

IMPACT OF HARD AND SOFT DATA ON CZECH AND SLOVAK POSITION IN INTERNATIONAL COMPETITIVENESS RANKINGS

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Abstract

Although the term "national competitiveness" is widely used, there is neither a clear definition of the concept, nor a widely accepted way of its measuring. Many economists warn against unconditional acceptance of the competitiveness rankings' results. They draw attention to the insufficient analytical framework, disputable selection of indicators, chosen system of weights, and the large representation of the soft data, despite the fact that these data have only limited informational value. The first aim of this article is to compare the results of the Czech Republic and Slovakia in the WCY and the GCR - considering various representations of hard and soft data in the overall index and the application of different weights to the similar variables. The second aim of this paper is to analyse the strengths and weaknesses of Czech and Slovak competitiveness according to their ranking in the competitiveness pillars. The third objective of this paper is to analyse the influence of hard and soft data on the country's overall position within the EU28. We try to describe and explain the differences between the results obtained by using all the WEF indicators and the results derived from selected indicators only.

Key words: national competitiveness, Global Competitiveness Report, World Competitiveness Yearbook

JEL Code: E20, F00, F6

Introduction

The debate about the meaningfulness of the term "national competitiveness" has started when this term has begun to be broadly used in connection with globalisation and changes in the international trade. Since the economist have not yet been able to reach an agreement about a generally accepted definition of this very often used term, the term "national competitiveness" is understood to be ambiguous.

The first aim of this article is to compare the WEF and the IMD methodology used for creating the Global Competitiveness Report (GCR) and the World Competitiveness Yearbook (WCY). This brief description will be followed by the comparison of Czech and Slovak results in these rankings. As a different number of countries is evaluated in each ranking, for the purpose of this comparison only the results of the EU28 countries were chosen and compiled into adjusted only EU28 rankings. In our analysis, the results of the Czech Republic and Slovakia in these adjusted rankings were used.

The second aim of this paper is to use the data published in the GCR for the evaluation of changes in Czech and Slovak national competitiveness according to the GCI, the adjusted GCI, and the Index (11). In analysis, our own indices, based on using of all and selected hard data published in the Competitiveness Dataset of the WEF, were constructed. The construction of the Index (11) was inspired by the attitude of Malý and Klvačová (Klvačová, Malý 2008). The Index (11) was calculated as follows: the country's rank in 11 indicators was taken into account and the arithmetic average was then computed. Based on the index values obtained for each economy, the competitiveness ranking for the EU28 was compiled. Similar attitude (arithmetic average of indicators) was used for the construction of the "adjusted GCI" - this index is based on using all of the hard and soft indicators.

For the analysis of the changes in competitiveness and for the description of Czech and Slovak strengths and weaknesses, methods of comparison and evaluation will be applied.

1 Theoretical issue of an ambiguous term "national competitiveness"

Traditional trade theorists - classical economists - argued that national competitiveness is a function of capital, labour, and natural resources. But their attitude based on the absolute and comparative advantage had to be revised due to the international connectivity of countries, regions, and firms caused by globalisation. Delgado et al. (2012) mention three ideas connected with the evolution of the competitiveness debate: market share, costs, and productivity. High market shares can be a symptom of underlying location advantages, however, the same result can be achieved through targeted and distortive subsidies as well.

The negative effects of unavailable policy, which can be a result of an ambiguous definition of the term "national competitiveness", are discussed by i.e. P. Krugman. As Krugman (1994) warns, obsession with national competitiveness poses three dangers: 1) it could result in increasing government expenditure on its enhancing, 2) it could trigger protectionisms and trade wars, and 3) it could lead to undesirable public policy. Another view

of competitiveness focuses on measures of the location costs. Low labour costs (compensation per hour, per employee) can be considered to signify competitiveness leading to lower unemployment, higher exports, and higher FDI. Other studies explore the relationship between labour costs and output. Unit labour costs are often used to test sustainability of country's balance of payments (e.g., European Bank, 2008). As Delgado et al. emphasise, the naive interpretation of competitiveness as low costs (low wages) is misguided if prosperity is the policy's objective. From R. Camagni's point of view (Camagni, 2002) the territory attitude to the judgement of competitiveness is very useful. "Unlike countries, cities and regions compete, in single currency areas, on the basis of an absolute advantage principle and not a comparative principle." Camagni points out that no efficient, automatic mechanism - like currency devaluation or prompt flexibility of wages and prices - exists to grant each territory some role in the international division of labour, whatever its relative performance. The competitiveness of territories is seen as a central issue for the security of employment stability, benefits from external integration, continuing growth of local well-being and wealth. (Camagni, 2002)

Porter (1990) refocused the competitiveness debate towards the notion that competitiveness is the foundation of the creation of wealth and economic performance. According to Porter, national competitiveness does not grow out of resource endowments or currency value, as traditional models assumed, but it can be created by a combination of strategic choices along the four determinants of the Diamond model. Using Porter's perspective, national competitiveness became tightly connected to productivity. Following this attitude, differences in prosperity of countries are determined by the differences in productivity of these countries¹. A range of indicators in the most famous international competitiveness rankings (the WEF's Global Competitiveness Report and the IMD's World Competitiveness Yearbook) have been proposed to explain cross-country differences in productivity².

¹ Several studies which are focused on competitiveness of the V4 countries are based on the examination of the relation between labour productivity and real exchange rate. Analysis of Posta (2010) was aimed at the testing of the predictive power of Balassa-Samuelson theorem for the V4 countries. According to this test, the effect of labour productivity on the real exchange rate can hardly be considered as clear-cut as predicted by the Balassa-Samuelson theorem.

² The term "national productivity" is closely related to the productivity of national firms. Firm productivity is one from the indicators of firm competitiveness. Competitiveness can be assessed through financial indicators which are available in accounting statements. For example, Scholleova, Camska (2015) used ROC curves and AuROC measures to test the utility of financial indicators as "competitiveness indicators". According to their results, it is possible - to a certain extent - to predict future competitiveness based on the previous results in specific indicators derived from the financial statements.

According to Cho and Moon (2013) and others two above mentioned, the traditional competitiveness reports are unsatisfactory in many respects. The absence of strong theoretical background is regarded as the fundamental problem - the reports lack a rigorous theoretical explanation, therefore it is unclear why some factors are important and others are not - and the probable cause of the frequent changes of the evaluation models. Although the IMD and the WEF used similar variables, they employed different models and produced different results. This is determined by the application of the different weights to the same variables.

Table 1 shows some basic characteristics of the WEF's and the IMD's attitude to the measurement of the national competitiveness and summarizes a few critical objections to their methodology.

Tab. 1: Key points of the WEF's and the IMD's methodology

<i>International ranking</i>	World Competitiveness Yearbook (2015)	Global Competitiveness Report (2015)
Publisher	International Institute for Management Development (IMD)	World Economic Forum (WEF)
Definition of national Competitiveness	Facts and policies shape the ability of a nation to create and maintain an environment which sustains more value creation for its enterprises and more prosperity for its people.	The set of institutions, policies, and factors that determine the level of productivity of a country
Number of countries	61 countries Advanced and newly industrialized countries Excluded many other developing countries	144 countries Both developing and developed countries Relying too much on the subjective data
Groups of indicators	1. Economic Performance 2. Government Efficiency 3. Business Efficiency 4. Infrastructure	1. Institutions 2. Infrastructure 3. Macro-economy Stability 4. Health and Primary Education 5. Higher Education and Training 6. Goods Market Efficiency 7. Labor Market Efficiency 8. Financial Market Development 9. Technological Readiness 10. Market Size 11. Business Sophistication 12. Innovation
Number of criteria	342	114
Data set	Hard data: 2/3 (138 used, 86 background info) Soft data: 1/3 (118 used)	Hard Data: 1/3 Soft Data: 2/3
Theoretical Validity	Missing variables: public-private partnership, market sophistication, cluster development, etc	Missing variables: natural resources, public-private partnership, foreign direct investment, etc
Weights	Different weights by types of data - Hard : Survey = 1 : 0.51	Different weights by stages of development - Factor-driven: 60: 35: 5 -Efficiency-driven: 40: 50: 10 - Innovation-driven: 20: 50: 30
Country grouping	Population size, GDP per capita, Region	Factor, Efficiency, Innovation-driven

Source: <http://www.imd.org/wcc/wcy-world-competitiveness-yearbook/>, <http://reports.weforum.org/global-competitiveness-report-2015-2016/>, online 10.3.2016, own processing

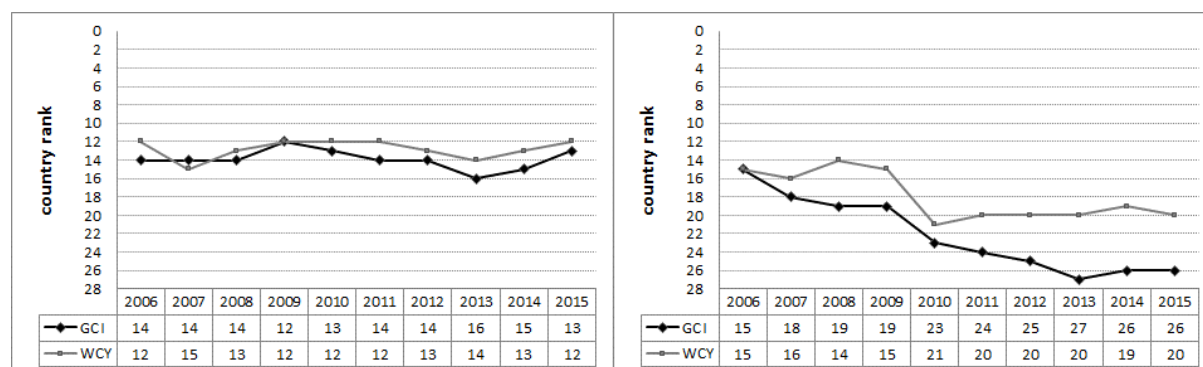
2 Impact of the different weighting systems applied by the WEF and the IMD on the country ranking

Attempting to summarize complex concepts - such as competitiveness - in a single metric or index raises a number of empirical challenges, among other data quality, indicator selection, indicator importance, weighting, aggregation, and so on. If done well, the exercise could yield a powerful tool capable of capturing the societal conditions which drive national competitiveness. (GCR, 2010-11) In every composite indicator analysis, the final index is the outcome of a number of choices: the framework (usually driven by theoretical models and experts' opinions), the indicators to be included and their normalization, the weights assigned to each indicator, and the aggregation method, among other elements. Some of these choices are subjective; others are driven by statistical analysis, mathematical simplicity, experts' opinions, or common practice. The aim of the robustness analysis (this analysis was realized by The Joint Research Centre) was to assess the extent to which all these choices, some of them considered crucial, might affect the final score and the ranking of the index.

The result of the robustness analysis initiated by the WEF was following: the width of error bars tends to decrease as the development stage increases. This ascertainment indicates that countries in the first development stage are more affected by the compensability among indicators within each pillar group. On the contrary, the highest-ranked countries, with only a few exceptions, are the least affected by compensability, meaning that the best performers have high scores in almost every aspect of competitiveness. One of the distinctive characteristics of the GCI is the introduction of the transition development stages. Countries which are in between two of the three major stages are assigned a set of weights, which gradually change as the country moves to the more advanced stage. This reproduces the smooth transition from a lower stage of development to the upper level, implying that countries possessing the economic capacity to perform better - reflected by their weight values - are expected to score higher in the different dimensions of the GCI. In terms of ranking, most of the countries would gain positions if assigned the weights of the adjacent lower-development stage and would lose positions if assigned the weights of the adjacent higher-development stage. (GCR, 2010-11)

The figure 1 and 2 illustrate the impact of the different choice of indicators and weighting system applied by the WEF (the World Economic Forum, the publisher of the Global Competitiveness report) and the IMD (the Institute for Management Development) on the Czech and Slovak evaluation inside the EU28. Both countries are better evaluated by the WCY ranking. It indicates that the predominance of hard data results in better results for both countries. The bigger difference between Slovakia's position in the two rankings could be caused by an unstable weighting system of subindices during this period (during our chosen period, the development stage of Slovakia changed several times, from the stage in transition 2-3 to the 3rd, innovation driven, stage). The previous paragraph describes the possible explanation of this bigger difference in case of Slovakia.

Fig. 1 and 2: Czech and Slovak position inside the EU28 according to GCR and WCY



Source: <http://www.imd.org/wcc/wcy-world-competitiveness-yearbook/>, <http://reports.weforum.org/global-competitiveness-report-2015-2016/>, online 10.3.2016, own processing

3 Comparison of Czech and Slovak strengths and weaknesses according to the WEF indicators

Table 2 summarizes the changes in Czech and Slovak position in the 12 WEF's pillars. For more precise view of strengths and weaknesses of Czech and Slovak Rep. we selected the results from the first year covered in the Competitiveness Dataset - 2006 and from the last ranking. We used dark grey tint for the four worst evaluated groups of indicators and light grey tint for the four best evaluated pillars in every column. Arrows in the last column indicate the change (improvement, deterioration) in the new ranking (GCR 2015-16) compared to the first ranking (2006-07).

The comparison between strengths and weaknesses of Czech position shows that indicators with negative impact on Czech position stay the same (the 1st pillar Institutions and the 7th pillar Labour market efficiency), whereas indicators with positive impact on Czech

competitiveness changed in the last edition of the GCR, compared to the first year of our analysis. The soft indicators (trust in politicians, quality and transparency of decision-making processes in the government and public sector, etc.) have a negative effect on the result in the Institution pillar (the 3rd worst indicator for Czech Rep. in the last edition is Public trust in politicians - 107th place out of 144 monitored countries, the indicator with the worst evaluation is Burden of government regulation - 120th place). However, the position of the Czech Republic in the key knowledge indicators (higher education and training, technological readiness, innovation and sophistication factors) is worse in the last edition. Compared to the EU15, the Czech Republic lags behind mainly in pillars characteristic for the knowledge economy. Above all, the Czech Republic suffers from badly evaluated government procurement of advanced tech products (83rd) and availability of scientists and engineers (66th). This indicates that other countries have higher pace of improvement in these important aspects of competitiveness.

Tab. 2: Strengths and weaknesses according to the WEF pillars

Ranking - GCI	Czech Republic			Slovak Republic		
	2006	2015	2006-15	2006	2015	2006-15
<i>Basic requirements</i>	39. (4.9)	31. (5.3)	↗	47. (4,8)	56. (4.7)	↘
1. Institutions	55. (3.9)	57. (4.1)	↘	50. (3,9)	104. (3.4)	↘
2. Infrastructure	33. (4.4)	41. (4.7)	↘	53. (3,7)	57. (4.3)	↘
3. Macroeconomic environment	36. (5.4)	21. (6.0)	↗	37. (5,4)	41. (5.2)	↘
4. Health and primary education	57. (6.0)	27. (6.3)	↗	65. (5,9)	50. (6.0)	↗
<i>Efficiency enhancers</i>	28. (4.6)	26. (4.8)	↗	31. (4,5)	47. (4.3)	↘
5. Higher education and training	27. (5.0)	29. (5.1)	↘	39. (4,4)	53. (4.6)	↘
6. Goods market efficiency	31. (4.7)	37. (4.6)	↘	38. (4,6)	54. (4.4)	↘
7. Labor market efficiency	31. (4.6)	47. (4.4)	↘	24. (4,7)	100. (3.9)	↘
8. Financial market development	50. (4.4)	24. (4.6)	↗	27. (4,9)	35. (4.4)	↘
9. Technological readiness	27. (4.4)	29. (5.4)	↘	33. (4,1)	44. (4.6)	↘
10. Market size	40. (4.6)	47. (4.5)	↘	53. (4,2)	62. (4.0)	↘
<i>Innovation factors</i>	27. (4.4)	32. (4.1)	↘	43. (3,8)	59. (3.7)	↘
11. Business sophistication	27. (4.8)	30. (4.5)	↘	47. (4,2)	57. (4.1)	↘
12. Innovation	27. (4.0)	35. (3.8)	↘	42. (3,4)	66. (3.3)	↘

Source: <http://reports.weforum.org/global-competitiveness-report-2015-2016/>, online 10.3.2016, own processing

The comparison between strengths and weaknesses of the Slovak Rep. in the first and in the last edition of GCR indicates deterioration of Slovak position in 11 pillars. The biggest lack is evident in the evaluation of institutional quality and labour efficiency. The soft indicators (trust in politicians, quality and transparency of decision-making processes in the government and public sector, etc.) have a negative effect on the result in the Institution pillar

(the 3rd worst indicator for Slovak Rep. in the last edition is Efficiency of legal framework in challenging regs - 132nd place out of 144 monitored countries, the indicators with the worst evaluation are Efficiency of legal framework in settling disputes - 138th place, and favouritism in decisions of government officials - 138th place). The biggest decline of Slovak rank is observed in the 7th pillar. This deterioration is driven by the negative evaluation in these indicators: hiring and firing practices (128th place), effect of taxation on incentives to work (132nd place), country capacity to retain talent (127th place), and country capacity to attract talent (129th place). In our opinion, the explanation of the negative results of Czech and Slovak Rep. can be based on three reasons: 1) other countries had higher pace of improvement in these aspects of competitiveness, 2) the majority of soft data, which explanatory power is encumbered of subjectivism and pessimism of respondents, 3) the higher rate of criticism is typical for respondents from new entering EU countries.

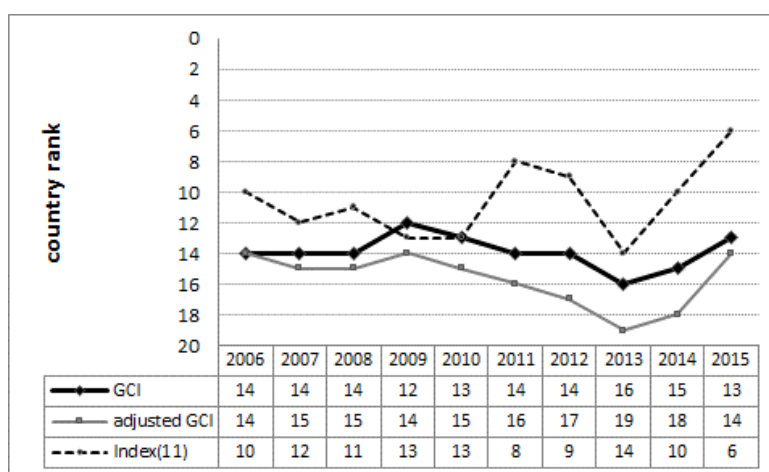
4 Impact of the choice of indicators and weighting system on country's competitiveness

National competitiveness, evaluated as a country rank in the international comparison, can be influenced by the selection of individual criteria, by the selection of evaluated countries or by the method of data aggregation. Country's ranking in the competitiveness rankings can therefore differ considerably depending on the fact whether those rankings evaluate each of the EU countries separately, or the EU28 as a whole. In this part of our paper, we followed the methodology of Maly and Klvacova (2008). The Index (11) for each country was calculated using countries' results in the selected hard data from the WEF's Competitiveness Dataset (GDP in PPP, population, GDP per capita, mobile telephone subscriptions/100 pop., government budget balance as % GDP, annual rate of inflation, general government debt as % GDP, 3rd pillar: Macroeconomic environment, tuberculosis cases/100,000 pop., infant mortality as deaths/1,000 live births, life expectancy, mobile broadband subscriptions/100 pop.). (We calculated the arithmetic average from the country's ranking in the selected WEF indicators and then we compiled a new ranking for the EU28.) Similar process was used for the construction of the "adjusted GCI". The obtained results were used for the evaluation of changes in Czech and Slovak national competitiveness.

4.1. Czech rank in the EU28 according to the GCI, "adjusted GCI", and Index (11)

The differences among the different ways of evaluation of Czech national competitiveness are obvious from the figure 3. If we consider only the EU28 countries, the improvement of the Czech ranking in the GCI will look less optimistic, compared to the results of the GCR 2013 (an improvement of 15 places compared to improvement of 3 places). It is therefore clear that the competitiveness position of the Czech Republic virtually did not change during the last 10 years. When judging the changes in the country's rank, it is necessary to take into account that the rating is relative - the country's improvement may be influenced or dictated by the slower growth rate of other countries' positive changes. It is evident that within the EU28, there is no distinct convergence towards the European leaders (the most competitive countries according to: a) GCI 2015-16: Germany, Netherlands, Finland, b) Index 11: Germany, Sweden, Italy) in the aforementioned period - the reasons for this are evident from the comparison of the results in individual pillars - see Tab. 3. If we use only selected hard indicators for our evaluation, the ranking of the Czech Republic will be better in all inspected years - apart from the results from 2009 and 2010.

Fig. 3: Changes in Czech national competitiveness



Source: <http://reports.weforum.org/global-competitiveness-report-2015-2016/>, online 10.3.2016, own processing

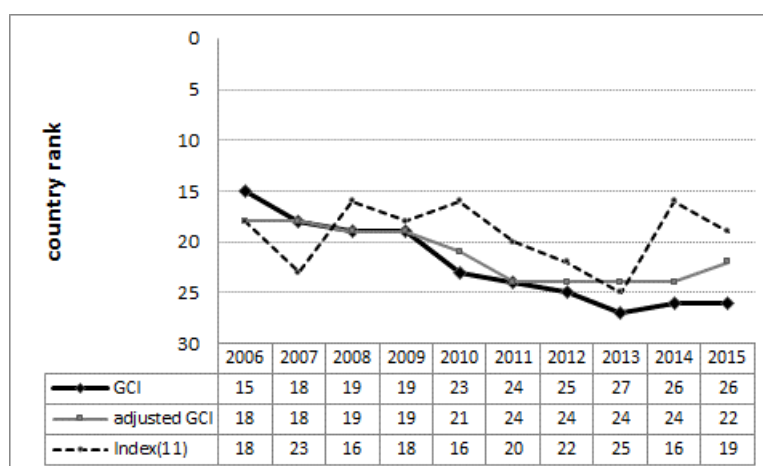
The impact of the macroeconomic indicators on the overall result is considerable due to the big representation of hard macroeconomic data in Index 11 (four data from eleven describe macroeconomic position) and the way of calculation (arithmetic mean). The results in the Index (11) in the years of economic decrease (2009, 2010, and 2013) are influenced mainly by the unfavourable macroeconomic data (the GDP decrease); therefore the results of the GCI and the Index (11) share some similarities. Favourable macroeconomic data are the main cause of bigger differences between the GCI and the Index (11) in the last year followed.

The worse position of the Czech Republic according to the "adjusted GCI" in all of the followed years is caused by the weighting system which is used for the computation of the overall index. As the WEF creators wrote in the GCR 2010-11, for almost all countries, the shift in score (with respect to the reference score) is negative when assigning weights of the lower stage and positive when assigning weights of the higher stage.

4.2. Slovak rank in EU28 according to the GCI, "adjusted GCI" and Index (11)

The differences among different ways of evaluation of Slovak national competitiveness are apparent from the Figure 4.

Fig. 4: Changes in Slovak competitiveness



Source: <http://reports.weforum.org/global-competitiveness-report-2015-2016/>, online 10.3.2016, own processing

The best Slovak position in followed indices is noticeable in Index 11. The impact of the macroeconomic indicators on the overall result is considerable due to the big representation of hard macroeconomic data in Index 11 (four data from eleven) describe macroeconomic position) and the way of calculation (arithmetic mean). The results in the Index (11) in the years of economic decrease and weak increase (2009 and 2013) are influenced mainly by the unfavourable macroeconomic data; therefore the results of the GCI and the Index (11) share more similarities in these years.

Favourable macroeconomic data are the main cause of bigger differences between the GCI and the Index (11) in the last year followed. The slightly better Slovak position according to the "adjusted GCI" is likely caused by the change of the weighting system which is used for

the computation of the overall GCI. Due to the negative evaluation in indicators entering into the subindex Efficiency enhancers (this subindex has the weight 50 % in computation of overall index) and the subindex Basic requirements (which has the bigger importance for overall index for countries in transition than for countries in the 3rd stage of development), Slovak results according to the GCI are worse compared to the "adjusted GCI" results with the same weights for all indicators.

Conclusion

When evaluating the country's position in the international rankings, the fact that the country's position depends on a relative score must be considered - an improvement may be caused by either the absolute improvement of the results in individual indicators or by the absolute worsening of other countries. When judging the strengths of Czech and Slovak competitiveness, this context should be taken into account.

The weaknesses of Czech and Slovak competitiveness (Czech and Slovak rank in pillars with negative impact on the overall results in the GCI) stayed the same during the research period (the worst indicators are found in the 1st pillar Institutions and the 7th pillar Labour market efficiency).

The indicators with positive impact on Czech and Slovak competitiveness changed in the last edition of the GCR compared to the first year of our analysis (see Table 2). The position of the Czech and Slovak Republic in the key knowledge indicators (the pillars: higher education and training, technological readiness, innovation and sophistication factors) is worse in the last edition. It indicates low pace of improvement in these key aspects of competitiveness. The importance of the representation of the hard and soft data and the weighting system applied for the countries' results is apparent from the differences between Czech and Slovak ranking according to all followed indices (the "original GCI", "adjusted GCI" and Index (11)). The improvement in Slovak evaluation according to the "adjusted GCI" after 2011 is probably influenced by the smaller impact of indicator "the domestic market size" (resp. by the smaller weight of subindex Efficiency enhancers in overall index). Due to the enlargement of the number of evaluated countries, the Czech and Slovak rank in this indicator is worse compared to the first year of the analysis. This indicator has a relatively large influence on the country's position due to its weight inside the group of the market size indicators (the weight of this indicator is 75 %), due to the weight of the 10th pillar in the

subindex Efficiency enhancers, and finally due to the biggest weight of this subindex in the overall index (the weight of this subindex is 50 % for both countries in the last edition of GCR).

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