	78.5	10	61	83.39	35	8.0	38.5	32	91.22	0.97	83	6	0.47	0.75438865	41.7
Slovakia	0	1	-38,243,550	-1369	0.2	99.52	3.3	-2.2	5.8	6	51	70.04	65	9.7	49.0	18	86.82	0.89	71	6	0.62	0.07004835	37.9
Finland	0	1	13,084,468,931	-2503	1	100.39	2.1	-1.7	63.1	2	89	93.81	65	8.8	61.4	49	93.11	1.61	88	5	0.53	0.32952406	29.4
Sweden	-0.5	9.5525	-3,047,369,374	-6219.7	1.7	101.14	3.2	1.1	42.2	1	88	78.75	55	6.9	75.5	66	94.61	1.15	85	4	0.57	0.46571841	20.7
United King- dom	0.25	0.85618	-173,505,992,628	-27538.8	1.6	100.7	1.9	-2.9	88.3	2	81	82.04	75	4.8	63.4	44	94.57	0.92	70	5	0.53	0.52068934	38.0

calculated in order to obtain an index associated with one of the four dimensions. With these four indices the PCA is applied in order to obtain the weight of each of the dimensions and to calculate the index looking for.

Country's International Reputation Index

After the selection of the variables, the first thing to be done is to check their independence. It is essential that these variables are not independent, as there would be no point in applying the analysis of main components, the main objective of which is to create new variables by eliminating redundant information, i.e., creating linearly independent variables, among other things. To check that the variables are not independent, the independence test has been carried out.

The contrast statistic that has been used is the Chi-square and a significance level of 0.05 has been set, i.e., the maximum probability of rejecting the independence scenario when it is true is 0.05.

The independence contrast has been made for each of the four dimensions that have been defined, since the analysis of the main components is applied to each of them in order to obtain the weight that each one will have when calculating the index.

The solved ones obtained were $\chi^2_{\text{exp}} = 27602$, 15 in markets and trade, $\chi^2_{\text{exp}} = 758$, 81 in national accounts, $\chi^2_{\text{exp}} = 281$, 39 in the labor market and $\chi^2_{\text{exp}} = 150$, 28 in living conditions and security. In three of the four dimensions, the probability is very close to 0 and is therefore below the level of significance and the variables of these three groups are not independent. Furthermore, the correlations between the variables of all the groups have been calculated and it has been possible to reach a conclusion on the dimension of living conditions and security.

In the correlation tables, you can see that there are high correlation values between the following:

- The Moody's Valuation and Corruption Perception Index variables of the national accounts dimension have a correlation of -0.818 .
- The CPI and HICP variables of the market and trade dimension with a correlation of 0.746 .

As can be seen, both couples have a high level of correlation. However, they have nevertheless been included in the index, as the factors loading are large enough to exceed the limits imposed for the selection of principal components in the following point, and therefore contain a relevant amount of information.

On the other hand, there are considerable correlation coefficients in terms of living conditions and security, for

example, between concern for old-age income and financial expenditure of 0.66 . In addition, it should be noted that there are several correlations above a value of 0.3 .

Finally, reference should be made to another variable selection criterion indicated in the OECD handbook (OECD 2008), which consists of choosing variables that have a minimum factor loading, since variables with a low factor loading provide little information. Therefore, only those variables that have a factor loading greater than 0.40 are selected. In this particular case, all variables exceed this value, so no variable is excluded according to this criterion (Table 2).

Once it has been verified that the variables are not independent, the main components are selected. Tables 6, 8, 10, and 12 of "Appendix" show the results of applying PCA to the variables included in the dimensions of *markets and trade*, *national accounts*, *labor market*, and *living conditions and security*.

For the *market and trade* dimension, we choose the first three components, as their eigenvalues are more than unity (2.214 , 1.237 , and 1.135), the variation explained for each component is greater than 10% (36.9 , 20.63 , and 18.93% for the first, second, and third components, respectively), and jointly they are able to explain 76.46% of the variation. For the *national accounts* dimension, we choose the first three components, as their eigenvalues are more than unity (2.367 , 1.825 , and 1.294), the variation explained for each component is greater than 10% (33.82 , 26.06 , and 18.49% for the first, second, and third components, respectively), and jointly they are able to explain 78.37% of the variation. For the *labor market* dimension, we choose the first two components, as their eigenvalues are more than unity (1.97 and 1.1), the variation explained for each component is greater than 10% (49.27 and 27.54% for the first and second components, respectively), and jointly they are able to explain 76.81% of the variation. For the *living conditions and security* dimension, we choose the first two components, as their eigenvalues are more than unity (2.293 and 1.36), the variation explained for each component is greater than 10% (38.21 and 22.67% for the first and second components, respectively), and jointly they are able to explain 60.87% of the variation.

Factor loadings are shown in Tables 7, 9, 11, and 13 of "Appendix" for the dimensions *markets and trade*, *national accounts*, *labor market*, and *living conditions and security* (in bold are highlighted the factor loadings with the highest absolute value for each variable, which correspond to the component where the variables are assigned).

Following this rule, we assign the variables as follows: for the *markets and trade* dimension, the variables *interest rate*, *CPI* and *HICP* are assigned to component 1, *exchange rate* is assigned to component 2, and *portfolio investment* and *balance of payments* are assigned to component 3; for the *national accounts* dimension, the variables *Moody's valuation*, *corruption perception index* and *insolvency resolution*

Table 2 Correlations for variables included in dimension

Markets and trade	Interest rate		Exchange rate		Portfolio invest- ment	Balance of pay- ments	CPI	HICP
Interest rate	1							
Exchange rate	0.216		1					
Portfolio investment	−0.103		−0.034		1			
Balance of payments	0.193		0.085		0.249	1		
CPI	−0.429		0.211		−0.177	−0.218	1	
HICP	−0.379		0.088		−0.182	−0.196	0.745	1
Labor market	Unemployment rate		Unemployment rate 55–65		Ability to make ends meet		Ease of opening a business	
Unemployment rate	1							
Unemployment rate 55–65	−0.401		1					
Ability to make ends meet	−0.443		0.4409		1			
Ease of opening a business	0.086		0.391		0.243		1	
National accounts	GDP	Public deficit	Government debt	Moody’s valuation	Corruption per- ception index	Insolvency resolution	Obtain- ing credit	
GDP	1							
Public deficit	0.132	1						
Government debt	−0.507	−0.277	1					
Moody’s Valuation	0.016	−0.083	0.527	1				
Corruption perception index	−0.149	0.126	−0.19	−0.818	1			
Insolvency resolution	−0.231	−0.243	0.113	−0.403	0.618	1		
Obtaining credit	−0.042	−0.242	−0.22	0.033	−0.093	0.275	1	
Living conditions and security	Homicide rate	Feeling of safety when walking in the street at night	Concern about income in old age	Pension-wage ratio	Emigration	Possibility of facing unexpected financial expenses		
Homicide rate	1							
Feeling of safety when walking in the street at night	−0.303	1						
Concern about income in old age	0.188	−0.356	1					
Pension-wage ratio	−0.368	0.124	0.018	1				
Emigration	0.323	0.045	−0.154	−0.02	1			
Possibility of facing unexpected financial expenses	0.364	−0.441	0.66	−0.268	0.051	1		

are assigned to component 1, *GDP* and *government debt* are assigned to component 2, and *public deficit* and *obtaining credit* are assigned to component 3; for the *labor market* dimension, the variables *unemployment rate*, *unemployment rate 55–65*, and *ability to make ends meet* are assigned to component 1, and *ease of opening a business* is assigned to component 2; for the *living conditions and security* dimension, the variables *feeling of safety when walking in the street at night*, *concern about income in old age*, and *possibility of facing unexpected financial expenses* are assigned to

component 1, and *homicide rate*, *pension-wage ratio*, and *emigration* are assigned to component 2.

To calculate the weight assigned to each variable, the total variance explained and the factor loading are used. Considering the *national accounts* dimension, the final weights for the variables *Moody's valuation*, *corruption perception index*, and *insolvency resolution* are equal to a 0.1479 (0.4315×0.3425), 0.1682 (0.4315×0.39), and 0.0925 (0.4315×0.2143) that they are assigned to component 1, the final weights for the variables *GDP* and

government debt are equal to 0.1155 (0.3326×0.3472) and 0.1563 (0.3326×0.47) as they are assigned to component 2, and the final weights for the variables *public deficit* and *obtaining credit* are equal to 0.0784 (0.2359×0.332) and 0.1218 (0.2359×0.5163) that they are assigned to component 3. Following this method, we have calculated the weights for the rest of variables, and the results are shown in Table 3. We must emphasize that if the original factor loadings is negative, weights are computed with a negative sign.

Following this step, an index has been calculated for each of the dimensions for each country. Table 4 shows the results of the computation of the index for selected countries.

Figure 1 shows a comparison of the results obtained in the 28 European countries with respect to the theme represented by each of the dimensions, in which we can see which are the best and worst qualified countries in each of the four groups.

With regard to the *markets and trade* dimension, countries such as Belgium, Germany, Sweden, and the United Kingdom are clearly prominent, which may be due to an increase in the CPI and the HICP indicating an increase in

the standard of living, without devaluing things, and therefore a development of the countries concerned. On the other hand, Romania, Croatia and Hungary are the worst off, probably due to high interest rates which mean that the investor has less money and therefore less investment capacity.

As regards the *national accounts* dimension, the worst countries are Malta and Bulgaria. In the case of Bulgaria this is possibly due to

- Moody's miscalculation
- The lack of trust in politicians due to corruption-related issues
- A low capacity for insolvency resolution there is

In the case of Malta, however, this poor score is due to

- Moody's low rating
- Low capacity to obtain credit
- A low insolvency resolution

On the other hand, the best countries in this dimension are Belgium, Denmark, Germany, Finland and the United Kingdom, all located in northern Europe, which have in common a good Moody's valuation and a high capacity for insolvency resolution.

In terms of the *labor market*, a country with a score far below that of the rest of the countries, Greece, stands out clearly because the unemployment rate in this country is far above that of the other European countries, and the capacity to make ends meet is also very low.

Among the top-ranked countries are Germany, Denmark, the Czech Republic, Malta, Austria, Sweden, and the Czech Republic, all of which may have low unemployment rates.

With regard to the last dimension, *living conditions and security*, there is one country clearly highlighted with a very low score which is Lithuania; this is probably due to the fact that it is the country with the highest rate of homicides and the lowest feeling of security when walking alone at night, which indicates not very high security among the population. Among the top-ranked countries are Denmark, Croatia, the Netherlands, Austria, Finland, Sweden and Spain, which are all countries with low homicide rates and high security when walking alone at night.

For the calculation of the index, the PCA has been done again with the indices calculated for each of the dimensions, and with this the weight of each dimension in our index has been obtained (Table 5).

Table 4 shows the perception index of a country in the financial markets for each of the 28 European countries. As you can see, the top-ranked countries are the United Kingdom, Germany, and Sweden, compared to Bulgaria, Croatia, and Greece, which are at the bottom of the table. In general, the best ranked countries receive high scores in all four

Table 3 Weights assigned to each variable

Weights assigned to each variable	
Markets and trade	
Interest rate	−0.1054
Exchange rate	−0.1690
Portfolio investment	−0.1420
Balance of payments	−0.0904
CPI	0.1878
HICP	0.1723
National accounts	
GDP	−0.1155
Public deficit	−0.0784
Government debt	0.1563
Moody's valuation	−0.1479
Corruption perception index	0.1682
Insolvency resolution	0.0925
Obtaining credit	0.1218
Labor market	
Unemployment rate	−0.2851
Unemployment rate 55–65	0.1507
Ability to make ends meet	0.2056
Ease of opening a business	−0.2442
Living conditions and security	
Homicide rate	−0.1465
Feeling of safety when walking in the street at night	0.1385
Concern about income in old age	−0.2196
Pension–wage ratio	0.0838
Emigration	−0.1172
Possibility of facing unexpected financial expenses	−0.2105

Table 4 Computation of the index

Country	Markets and trade	National accounts	Labor market	Living conditions and security	Index
Belgium	0.752	0.535	-0.123	-0.387	0.193 (8)
Bulgaria	-0.476	-0.663	0.148	-0.266	-0.344 (26)
Czech Republic	0.335	-0.15	0.572	-0.287	0.07 (10)
Denmark	-0.071	0.55	0.667	0.295	0.346 (5)
Germany	0.603	0.554	0.897	-0.038	0.46 (2)
Estonia	0.477	-0.063	-0.105	-0.491	-0.063 (15)
Ireland	-0.606	-0.009	-0.179	0.087	-0.161 (19)
Greece	-0.156	-0.162	-1.582	-0.283	-0.471 (28)
Spain	0.132	0.115	-0.604	0.209	0.007 (13)
France	0.307	0.497	-0.352	0.074	0.163 (9)
Croatia	-0.978	-0.471	-0.498	0.26	-0.389 (27)
Italy	0.046	0.001	-0.392	0.116	-0.031 (14)
Cyprus	-0.7	-0.258	-0.425	-0.014	-0.328 (25)
Latvia	0.307	-0.154	-0.36	-0.457	-0.168 (21)
Lithuania	0.137	-0.288	-0.106	-0.816	-0.302 (23)
Luxembourg	-0.3	-0.452	0.283	0.126	-0.104 (17)
Hungary	-0.719	-0.191	0.107	0.159	-0.161 (20)
Malta	0.235	-1.07	0.824	-0.418	-0.192 (22)
Netherlands	-0.041	0.286	0.436	0.292	0.236 (7)
Austria	0.379	0.483	0.535	0.291	0.412 (4)
Poland	-0.307	0.09	0.327	0.055	0.028 (11)
Portugal	0.165	0.178	-0.493	0.061	0.011 (12)
Romania	-0.838	-0.456	-0.164	0.199	-0.303 (24)
Slovenia	-0.096	-0.197	-0.256	0.168	-0.063 (16)
Slovakia	-0.228	-0.346	-0.147	0.197	-0.12 (18)
Finland	0.118	0.673	0.131	0.291	0.32 (6)
Sweden	0.569	0.211	0.583	0.36	0.415 (3)
United Kingdom	0.954	0.753	0.277	0.217	0.554 (1)

Fig. 1 Comparison of the four dimensions

Table 5 Weights assigned to each dimension

Weights assigned to each dimension	
Markets and trade	0.246
National accounts	0.269
Labor market	0.194
Living conditions and security	0.291

dimensions, while the worst ranked countries tend to receive low scores in all four dimensions analyzed.

Conclusion

The perception of a country is a very important aspect in many dimensions. The current globalization process has caused countries to be fully aware on the way they are depicted because of a significant competition between

nations in every industry, market, and aspect of society as consumers. A nation image is important for many reasons, such as self-perception, economic and political reasons within borders and among countries.

We propose a country's international reputation index as an instrument to measure the problems and possibilities countries have in improve their image. Thus, the creation of an index for country comparisons, and to discern differences in a range of factors, should be of great interest to politicians, employers, and individuals.

Here we adopt a global perspective, using a set of variables measured at the country level to evaluate the conditions for having perception based on financial markets in Europe. The index is a combination of four dimensions: Markets and trade, National accounts, Labor market, Living conditions and security.

The goal of the formulation of this index was the measurement of the perception of the different countries that belong to the European Union. To do this, using from 28 European countries, we collected twenty-three different factors, included in four dimensions, which seek to bring together the most important aspects.

Results show the top-ranked countries are the United Kingdom, Germany, and Sweden, compared to Bulgaria, Croatia, and Greece, which are at the bottom of the table. The fact that our index includes several dimensions of analysis may prove helpful in carrying out international comparisons.

We also demonstrate that there are significant cross-country differences in the scores assigned to the different dimensions of the index, indicating that the perception can be addressed using a range of policy instruments. To the extent that more data becomes available, the index can be included in further analysis, which would improve our understanding of the phenomena.

Our research may serve as a first step in identifying cross-country differences and the underlying factors affecting the new perspective (reputation-country attractiveness). However, we acknowledge that the decision to invest in a country is personal and should be taken seriously, with a high degree of responsibility. Thus, our index does not capture all the factors behind personal reputation, which explains why it is not a perfect measure of country attractiveness. To the extent that more data becomes available, the index can be included in further analysis, which would improve our understanding of the reputation phenomena.

It will be very interested to know the position in the ranking of United Kingdom after the Brexit.

Appendix: Results for the Principal Components Analysis (PCA)

See Tables 6, 7, 8, 9, 10, 11, 12, and 13.

Table 6 Eigenvalues for variables included in dimension "markets and trade"

Component	Eigenvalues	Variation explained	Cumulative variation explained
1	2.214	36.90	36.90
2	1.237	20.63	57.53
3	1.135	18.93	76.46
4	0.716	11.93	88.39
5	0.465	7.75	96.14
6	0.231	3.86	100

Table 7 Rotated factor loadings for variables included in dimension "markets and trade"

Variable	Component 1	Component 2	Component 3
Interest rate	−0.674	−0.539	0.147
Exchange rate	0.167	−0.878	−0.054
Portfolio investment	−0.023	0.183	−0.854
Balance of payments	−0.213	−0.321	−0.681
CPI	0.9	−0.158	0.155
HICP	0.862	−0.081	0.171

Bold indicates the factor loadings with the highest absolute value for each variable, which correspond to the component where the variables are assigned

Table 8 Eigenvalues for variables included in dimension "national accounts"

Component	Eigenvalues	Variation explained	Cumulative variation explained
1	2.367	33.82	33.82
2	1.825	26.06	59.88
3	1.294	18.49	78.37
4	0.746	10.65	89.02
5	0.538	7.68	96.71
6	0.159	2.28	98.98
7	0.071	1.02	100

Table 9 Rotated factor loadings for variables included in dimension “national accounts”

Variable	Component 1	Component 2	Component 3
GDP	−0.194	−0.777	−0.061
Public deficit	0.071	−0.322	−0.684
Government debt	−0.285	0.904	−0.012
Moody's Valuation	−0.895	0.27	0.082
Corruption perception index	0.955	0.043	−0.125
Insolvency resolution	0.708	0.292	0.433
Obtaining credit	0.016	−0.232	0.853

Bold indicates the factor loadings with the highest absolute value for each variable, which correspond to the component where the variables are assigned

Table 10 Eigenvalues for variables included in dimension “labor market”

Component	Eigenvalues	Variation explained	Cumulative variation explained
1	1.97	49.27	49.27
2	1.1	27.54	76.81
3	0.547	13.68	90.5
4	0.38	9.5	100

Table 11 Rotated factor loadings for variables included in dimension “labor market”

Variable	Component 1	Component 2
Unemployment rate	−0.884	−0.219
Unemployment rate 55-65	0.643	−0.537
Ability to make ends meet	0.751	−0.285
Ease of opening a business	0.007	−0.945

Bold indicates the factor loadings with the highest absolute value for each variable, which correspond to the component where the variables are assigned

Table 12 Eigenvalues for variables included in dimension “living conditions and security”

Component	Eigenvalues	Variation explained	Cumulative variation explained
1	2.293	38.21	38.21
2	1.36	22.67	60.87
3	0.942	15.7	76.57
4	0.682	11.37	87.94
5	0.474	7.9	95.84
6	0.25	4.16	100

Table 13 Rotated factor loadings for variables included in dimension “living conditions and security”

Variable	Component 1	Component 2
Homicide rate	−0.328	−0.781
Feeling of safety when walking in the street at night	0.681	0.15
Concern about income in old age	−0.858	0.139
Pension-wage ratio	0.17	0.591
Emigration	0.247	−0.698
Possibility of facing unexpected financial expenses	−0.84	−0.249

Bold indicates the factor loadings with the highest absolute value for each variable, which correspond to the component where the variables are assigned

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