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SUSTAINABLE DEVELOPMENT AND PERFORMANCE OF INSTITUTIONS: APPROACHES TOWARDS MEASUREMENT

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Abstract. The aim of this paper is to estimate and to compare sustainable development processes in Lithuania, Latvia and Estonia focusing on institutional dimension of sustainable development. Attention has been focused on the selection of system of indicators with particular emphasis on institutional indicators. The authors employ the most popular two multicriteria methods: Simple Additive Weighting (SAW) and multi-criteria complex proportional method (MCP). Data embracing 2004-2010 year period is being analyzed. In order to obtain a multi-faceted view, several variants of sustainable development estimations of Lithuania, Latvia and Estonia are being performed. Each variant represents a different approach to development perception. The difference lies in emphasis, which is being put on the economic and institutional aspects of development. Hypothesis has been raised that the different methods employed may affect comparison results.

Keywords: Sustainable Development, Institutional Dimension, Multi-criteria Complex Proportional Method, SAW Method.

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1. Introduction

Properly functioning institutions are essential for sustainable development in the realization of social, economic, and environmental aims set by the society (Helm, 1998). The importance of institutions and their impact on economic development emerged in the 1970s with the North Douglas work on institutions. North (1991) emphasizes the importance of institutions. He claims that institutions provide the incentive structure of an economy and that, as the structure evolves; it shapes the direction of economic movement towards growth, stagnation or decline. Nevertheless, institutions, according to scientists, could obtain different meaning. North (1994) perceives institutions as humanly devised formal and informal constraints, respectively, rules, laws, constitutions, and norms of behaviour, conventions, and self-imposed codes of conduct. Those formal and informal constrains, respectively, define the incentive structure of societies and, specifically, economies. North (1991) distinguishes institutions and organizations by indicating, that it is the interaction between institutions and organizations that shapes the institutional evolution of an economy. If institutions are the rules of the game, organizations and their entrepreneurs are the players. Institutions are humanly devised constraints that structure human interaction. Organizations are made up of groups of individuals bound together by some common purpose to achieve certain objectives. To generalize that approach, it could be stated that institutions and organizations must be two interacting parties, the first of which sets rules or transmits those, which are already set, and another party (i.e. organizations), which acts ac-

cordingly to the established rules. Hodgson (2006) provides critical comment about North's proposed definition of institutions, i.e. that institutions and organizations are not synonymous. Hodgson (2006) starts from distinguishing the main characteristic features of institutions and later uses those characteristics for comparison of organizations with institutions. Hodgson (2006) recalls that "organizations are special institutions that involve (a) criteria to establish their boundaries and to distinguish their members from non-members, (b) principles of sovereignty concerning who is in charge, and (c) chains of command delineating responsibilities within the organization". The World Bank (2003) provides a definition of institutions as "the rules and organizations, including informal norms that coordinate human behavior. Tvaronavičienė *et al.* (2009) assert that notion of institution is much wider than notion of organization and institutions could be considered in a broad and narrow sense. In a broad sense, the notion of institution embraces organizations, while in a narrow sense North's approach can be adopted, i.e. "if institutions are the rules of the game, organizations and their entrepreneurs are the players"(North 1994: 361). Williamson (2000) identified four levels of institutions: the highest level of the institutional hierarchy provides the basic foundations for society's institutions. It encompasses informal institutions, customs, traditions, ethics and social norms, religion and some aspects of language and cognition. The basic institutional environment or, according to the author, the formal rules of game belong to level two. At this level constitutions, political systems and basic human rights are defined; property rights and their allocation; laws, courts and related institutions to enforce political, human rights and property rights, money, basic financial institutions, and the government's power to tax; laws and institutions governing migration, trade and foreign investment rules; and the political, legal and economic mechanisms that facilitate changes in the basic institutional environment. Institutions of governance are "the play of the game" (prices, wages, costs, quantities bought and sold). Scientists asserting prime importance of the institutions in the process of development have disagreements on the range of questions, for example, the definition of institution (whether political and economic institutions should be distinguished; whether institutions and organizations are synonymous, etc.). Another point of polemics concerns the origin of institution, i.e. endogenous versus exogenous one (Gwartney *et. al.* 2006; Cervellati *et al*. 2004; Helliwell 1994; Schwartz 2003; Aoki 2001; Acemoglu *et al*. 2001; Greif 1998). And the last, even admitting those pitfalls of interpretation, we still need to select indicators reflecting institutional state in order to be able to take into account institutional development input into the achieved aggregated sustainable development level. Acemoglu and Robinson (2008) claim that differences in economic institutions serve as the main determinant of prosperity across different countries. Economic institutions are seen as "collective choices that are the outcome of a political process", i.e. "depend on the nature of political institutions and the distribution of political power in society". Acemoglu and Robinson (2008) distinguish two types of institutions: economic and political. Political institutions condition efficiency of economic ones. Economic institutions, in their turn, are the main players consequently determining the level of sustainable development. While admitting that economic institutions are shaped by political ones, the authors state that they have "a highly preliminary understanding of the factors that lead a society into a political equilibrium which supports good economic institutions". According to the authors, some examples of political transitions leading to accomplishment of economic outcomes *ex post* could be observed. Nevertheless, good practices do not lead to clear frameworks. We can add that according to Acemoglu and Robinson (2008) the role of geographic, cultural and human interaction determinants in strengthening economic institutions remains unclear. To generalize, the impression is that the authors' distinguished economic and political institutions can be equally efficiently renamed respectively into "organizations" and "state institutions" or policies. Tvaronavičienė *et al.* (2009) suggest a contextual framework, i.e. institutions embrace organizations in their direct understanding and to consider further institutional impact on the sustainable development processes need to take into account both exogenous (outer) and indigenous (inner) stimuli to expand on various possible modes. For estimation purposes the authors of this paper will consider the role of institutions as environment conditioning tools. The better institutional performance at separately taken country, the better performance of organizations-market players and the faster sustainable development processes.

2. Measurement of Institutions: Selection of Indicators

To choose a set of indicators reflecting institutional facets, suitable for further analysis, i.e. for processing by mathematical methods, such as multi-criteria ones, is a complicated task. Rodrik (2000) raised a question, which institutions are important and consequently (we reckon) what effects should be measurable. E.g., the following facets of institutional impact are being listed: property rights, macroeconomic stabilization, social insurance, and conflict management. Evaluation of institutional quality and indicators proposed by the Freedom House, the Fraser Institute, and the Heritage Foundation are widely used by scientists. The Heritage Foundation composes Index of Economic Freedom, which covers 10 freedoms: Business Freedom, Trade Freedom, Fiscal Freedom, Government Freedom, Monetary Freedom, Investment Freedom, Financial Freedom, Property Freedom, Freedom for Corruption and Labor Freedom. All these areas are important to sustainable development. According to the Freedom House, the quality of institutions is measured by grading areas which affect sustainable development. The two main categories have been selected: Political Rights and Civil Liberties. Political Rights are based on ten political questions grouped into three subcategories: Electoral Process (3 questions), Political Pluralism and Participation (4), and Functioning of Government (3) and Civil Liberties based on 15 questions grouped into four subcategories: Freedom of Expression and Belief (4 questions), Associational and Organizational Rights (3), Rule of Law (4), and Personal Autonomy and Individual Rights (4). The Freedom House Index or Freedom in the World is an average of the two indices: Political Rights and Civil Liberties. The Index of Economic Freedom in the world constructed by Gwartney and Lawson (2003) measures the degree to which the policies and institutions of the countries are supportive of economic freedom. That Index measures the degree of economic freedom in related areas and embraces following facets: Size of Government, Expenditures, Taxes, Enterprises; Legal Structure and Security of Property Rights; Access to Sound Money; Freedom to Trade Internationally; Regulation of Credit, Labor, Business (Fraser Institute 2011). The widely used measure of institutions is the Worldwide Governance Indicators (WGI) constructed by Kaufmann *et al.* (2005). The World Governance Indicators measure six dimensions of governance: Voice and Accountability; Political Stability and Absence of Violence/ Terrorism; Government Effectiveness; Regulatory Quality; Rule of Law; Control of Corruption. To our minds while tackling institutional development impact on sustainable development, it is reasonable to distinguish two general groups of indicators: economic indicators and institutional indicators**.** It is obvious that those groups in some respect overlap (e.g. Redek, Sušjan 2005) and any attribution to one or another group is rather conditional (Grybaitė, Tvaronavičienė 2008; Tvaronavičienė *et al.* 2008; Tvaronavičienė, Grybaitė, Tvaronavičius 2008). While agreeing, that economic indicators would embrace major macroeconomic and some social facets (Table 1. Economic Indicators), let us concentrate further very specifically on the indicators, which do not fall under economic development characteristics. Many authors (Ulubasoglu, Doucouliagos 2004) agree that both political and economic freedoms impact growth significantly and, as they claim, it has a positive effect. The authors indicate a wide array of possibly important aspects, which should be taken into account.

The following indicators, as reflecting institutional impact on sustainable development processes are being selected, i.e. four aggregated Worldwide Governance indicators: *Rule of Law* (measuring perceptions of the extent to which agents have confidence in and abide by the rules of society, and, in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence), *Government Effectiveness Index* (measuring perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies), *Voice and Accountability* (captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and free media) and, *Regulatory Quality (*captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development). The Heritage Foundation embraces the *Index of Economic Freedom,* which covers freedoms from property rights to entrepreneurship. Into the

list of indicators authors include the *Corruption Perception Index* developed by Transparency International. The index measures the degree to which public sector corruption is perceived to exist. The *level of citizen's confidence in the EU institutions* describes to what extent the confidence of the European citizens in the European institutions is perceived, *E-government availability online, in per cent*, *Voter turnout in national elections, in per cent.* The indicator makes a contribution towards the two renewed sustainable development strategy policy guiding principles 'open and democratic society' and 'involvement of citizens' (Eurostat 2011). Major economic and some social facets embrace socio-economic indicators (Table 1).

Table 1. Set of Indicators

Institutional	Social-Economic
Voice and accountability	*Real GDP per capita (euro per inhabitant)*
Regulatory quality	*Total R&D expenditure, % of GDP*
Government Effectiveness Index	*Annual average inflation rate*
Rule of Law	*Business investment, % of GDP*
Index of Economic Freedom	*Level of the Internet access-households*
Corruption Perception Index	*Labour productivity per person employed*
E-government on-line availability, in per cent	*General government debt*
Voter turnout in national elections, in per cent	*FDI intensity*
Level of citizen's confidence in the EU institutions	*Inequality of income distribution*
	Unemployment rate, annual average

The listed indicators will comprise institutional indicator group, while estimating relative sustainable development level of Lithuania, Latvia and Estonia. Indicators included into the set meet the following requirements (Bruntland 1987; Disano 2002): they do not contradict each other; they can be put into the hierarchical range according to significance; they are intrinsic to all considered countries; numeric values of the chosen indicators are available. The indicators are attributed to two groups, representing, respectively, socio-economic and institutional aspects of development.

3. Evaluation of Relative Sustainable Development in the Baltic Countries

Indicators' set is composed *ad hoc* to reflect the institutional aspect of sustainable development. To put it in another way we suggest the set of indicators, which is customized for research purposes, i.e. is suitable for revelation of relative impact of institutional development on aggregated level of sustainable development. Composing indicators' set, modeling different significances and application of multi-criteria evaluation on data of Lithuania, Latvia and Estonia, would allow us to reveal limits, within which obtained results could fluctuate. Fluctuation range, in its turn, would indicate how much results could be affected by application of different development estimation premises. Multi-criteria methods, as a rule, use experts' questioning. For countries' comparisons multi-criteria methods, which conventionally suggest participation of experts, are usually applied. We assert that the so-called "experts" in that particular case would express only their personal beliefs and values; discussion about, what aspects of development are more significant, is too great and complex to be wrapped up by experts. Opinions about more or less significant development sides can vary; experts could be biased. Switching from experts' questioning to modeling of significances of the indicators included into the set, would allow us to reveal how much results could change if differently thinking groups of experts would be employed. The revealed differences are seen as tertiary data letting to judge the impact of institutional development on sustainable development level, when different approaches to significances of economic and institutional aspects are being adopted. Multi-criteria methods allow to aggregate values of indicators, included into the system, and obtain the value of one integral indicator. That integral indicator would represent the measure of considered countries' development at particular moment. Computing of such indicators for a period of 2004-2010 enables deriving tendency of development of a concrete country. Integral indicators computed for the Baltic countries would allow comparing countries and getting insights of their development specifics. The technique of integral indicator computing may differ depending on the multi-criteria method applied. We will use the most popular two methods: Simple Additive Weighting (SAW) and multi-criteria complex proportional method (MCP) (Saaty 1980, 1994; Ginevičius *et al.* 2006; Ginevičius 2006, 2008; Ginevičius, Podvezko 2008a, b; Zavadskas *et al.* 2006, 2008; Zavadskas 2008; Turskis *et al*. 2009). Not going into details, we just recall principles of multi-criteria methods' application. Multi-criteria

methods are devised to connect the product of two values. The first value is significance or weight of a particular indicator included into system; the second value is the value of the indicator, for which significance has been determined. Usually significance is set as decimals, sum of which is equal to one. The first value is significance or weight of a particular indicator included into the system; the second value is the value of the indicator, for which significance has been determined. Usually significances are set as decimals, the sum of which is equal to one (1):

$$\sum_{i=1}^{m} w_i = 1 \quad ,$$

where w_i – *i*- significance of considered indicator; m – number of indicators included into system (i = 1,...,n). In our case multi-criteria evaluation was performed on 19 indicators' basis (Table 1). Development of Lithuania, Latvia and Estonia was estimated taking annual values of considered indicators *rij* (i = 1, ... m; j = 1, ..., n), where m – number of indicators, n – number of countries.

We adopted an idea to model mathematically plausibly three different approaches to development; the first one would emphasize institutional aspects of development, the second one would emphasize socio-economic aspects, and in the third case all indicators included into the system would be considered as equally significant. Comparisons of resulting aggregated indicators' values would reveal how much adopted approach reflected by attributed significances affects the final result. To get answers to the raised scientific question, three different situations are being mathematically modeled. In the first situation institutional aspects of development are considered as the most important and, appropriately, institutional indicators receive the highest significances. In the second situation economic aspects are more stressed, hence, higher significances are attributed to them. In the third situation economic and institutional aspects are considered equally important; hence, all the indicators receive equal significance. (see Table 3, 4, 5).

As noted above, in the first modeled situation we assume that institutional aspects of development are being emphasized. Hence, economic indicators are being considered as less important in comparison with institutional ones, when the level of sustainable development is estimated. The application of the MCP method provides us with results: in the averaged period of 2004-2010 Estonia is the country, which among the Baltic countries achieved the highest level of development (after the EU-15). According to the calculations, Lithuania and Latvia appear in the second and the third place, respectively. The application of the SAW method provides us with similar results (see Figure 1, 2).

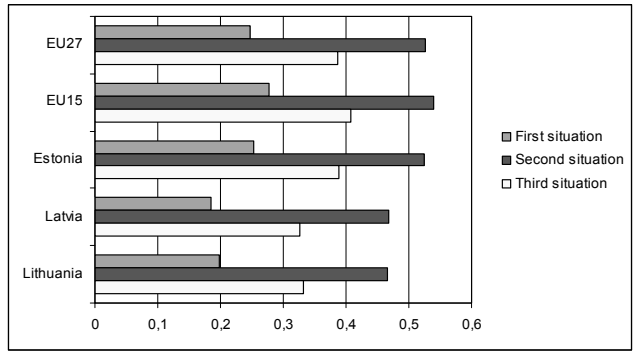

Figure1. Aggregated Assessment of the Baltic Countries in the EU Context during the Averaged Period of 2004-2010; MCP Method.

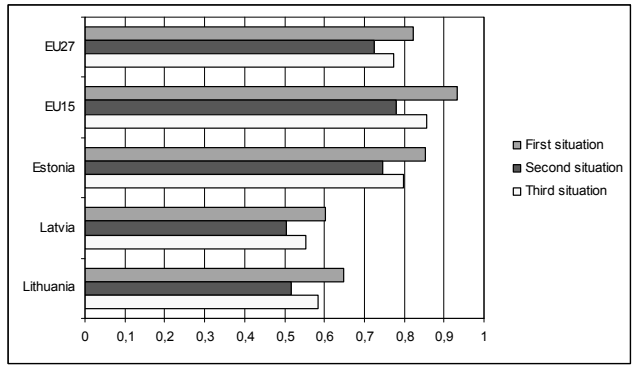

Figure 2. Aggregated Assessment of the Baltic Countries in the EU Context during the Averaged Period of 2004-2010; SAW Method.

The EU-15 countries appear to be better developed than Lithuania, Latvia and Estonia. If the European context is taken into consideration, the EU-15 countries get into the first place, Estonia gets into the second place, the EU-27 get into the third place, and the fourth and the fifth is occupied by Lithuania and Latvia, respectively. As we see, the EU-15 countries remain in the first place in all three modeled situations applying two different methods – MPS and SAW. In the second mathematically modeled situation socio-economic aspects of development are stressed; the highest significances are attributed to the indicators included into the group of economic ones (Table 4). Data employed in the calculations represent math-

ematical averages of the selected indicators, computed for the period of 2004-2010. Rationale behind choosing of averages lies in the following considerations. As we know, macroeconomic conditions during the last years have been changing drastically in the majority of countries. The notion of sustainable development embraces a vast array of dimension of development, hence, to avoid distortions we decided to base our countries' comparisons on the period averages, as providing more objective insights into the processes of sustainable development. Aggregated indexes computed for Lithuania, Latvia, Estonia, the old European Union (EU-15), and the extended European Union (EU-27) countries for averaged period of 2004-2010 let us draw the following conclusions. (Figure 1, 2). The EU-15 countries remain in the first place; however, the SAW and MCP methods provide us with rather different results: Estonia and the EU-27 countries change their position, and we see the EU-27 in the second place, Estonia in the third place, Latvia in the fourth place and Lithuania in the fifth place (Figure 1). Note the first situation when Lithuania was in the fourth place. However, when the SAW method is applied (Figure 2), we see different situation while, the results remain the same as in the first modeled situation. In the third modeled situation we assume that socio-economic and institutional aspects of development are being treated as equally important, and, hence, equal significances are attributed to all the indicators included into the sustainable development system. The application of multi-criteria method provides us with rather similar results as in the first situation, where greater significances are attributed to the institutional indicators. In the averaged period of 2004-2010, Estonia is the country, which among the Baltic countries achieved the highest level of development (after the EU-15). The same applies if compared with the first situation: Estonia surpasses the EU-27 countries. According to the calculations, Lithuania and Latvia appear, in the fourth and fifth place, respectively (Figure 1 and 2) (Application of both multi-criteria methods (SAW and MPC) provides us with rather similar results). If the European context is taken into consideration, the EU-15 countries get into the first place, the EU-27 gets into the third place, the second place (third in the second situation (MCP method)) is occupied by Estonia, the fourth and the fifth places are occupied by Lithuania and Latvia, respectively. To conclude, the application of different methods provides us with rather similar results, with exception of the second situation when applying the MCP method. Note that in all three situations Estonia was in the second place except the second situation according to the MCP method (see Table 2).

Table 2. Countries' Ranking according to Generalized Situational Results

	1 situation		*2 situation*		*3 situation*	
	MCP	SAW	MCP	SAW	MCP	SAW
EU(15)	1	1	1	1	1	1
EU(27)	3	3	2	3	3	3
Estonia	2	2	3	2	2	2
Lithuania	4	4	5	4	4	4
Latvia	5	5	4	5	5	5

Conclusions

The scientists asserting prime importance of the institutions in the process of development have disagreements on the range of questions, for example, the definition of institution (whether political and economic institutions should be distinguished; whether institutions and organizations are synonymous, origin of institution, i.e. endogenous versus exogenous, etc.). Despite the fact, that there are no consensus about the definition of institutions, scientist agree, that properly functioning institutions are essential for sustainable development in the realization of social, economic, and environmental aims set by the society.

Tackling institutional development impacts on sustainable development in their research the authors distinguish two general groups of indicators: economic and institutional ones. It is obvious, that those groups overlap in some respect; therefore the selection of sustainable indicators' system is complicated and partly subjective. For multi-criteria evaluations, the indicators' system has to be sufficiently concise, comprising indicators quantitatively available. Hence, reflecting institutional performance requires shortcut of other aspects of sustainable development.

To summarize the specifics of application of multi-criteria method, we need to emphasize that despite the fact that methods are quite different the selection for particular methods for research, has less impact on calculation results, than the attributed significance to one or other group of indicators.

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Table 3. The first situation. Institutional aspects of development are considered as the most important and, appropriately, institutional indicators receive the highest significance.

Indicators	Score		Significance
Socio-economic			
GDP-current prices (euro per inhabitant)	0.19	1.00%	0.01
Total R&D expenditure % of GDP	0.19	1.00%	0.01
Annual inflation rate	0.19	1.00%	0.01
Business investment, % of GDP	0.19	1.00%	0.01
Level of the Internet access to households	0.19	1.00%	0.01
Labour productivity per person employed	0.19	1.00%	0.01
General government debt	0.19	1.00%	0.01
FDI investment intensity	0.19	1.00%	0.01
Inequality of income distribution	0.19	1.00%	0.01
Unemployment rate, %	0.19	1.00%	0.01
Institutional			
Rule of Law	1.9	10.00%	0.10
Voice and accountability	1.9	10.00%	0.10
Government Effectiveness Index	1.9	10.00%	0.10
Regulatory quality	1.9	10.00%	0.10
Level of citizen's confidence in the EU institutions	1.9	10.00%	0.10
Index of Economic Freedom	1.9	10.00%	0.10
Corruption Perception Index	1.9	10.00%	0.10
E-government availability online	1.9	10.00%	0.10
Voter turnout in national and EU parliament	1.9	10.00%	0.10
	19	100.00%	100.00%

Table 4. The second situation. Socio-economic aspects of development are considered as the most important and, appropriately, socio-economic indicators receive the highest significance.

Indicators	Score		Significance
Socio-economic			
GDP-current prices (euro per inhabitant)	1.81	9.53%	0.10
Total R&D expenditure % of GDP	1.81	9.53%	0.10
Annual inflation rate	1.81	9.53%	0.10
Business investment, % of GDP	1.81	9.53%	0.10
Level of the Internet access to households	1.81	9.53%	0.10
Labour productivity per person employed	1.81	9.53%	0.10
General government debt	1.81	9.53%	0.10
FDI investment intensity	1.81	9.53%	0.10
Inequality of income distribution	1.81	9.53%	0.10
Unemployment rate, %	1.81	9.53%	0.10
Institutional			
Rule of Law	0.1	0.53%	0.01
Voice and accountability	0.1	0.53%	0.01
Government Effectiveness Index	0.1	0.53%	0.01
Regulatory quality	0.1	0.53%	0.01
Level of citizen's confidence in the EU institutions	0.1	0.53%	0.01
Index of Economic Freedom	0.1	0.53%	0.01
Corruption Perception Index	0.1	0.53%	0.01
E-government availability online	0.1	0.53%	0.01
Voter turnout in national and EU parliament	0.1	0.53%	0.01
	19	100.00%	100.00%

Table 5. The third situation. Socio-economic and institutional aspects are considered equally important; hence, all the indicators receive equal significance.

Indicators	Score		Significance
Socio-economic			
GDP-current prices (euro per inhabitant)	1	5.26%	0.05
Total R&D expenditure % of GDP	1	5.26%	0.05
Annual inflation rate	1	5.26%	0.05
Business investment, % of GDP	1	5.26%	0.05
Level of the Internet access to households	1	5.26%	0.05
Labour productivity per person employed	1	5.26%	0.05
General government debt	1	5.26%	0.05
FDI investment intensity	1	5.26%	0.05
Inequality of income distribution	1	5.26%	0.05
Unemployment rate, %	1	5.26%	0.05
Institutional			
Rule of Law	1	5.26%	0.05
Voice and accountability	1	5.26%	0.05
Government Effectiveness Index	1	5.26%	0.05
Regulatory quality	1	5.26%	0.05
Level of citizen's confidence in the EU institutions	1	5.26%	0.05
Index of Economic Freedom	1	5.26%	0.05
Corruption Perception Index	1	5.26%	0.05
E-government availability online	1	5.26%	0.05
Voter turnout in national and EU parliament	1	5.26%	0.05
	19	100.00%	100.00%