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What Do Competitiveness Rankings Show Us?

Substantiation and Informativeness of the World Economic Forum's Competitiveness Ranking

Summary: In the past few years, competitiveness has become one of the main focus of economic policy. This study provides an overview of the measurement risks mentioned in the references in connection with the measuring of competitiveness, and using the method of document analysis it evaluates whether the competitiveness index of the World Economic Forum meets the requirements of science and whether it provides adequate information for decision-makers and the professional public. The paper establishes that international competitiveness measurements sum up several relevant data sources that provide valuable information about national economies and socio-economic development levels. However, the large quantities of data of a quite diverse nature do not allow such rankings to inform about a nation's competitiveness in a scientific depth. Choice of some data sources of the World Economic Forum's Global Competitiveness Report was not based on their connection with competitiveness, and in some cases are inconsistent.

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In the past few years, competitiveness has become one of the main focus of economic policy. Competitiveness '*has increasingly become the tool of comprehensive evaluation and performance assessment of economies*' (Török, 2003, referenced by Somogyi, 2009). Economic policymakers of countries aiming to boost their economies to match up with those in the lead justify large-scale interventions, streamlining of the tax environment, increase of the flexibility of labour market and shifting of priorities of the education system by the objective of improving competitiveness.

Competitiveness is also the key term of two domestic economic policy manifests. The National Competitiveness Council is the economic policy advisor organ of the government, and it published the document entitled Program for a More Competitive Hungary in early 2019. The Hungarian Central Bank also released a publication for professionals in 2019, entitled Competitiveness Program in 330 Points.

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Meanwhile, it is not clear if the indicators of international economic success in terms of competitiveness (international terms of trade, international trade balance, GDP per capita) are to be considered, or rather the significant factors leading there (capability to attract capital, workforce supply, infrastructure, condition of social- and human capital). Starting from the 1980's, discussions aiming to define competitiveness emerged, and several examples of efforts to define and quantify competitiveness took shape, yet some basic questions still remain unanswered today. In addition to the several '*hard*' (for example statistical) data, well-known international competitiveness measurement systems rely on '*soft*', i.e. subjective data provisions, such as evaluations by executives, expert surveys or derivative data to a great extent.

By today, public political and professional discourses regarding competitiveness are also based on international competitiveness rankings. The program document of the Competitiveness Council laid down recommendations in connection with areas where the country has shown declining results in the World Bank's Doing Business rating. The Hungarian Central Bank's material refers to the indicators of the World Economic Forum and the World Bank on several occasions. In addition, any changes in the rankings are newsworthy events for the public, too.[1] Since competitiveness evaluations are based on competitiveness rankings, it is necessary to examine whether such rankings provide a reliable overview regarding countries' competitiveness and whether they serve as an authentic data source for the public and for economic decision-makers.

The study bases reliability analyses of international competitiveness rankings on the pertinent professional discourse, and evaluates the index's scientific substantiation and predictive power by analyzing the methodological documents associated with the World Economic Forum's Global Competitiveness Report. Based on this, the analysis assesses whether the results of competitiveness measurements provide authentic and useful information for decision-makers and the professional public.

WHAT DOES COMPETITIVENESS MEAN?

Efforts to define competitiveness emerged before scientific research of competitiveness starting in the 1980's. Each school applied different interpretations of the term of competitiveness, caused by the basic differences in their views regarding the economy and science of financial management (Krugman, 1996; Buckley and Pass, 1988).

> *'Competitiveness is the set of institutions, policies, and factors that determine the level of productivity of an economy, which in turn sets the level of prosperity that the economy can achieve.' (World Economic Forum, 2018)*
>
> *'Competitiveness is the level of the sum of factors underlying a long-term growth. A national economy is competitive if it utilizes its available resources optimally to attain the highest possible, but at the same time sustainable level of welfare.' (Hungarian Central Bank, 2019)*
>
> *'Competitiveness is a capability of a national economy to create, use and sell products and services within a global competition in a way that the yield of its own production factors and the welfare of its citizens grows in a sustainable way.' (Chikán, Czakó, Kazainé, 2006)*

The difference between views of classic, later the neoclassic approach is that they derive attainment of a favorable export

market position – from *Adam Smith*'s absolute advantages to the comparative competitive advantage – from different factors. *Ricardo* contends that the key to competitiveness is relative cost advantage, and *Heckschner and Ohlin*, developing this theory further, see it in specializations based on determinant supply (Bakács, 2004; Somogyi, 2009).

Competitiveness can be interpreted on the level of countries, industries or companies – see *Buckley* and *Pass* (1988); *Ambastha* and *Momaya* (2004). *Krugman* (1996) argues that competitiveness, as a zero-sum game cannot be applied for national economies. It is a term only usable for companies. According to the representatives of institutional economics, competitiveness is nothing but the sum of factors affecting the growth of productivity (Vakhal and Palócz, 2018). *Porter*'s approach emerging in the 1990's claims that competitiveness of individual countries is not primarily affected by the quality of the macro environment. *Fagerberg* (1988) opined that technological- and capacity factors are more important than competitive prices. Buckley and *Pass* (1988) emphasized that depending on the field the competitiveness measurements are focusing on, some questions relevant for competitiveness will remain unanswered by default. To mention a domestic author, *Attila Chikán* and his Competitiveness Research Centre have analysed the key determinants of both micro- and macro level competitiveness. Starting in 2016, the Hungarian Central Bank placed competitiveness in the center of its research activities (Hungarian Central Bank, 2019b), and there is an independent competitiveness research workshop at the National University of Public Service.

Competitiveness in terms of national economies is not defined in a uniform and scientific way that would provide a clear set of determinants serving as a basis for competitiveness measurements. Competitiveness measurements are primarily affected by the conceptual difference that is built on the examinations of the causes of competitiveness and aims to unravel the factors contributing to it. The risk inherent to this approach is that there is no scientifically proven taxonomy establishing the exact social and economic factors underlying competitiveness. The socio-economic system environment is so complex that no comprehensive research about individual factors, or their causal impacts to competitiveness is available. Meanwhile, the other approach defines competitiveness with the output results: competitiveness is success on the international market. In this case, finding the causes of competitiveness is secondary, and measurement of competitiveness does not differ from the indicators designed to measure welfare and economic development level. This results in consequences that those who commit to measure the '*input*' side of competitiveness also affecting productivity can only avail key data and information from e.g. *'soft'* surveys. In terms of our analysis, we apply the above definitions created by the Hungarian Central Bank and Chikán, *Czakó and Kazainé*, which provides us with a comprehensive definition of competitiveness, and it is in line with how the term is generally used by professionals, the public and members of the society.

MEASURING COMPETITIVENESS

International Reports Initiatives in connection with the measurement of competitiveness reached the stage where today's competitiveness indexes are created by international organizations in the nineteen eighties. The two most popular systems for measuring competitiveness (Arslan and Tathdil, 2012) don't only consider macroeconomic data when setting up a competitiveness measurement process, but use the parameters

of the general socio-economic- and regulatory environments and infrastructure supply. The Swiss-based international organization, The World Economic Forum (WEF) has been analyzing competitiveness since 1979, and the International Institute for Management Development (IMD) has been publishing the World Competitiveness Yearbook *(see Table 1)* since 1989.

In the World Economic Forum's index, most indicators originate from the World Bank, the IMF and the specialized organs of the UN. Out of the 98 indicators used, 44 reflects the opinion of executives interviewed in the *Executive Opinion Survey* conducted by the WEF's partner institutes. Ranking of the 2018 evaluation of the IMD was based on 340 indicators, originating from international (OECD, IMF, UNESCO, World Bank), national and regional organizations. Their 2018 survey conducted with company heads is supported by the opinions of 6,371 participants. Similarity of the two competitiveness measurement system is implied by the fact that when taking a closer look at the 2018 rankings, the top ten

Table 1

MAIN CHARACTERISTICS OF THE MOST WIDELY KNOWN COMPETITIVENESS INDEXES

	World Economic Forum Global Competitiveness Report	International Institute For Management Development World Competitiveness Yearbook
Number of assessed countries	140	63
Key fields	4 categories, 12 determinant	4 categories, 20 determinant
	Supporting environment (institutions, infrastructure, ICT-adaptation, macroeconomic stability) **Human resources** (health care, skills and capabilities) **Markets** (product market, labour market, financial system, size of market) **Innovation factors** (business dynamics, innovative skills)	**Economic performance** (performance of national economy, international trade, international investments, employment rate, prices) **Efficiency of the government** (public funds, tax policy, institutional framework, economic regulation, social structure) **Efficiency of financial management** (productivity, labour market, financing, management, values and attitudes) **Infrastructure** (basic infrastructure, technological and scientific infrastructure, health and environment, education)
Number of indicators	98	340
Weighting	The 12 competitiveness determinants are weighted equally	The 20 competitiveness determinants are weighted equally

Source: Edited by the author

entailed seven identical countries. Apart from the several differences, approaches of the presented measurement systems are similar to the extent that all of them present key determinants affecting competitiveness by a manifold approach, taking both economic and social factors in consideration. Our analysis covers the most widely known competitiveness index, the measurement system of the World Economic Forum in detail. The selection was justified by the facts that this index goes back to the longest way, and it is recognized by both researchers and politicians. The name of the measurement system already indicates that it is designed for the conduct of competitiveness assessments, representing a significant 140 countries.

Measuring National Competitiveness

Reports based on national competitiveness measurement results can be construed as a certain criticism of international competitiveness rankings (comprehensive reports also entailing recommendations are currently prepared by three EU member states). The competitiveness report prepared by the Hungarian Central Bank in 2017 fits very well into this approach. The report is designed to provide a theoretic foundation to the measurability of competitiveness, and it also includes the basic blueprint of a comprehensive indicator system, on the one hand supported by indicators of revenue generating capabilities and production efficiency, and on the other hand by indicators based on prices and expenditures, 101 indicators in total, all based on objective and quantified data. At the same time, the measurement omits subjective, but in terms of competitiveness, essential determinants, such as investor's trust and expectations. The report systematically analyzed the performance indicated by the most important competitiveness indicators, and though it is about a national-scope report, it also depicted Hungary's position in comparison to the V3 countries and to the EU member states (Hungarian Central Bank, 2017). Based on the results of the above report, the central bank's 330-point competitiveness proposal package in 2019 identified the areas to improve and set the respective objectives (Hungarian Central Bank, 2019a). The two annual publications planned by the Hungarian Central Bank to start in 2019, namely the competitiveness report and the competitiveness mirror are designed to measure the realization of these objectives (MNB, 2019b).

METHODOLOGY

First, we sum up the referenced results regarding the significant risks affecting the authenticity of competitiveness measurement systems.In the second part of this paper, we examine the scientific reliability of the World Economic Forum's Global Competitiveness Index in detail. Using the method of document analysis, the study provides an overview of the methodological documents available to the public on WEF's website (WEF, 2018), especially Appendix B: Executive Opinion Survey, The Voice of the Business Community, Appendix C: Technical Notes and Sources. The detailed description of the 98 data sources and indicators used for the computation of the index is available in the methodological information in Appendix C of the 2018 competitiveness report (WEF, 2018, 633-644). In addition, we have reviewed the information publicly accessible on the organization's website regarding the organization's members, legal status and financing, along with the organization's annual report for 2017-2018.[2]

We regard competitiveness measurements and rankings substantiated, if they satisfy the basic criteria considered as axioms by science.

❶ In terms of reliability of measurement

results, it is important that the organization conducting the measurements should be an independent institution with a scientific competence. This independent scientific quality may be compromised, if, for example, persons who may be associated with countries subjected to the measurement participate in the control of the organization operating the measurement system, or the organization is maintained by stakeholders of the measurements.

❷ It is a basic requirement that the research method should facilitate provision of scientifically substantiated answers to the questions posed by the research. Therefore, it is an important question whether the chosen data source is linked to competitiveness, and whether the methodology is suitable to compare countries' competitiveness and to represent temporal changes.

❸ A basic requirement of researches using surveys is that participants represent the population the subject issue pertains to, and that participants possess adequate knowledge regarding the subject issue.

Consequently, regarding the WEF index, we examine whether

- the organization is an independent and scientific institution,
- the indicators and data sources are selected along the criteria of being associated with competitiveness,
- such indicators and data sources assess the factors affecting competitiveness comprehensively and with the appropriate weighting,
- the indicator system is logical and coherent in its approach,
- the method of data aggregation is adequate,
- the data are current,
- handling of missing data is appropriate,
- in case of opinion surveys, setting up the sample and the questions, and processing of received answers is compliant with the scientific standards.

SUBSTANTIATION RISKS OF COMPETITIVENESS MEASUREMENTS, BASED ON THE REFERENCES

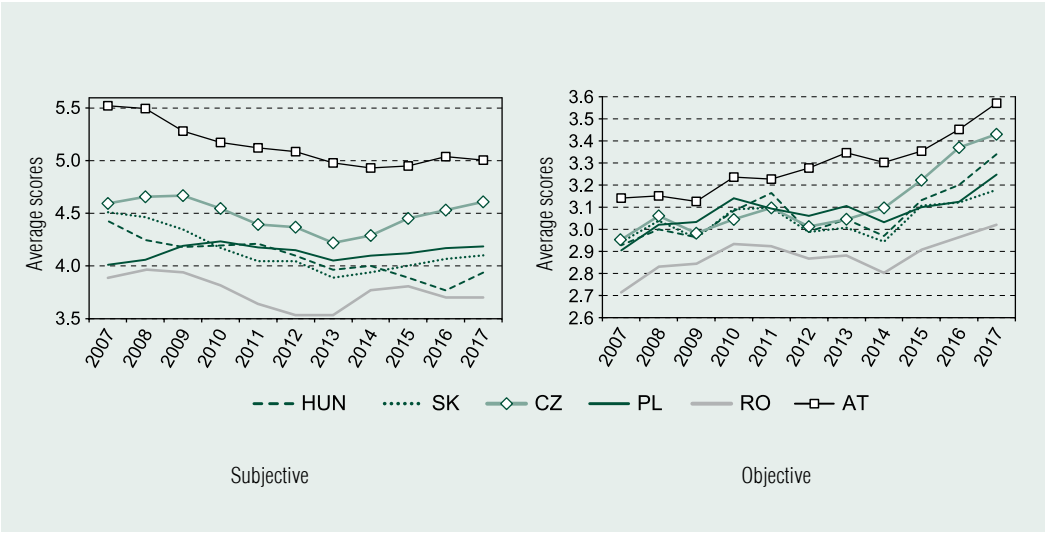
Competitiveness measurements are supported by several theoretical approaches (Staskevičiūt-Tamošiūnienė, 2010). The most popular composite indices allow for the aggregation of large quantities and diverse data sources into one single index. However, in the case of composite indices, aggregation inherently leads to loss of information, and indexes and rankings simplify. Therefore, they may convey misleading messages. (Saisana and Tarantola, 2002; Nardo et al., 2005).

Use of Soft and Hard Data Sources

While a unified index will seem objective, it still may be significantly based on subjective value assessments; usually, about 50 per cent of the used data are so-called '*soft*' data from opinion surveys (Staskevičiūt-Tamošiūnienė, 2010). Several authors point out that use of opinion surveys may be unjustified in cases where facts are also available (Baksay et al., 2017; Staskevičiūt and Tamošiūnienė, 2010). At the same time, *Vakhal and Palócz* (2018) argue that 'mixed' methods, i.e. joint use of *hard* and *soft* data sources is appropriate, as it is the only way to reflect the most important social factors contributing to competitiveness. Important issue is the relation and correlation of *soft* and *hard* indicators. Vakhal and Palócz (2018) found that in the period between 2007 and 2018, the group of countries consisting of Hungary, Austria, Czechia, Poland, Romania and Slovakia, the 'subjective' and 'objective' indicators[3] used in the WEF's index work

Figure 1

AVERAGE SCORES OF SIX COUNTRIES ORIGINATING FROM OBJECTIVE AND SUBJECTIVE INDICATORS (2007-2017)



Note: HUN–Hungary, SK–Slovakia, CZ–Czechia, PL–Poland, RO–Romania, AT–Austria

Source: Vakhal and Palócz, 2018

differently. While soft indicators show a decline in these countries' performances, objective indicators show an improving competitiveness. This is an important warning that indicators theoretically measuring the same phenomenon may work radically differently *(see Figure 1)*.

The authors also pointed out that the more developed a country is, the more subjective indicators align with the indicators originating from objective data sources. *Baksay et al.* (2017) find that based on subjective indicators, Hungary's performance shows similarity to that of African countries, however, the performance measured along objective indicators is significantly different. The GCI score – based on their research – rather shows correlation with subjective indicators. One consequence of the 2018 adjustment of the GCI methodology is the decrease of the weight of subjective indicators. Presumably, doubts arising in connection with the use of subjective indicators also contributed to the fact that by today, the proportion of '*soft*' data sources in the World Economic Forum's Global Competitiveness Report was cut down.

Competitiveness Index and Economic Data

Berger and Bristow (2009) examined the forecasting abilities of four competitiveness measurements, including that of the GCI. Their results show that these indexes are only weak precursors of economic growth. *Rota* (2013) compared the GCI scores and the growth of the GDP of 118 countries. He found that in the case of more competitive countries, the correlation between the changes of GCI and GDP were clear, however, for less competitive countries, the competitiveness

index does not show any correlation with the changes of the GDP. Some opine that indexes measuring competitiveness concentrate way too much on the underlying causes of competitiveness, therefore, they recommend basing the assessment of competitiveness on clearly quantifiable data. *Djogo and Stanisic* (2016) also recommend several 'objective' indicators to measure competitiveness: external trade surplus in the proportion of GDP, unemployment rate, annual cost of wages for one employee, investment rate. The authors compared the results of GCI with their own index they based on six economic data for 39 countries. They found a strong correlation between their index and the results of the GCI (0.609). At the same time, there are countries where, as a trend, the GCI shows a better competitiveness than the individual index.

Aggregation Methods

Competitiveness measurements either weight each determinant equally for all countries, or they classify the assessed countries in separate categories, and weightings vary by the cluster. *Önsel* et al (2008) found that weighting of data sources used for competitiveness indices may distort the assessment results, if the individual development level categories are based on the GDP per capita; the potential of eliminating the differences in development level will not be reflected by such classification. Other authors point out that score aggregation without weighting is also risky. Namely, the determinants of competitiveness cannot be identical, and the impact of such determinants also varies by country and by development stage (Hawkins, 2006; Cho and Moon, 2005). This implies justification of such classification of countries by their structure of economy and size of markets and base the competitiveness measurements on this classification. *Šegota et al.* (2017) contends that the GCI does not provide a comprehensive overview, as it is not able to measure countries' *efficiency*, which is based on the extent they exploit various competitiveness opportunities and inputs. Comparisons factoring in the above would show a higher competitiveness efficiency in the case of not so competitive, undeveloped EU members states.

RELIABILITY OF THE WORLD ECONOMIC FORUM'S GLOBAL COMPETITIVENESS INDEX

The organization named World Economic Forum is seated in Geneva, Switzerland. It was founded in 1971 under the name of European Management Forum, as a non-profit organization. Switzerland has been recognizing it as an international organization since 2015, giving it the associated privileges.[4] The Forum's legal structure is a foundation under Swiss civil law.[5] The Forum's most important mission is to facilitate cooperation between the private- and public sectors. WEF expresses its objectives in 15 system initiatives. These system initiatives expressly aim social and public political changes.[6] The system initiatives entitled '*Shaping the Future of…*' reflect commitment to shaping the future of for example media- and entertainment industry, trade and investments, infrastructural investments, food industry, health care, financial- and monetary systems, gender and education. The organization also takes stance on issues falling outside of the scope of economy, but politically dividing, such as LGBT rights.[7]

According to the organization's statement, members of the World Economic Forum (Institutional Members, Forum Members, Strategic Partners), entail 1000 large companies with a USD 5 billion + turnover.

However, the information available on the organization's website is not sufficient to establish the exact member companies and the criteria of membership. The Forum's main source of income comes from membership fees. The organization's 2017-2018 annual report reveals that the membership fees amounted to CHF 326,740,000.00, and the organization collected CHF 227,317,000.00 of partner's fees. At the same time, the organization did not publish a detailed financial statement allowing for the establishment of individual payment amounts by member. The World Economic Forum Strategic also has strategic partners. These strategic partners are business organizations that participate in the support of WEF system initiatives, and may also participate in strategic decision-making. Such strategic partners are for example *Bloomberg, General Dynamics, Henkel, Lockheed Martin and Turkcell.*

The organization's Chairman is *Borge Brende*, Norway's former Minister of Foreign Affairs and Minister of Industry and Commerce. The persons and bodies controlling the organization are: the Board of Trustees, the Chairman, the Board of Directors and the Managing Board. In 2019, the 25 members of the Board of Trustees comprised former and current politicians:

- *Al Gore*, the former Vice President of the USA,
- *Chrystia Freeland*, Canada's Minister of Foreign Affairs,
- *Ursula von der Leyen*, Germany's former Minister of Defense,
- *Peter Maurer*, Switzerland's former ambassador to the UN,
- *Mark Carney*, Bank of England's Governor, and the former Governor of the Bank of Canada,
- *Christine Lagarde*, former French Minister of Finance, former CEO of the IMF, and Chairman of the European Central Bank.

Members of the Board of Trustees also comprises businessmen with significant assets, for example *Marc Benioff* (Salesforce – USA), *Peter Brabeck-Lethmate* (Nestlé, Rocher – Switzerland), *Jack Ma* (Alibaba.com – China).

Based on the above, it can be established that the World Economic Forum is not an academic institution specializing in economic sciences or financial management. Regarding the Forum's impartiality, the fact that its members and financers are global companies, however, the full list of members and their financial contribution is not disclosed, indicates risks. In addition, several former and current politicians are acting in the governing bodies of the organization.

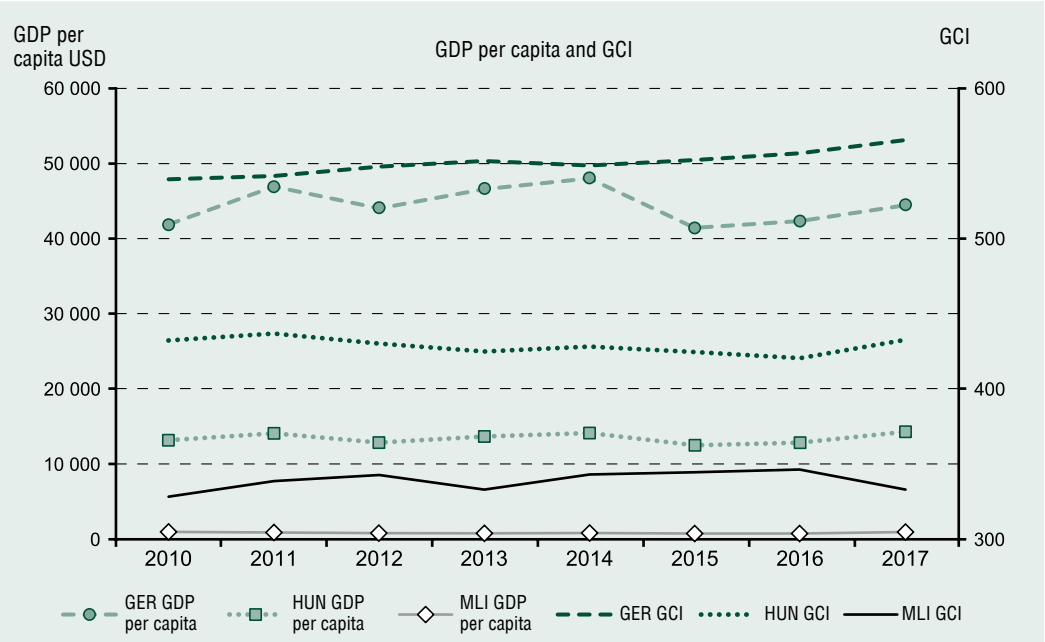
Below, we will examine the scientific substantiation of the method of computation of the 98 indicators used for the WEF GCI index and the index itself.

GCI and Economic Performance

The key elements of the term of competitiveness used by the WEF are productivity, economic performance and welfare. The most widely understandable indicator of economic growth and welfare is GDP, i.e. the gross domestic product per capita, a classic indicator of a country's welfare and development level. As indicated above, Berger and Bristow's (2009) results show that GCI is only weak precursor of economic growth. Consequently, we have examined the WEF competitiveness measurement scores and the GDP per capita in the period between 2010 and 2017 for three countries, one on the top, one in the mid-section and one in the bottom of WEF's competitiveness ranking, each operating in different economic models and filling different roles in the world economy. These countries representing the WEF ranking's three typical positions are Germany, Hungary and Mali (see *Figure 2*).

Figure 2

THE GDP PER CAPITA AND GCI FOR THREE COUNTRIES (2010-2017)



Source: own edited, data source: WEF GCI 2018, World Bank

It is remarkable that for Germany, the constantly high and increasing GCI value does not reflect the GDP's significant changes, including the 2014 decline of the German GDP. For Hungary, the increase of the GDP after 2016 aligns with the improvement of the GCI, especially for 2016, and the trends of the two indicators are in synch. Mali's GDP per capita varied between 700-800 USD in the subject period, while the country's GCI index showed 3.28-3.56 points, which is equally low. Meanwhile, smaller variations of the GDP and the GCI did not indicate any temporal synch or regular temporal shifts.

Of course, the above comparison cannot be considered as an econometric examination done with an adequate statistical apparatus, because systematic analysis of the issue of predictivity would require a separate study. At the same time, results show the importance of the fact that the ranking should be tested with scientific statistical methods and toolkit for the actual ability of the competitiveness measurement to predict sustainable economic development, or to establish the indicators that show closer or looser correlation with individual indicators of economic results. Most probably, this could be a useful input for the method of selection of the index's data sources.

Selection of Indicators

The connection of the 98 selected indexes with the GCI's competitiveness interpretation is not shown by the methodological description of the research. The methodological part of

the report entailing GCI results also fail to detail the professional criteria of selection of indicators used for the index. Furthermore, the report does not present any scientific tests that would examine the connection of individual indicators with economic growth or productivity. Based on the presented methodology, it cannot be established whether they made efforts to rule out any cross-correlations between individual partial determinants, or whether they conducted robustness tests when selecting individual indicators. Since selection of indicators is not supported by any detailed reasoning or justification, this suggests the risk that data sources used for the index are chosen impulsively and adventitiously.

Connection with Competitiveness

The issue of the extent the selected indicators can be considered as a factor representing competitiveness or part thereof is closely linked to the above problem. We based the evaluation of this issue on WEF's interpretation of competitiveness. For numerous indicators used, it can be proven that they are connected to the term of competitiveness, however, in some cases there is no material link between them. Such indicators are the freedom of the press (1.09), the extent of insurance premiums (9.05), establishment of wages at company level or by bargaining process (8.04), presence of critical approach in education (6.08). For the indicator of the ethnical, religious, sexual diversity of the workforce (12.01) there is a significant risk of representing ideologically biased values without any link to any professional interpretation of competitiveness. In the case of this indicator employers are asked about the workforce's highly sensitive data, which are not associated with competitiveness. In highly developed data protection cultures, such data are not even to be processed.

Inconsistency among the Indicators

While several indicators reward the mobility, flexible employment and layoff of workforce, for the indicator 8.06, countries where the workers' rights are protected, get a high score. We know that several dynamically developing countries build the actual boosting of their competitiveness on the flexibility of labour market, restricting worker associations and strike rights, and cutting costs of labour. The determinant counting as positive in the indicator therefore contradicts an important tool applied to boost competitiveness on the short term, and, unlike the principles of other indicators, it considers regulations increasing costs of labor as positive.

Prevalence of Free Trade Ideology

The index's indicator numbered 7.05 awards high scores for low tariffs, and indicator number 7.08 awards openness of service trade. Indicator number 10.02 awards high import rates expressed in the proportion of the GDP. These three indicators penalize export-driven economies aiming to achieve external trade surplus, dynamically developing countries with a protectionist trade policy, and reflects free trade ideologies, which is advantageous for economic actors already stronger. While numerous countries regard the increase of export and achievement of external trade surplus as one of the most important results of competitiveness, the index is built upon commercial liberalization and values in favor of openness of the economy. It is a well-known fact that several center-capitalist countries achieved commercial advantages themselves

by protecting their own markets before their success under free trade circumstances (Nye, 1991; Chang, 2010). Additionally, protectionism is not always a choice: protectionist policies are often intertwined reactions.

Under-evaluated Areas

An important element of competitiveness is the condition of human capital, and the quality of social trust. Strength of social trust network, good-faith cooperation in business relations, and voluntary contractual performance results in proven savings in economic relations (about social trust and economic growth see: Bjørnskov, 2017). Status of such trust is built in the WEF's index by a single derived indicator (1.05), which is weighted with only a 1.18 per cent. In our opinion, social trust should be weighted with a larger percentage, and along more dimensions. *Djogo és Stanisic* (2016) emphasized that individual elements of competitiveness, such as equilibrium, increase of welfare without external debts, investment rate and the extent of external debts are not represented adequately by the WEF indicators. Additionally, several countries' exchange rate policy serves their export policy, and the GCI ignores assessment of the monetary toolkit supporting competitiveness.

Inappropriate Use of Soft Data Sources

Individual key factors affecting competitiveness can be measured by relying on *soft* data sources. Such factors are for example important social capital indicators, such as business trust, expectations, performance motivation, and the extent of anomy. WEF's methodology bases measurements of the same phenomenon within the same pillar (field) on statistical data and on executive opinions jointly. In theory, this may be a good thing. However, in our point of view, exclusive use of subjective executive opinion is not justified for the following indicators, considering that assessment of the questions could be based on the analysis of the given country's regulatory environment or on statistical data:

- Judicial independence (1.07),
- Property rights (1.15)
- Intellectual property protection (1.16)
- Strength of auditing and reporting standards (1.18)
- Digital skills among active population (6.05)
- Extent of market dominance (7.02)
- Prevalence of non-tariff barriers (7.04),
- Hiring and firing rules (8.02),
- Measures assisting the unemployed (8.05),
- Ease of hiring foreign labour (8.07),
- Internal labour mobility (8.08),
- FFinancing of small- and medium sized enterprises (9.02),
- Venture capital availability (9.03),
- Soundness of banks (9.06).

The index contains indicators that are relevant for competitiveness. For such indexes, collection of data by surveys is justified, however, compared to other social groups, executive positions providing the samples do not have first-hand and relevant experiences in the given issue. Such indicators are for example:

- Critical thinking in teaching (6.08),
- Reliability of police services (1.04),
- Quality of roads (2.02),
- Efficiency of train services (2.04),
- Efficiency of air transport services (2.06),
- Reliability of water supply (2.12).

In the evaluation of index 8.03 – the relation of employers and employees – only the opinion of the employers are considered in a basically interdependent, bilateral legal relation.

Poor Indicators

Indicator 1.14 is entitled 'Incidence of Corruption', however, the chosen indicator is Transparency's Corruption Perceptions Index, which measures corruption by using expert opinions, and it does not quantify actual occurrences. Indicator 1.09 'Freedom of the press' uses the index based on the survey of the organization Reporters Without Borders. Based on the published methodology of this survey, the exact composition of participants is not disclosed[8].

Missing Data and Timeliness of Data

For indicators where no data are available or the available data are older than 10 years, data imputation is conducted to establish the GCI. In 2018, this was applicable for 16 indicators out of the 98, affecting 69 countries (see *Figure 3).* This way, 1.18 per cent of the total data considered in the computation of the GCI originates from data imputation, which is acceptable. However, examining the affected countries, it is apparent that data imputation was mostly done in the case of African, Mid- and South American and Asian developing countries. Only 17 countries were affected by the computation of some missing data, and apart from a few exceptions, it did not affect Western countries (WEF, 2018; 642).

At the same time, in the linear regression analysis used for the imputation of missing data, sometimes explaining variables without a proven connection to the given phenomenon are placed in the model. Therefore, for example in the cases of Hong Kong and Taiwan, the extent citizens are informed online (indicator 1.12) are imputed by using the CPI value, and for a further 16 countries, adherence to basic employment standards are replaced by data about the freedom of the press, based on the World Press Freedom Index. The data used to compute the GCI demonstrate quite a spread over time. Timeliness of the GCI is compromised by the following circumstances of computation of the 2018 value:

- for the indicator used to evaluate the goods market (7.08), they rely on a data source from 2011;
- out of 6, 2 indicators (9.05 and 9.09) used to evaluate the development level of the financial system are also affected by results from 2013;
- out of 6, 2 indicators (12.03 and 12.06) used to evaluate the innovative capabilities are also affected by results from 2012.

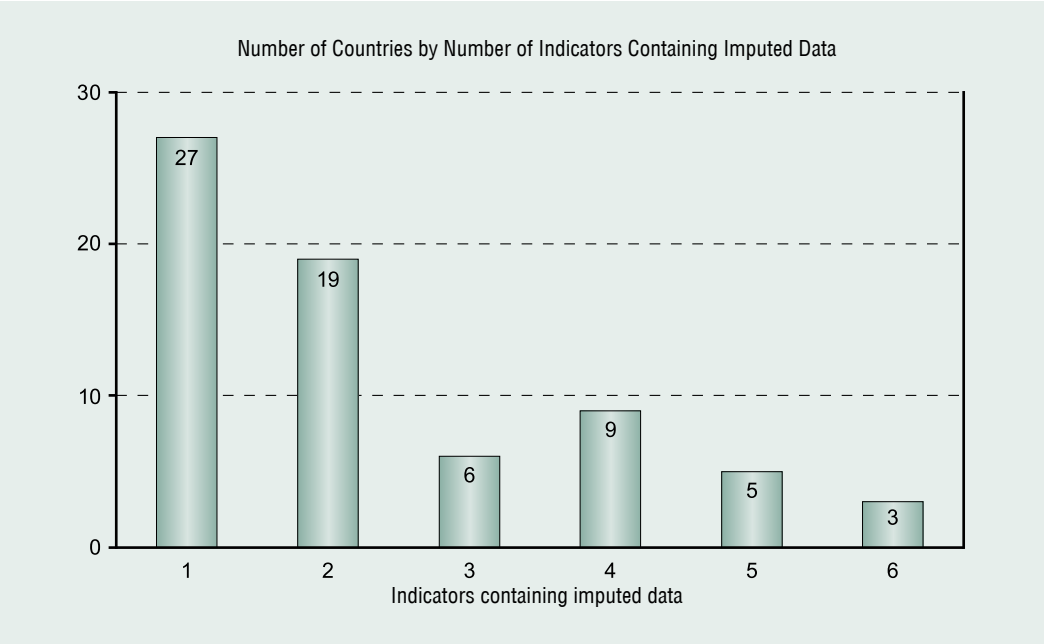
To demonstrate the consequences of this through a concrete example, for the R&D expenditures in the proportion of the GDP (12.07), meaning one of the indicators of innovative capabilities, for 14.3 per cent of the total 140 assessed countries, data were imputed, but for the 85.7 per cent, assessment was also based on data from earlier than 2016. Timeliness of data used to assess GDP-proportional R&D expenditures is shown in *Figure 4.*

Executive Opinion Survey – Composition of the Sample

Out of the 98 indicators used for the computation of the 2018 index, 44 was based on the data of the *Executive Opinion Survey* expressly conducted for the compilation of the index. During the weighting, 44 indicators are affecting 30.9 per cent of the index score. One of the key elements of the 2018 methodological restructuring was the relative decrease of the weight of indicators based on the survey. During the survey, 16,658 executives of 140 countries were interviewed using a questionnaire of 148 questions. An average of 83 businessmen answered the

Figure 3

COUNTRIES ASSESSED BY IMPUTED DATA (WEF GCI 2018)



Source: own edited, based on WEF, 2018

questions of the questionnaire. The three largest samples are coming from India, Pakistan and the United States, where 378-291 executives were interviewed. The smallest sample was provided by Norway in 2018: 31 executives. In 2018 in Hungary, 89 executives answered the questionnaire.

The sample was created in a way to satisfy the following three criteria in terms of the given national economy.

- Answers are solicited from executives of companies reflecting the ratio of each sector, in terms of contribution to the GDP (agriculture, plant industry, other industry – mining, construction – and services).
- The sample reflects the sectoral distribution of both small- and large companies (under 250 employees / over 250 employees).
- The sample should provide an adequate geographical coverage throughout the country.

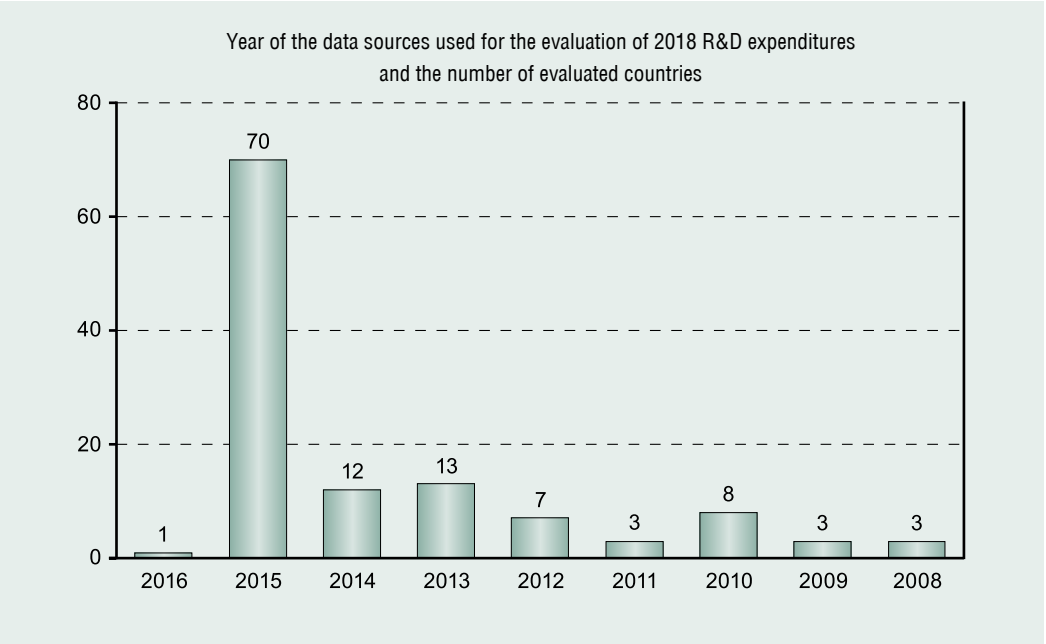
Principles of sample compilation do not include a sufficient representation of foreign- or domestic company ownership. Consequently, it can occur that only domestic or only foreign-ownership companies make it into the sample. Establishment of the criteria of layered sampling is a scientifically fair solution, however, subsequent random selection is not possible.

According to the principles of setting up the sample, the interviewees are selected and the questionnaires are collected by the WEF partner organizations in the given country. Data are collected via a telephone interview, paper-based and online questionnaires. The actually interviewed companies and the persons providing the answers are not disclosed. However, the list of national partner organizations is accessible.

For several countries however, more than

Figure 4

TIMELINESS OF DATA USED TO ASSESS GDP-PROPORTIONAL R&D EXPENDITURES



Source: own edited, based on WEF, 2018

one partner organization collects the data. In several cases, state-owned organization, ministries, national statistical bureaus, commercial chambers, national banks also contribute to data collection as a partner organization.

Processing of Questionnaire Answers

Prior to the use of questionnaire answers, questionnaires with the same answers for 80 per cent of the questions are filtered out. *'Outlier'* questionnaires deviating from the average results of the national questionnaires to a given extent are also disregarded. The methodology also corrects answers according to questionnaires answered earlier; results of the previous year are integrated by way of calculation of the moving average (WEF, 2018, 628). This is a fair data processing practice meeting scientific criteria.

Subsequently, the answers are also checked by expert groups. In case the 'qualitative analysis' of the country expert opinions evaluates the answers as unlikely or not plausible, the questionnaire results will not be considered. WEF's methodology does not reveal the persons in the panel or the methodology of plausibility checks. Should the expert panel decide that in the given year and for the given country, the *Executive Opinion Survey* is not reliable, the survey's data sources will be disregarded for this country, and results of the previous year will be used. The impacts of this data processing method are considerable: In 2018, in addition to the annulment of the Executive Opinion Survey of Azerbaijan, Bahrain, Burundi, Ethiopia and Guinea, the opinion of Chinese executives

were also ignored in the preparation of the 2018 WEF competitiveness index (WEF, 2018, 628). It cannot be ruled out that disregarding of the empirical research based on a carefully selected sample was not based on arbitrary intentions.

CONCLUSIONS

International competitiveness measurements sum up several relevant data sources independently providing valuable information about national economies and socio-economic development levels. However, the competitiveness definitions used by the measuring organizations are covering a wide scale of phenomena, so that selection of individual data sources for the purposes of this measurement is hardly justifiable by scientific assets. The result of the competitiveness measurement become isolated, and their connection to the objective indicators measuring economic performance will be reduced.

These risks are also inherent to the World Economic Forum's index. Additionally, GCI also evaluates factors with no proven link to competitiveness, and the relation of some indicators is contradicting. For example, the index evaluates both the factors increasing costs of labor (employee's rights) and factors decreasing such costs (simplicity of hiring and firing) as positive. Besides the index primarily awards application of free trade principles. In addition, the index fails to adequately cover key competitiveness areas such as monetary policy or social trust.

It would be reasonable for the measuring organization to assess the index's predictive capability by using statistical and econometric methods. Scientific reliability would be increased to a great extent by the assessment of the correlation of the prepared index to individual emphasized indicators measuring economic performance, for example the increase of GDP or the volume of export.

Competitiveness indexes are characterized by the use of both statistical data and opinion surveys. This is inevitable, if, we wish to collect information about subjective, however fundamental determinants of the socio-economic environment of competitiveness. At the same time, the World Economic Forum's measurement system relies on executive opinions, including where objective data would be available. Usability of the results and comparability are compromised by the fact that in the sample of interviewed executives, random selection is not ensured, and in some cases, questionnaire results are disregarded due to the above expert opinions.

Consequently, the question arises whether competitiveness rankings are worth to be considered by economic policymakers and the professional public?

Some competitiveness measurement data are useful, and others less so. Amongst others, debt dynamics, loans available for businesses, spreading of digital capabilities, tracking of the number of patents, broadband network coverage, connectivity of air traffic, healthy life expectancy, the number of years spent in education or the quality of employment rules are considered key indicators for the domestic economic policy. Additionally, competitiveness measurements provide a useful database for the purposes of unveiling the processes of commercial partners important for Hungary. Based on this, changes of spending power on the markets of domestic products or of investment climate can be inferred, and it provides an opportunity to factor these in the economic policy. This can most probably be supported by the information of a national competitiveness measurement conducted by for example the Hungarian Central Bank starting in 2019. At the same time, in addition

to the objective data, attitudes, investment trust and expectations would also be worth to include in the measurement system.

However, it should be pointed out that there are inherent risks in an economic policy optimized exclusively for boosting competitiveness or aiming only for a more favorable position in the ranking. A short-term boost of competitiveness can be attained at the expenses of public debt, increase of debt rate and external equilibrium. Therefore, economy policy should always consider that competitiveness is only one of the many elements of a balanced and multi-faceted economic objective system. The requirement for sustainability is also an important part of this.

Additionally, it's important to see that competitiveness is caused by different factors in small, open and export-driven economies, and is affected by different social and economic circumstances than in countries with larger internal markets and better capital supply. This diversity is not reflected very well by the evaluation method of international competitiveness rankings. Additionally, in the planning of measures to boost competitiveness, it is worth to consider the economic cycle the economic policy is operating in. During economic upturn, it is worth to focus on the sustainability of economic growth, and not to overheat the economy for the sake of a short-term boost of competitiveness.

Even considering the above, improving competitiveness does not mean that the competitiveness 'race' can be 'won' once and for all. Countries, depending on their place in the international production chain and on individual conjunctural cycles, may be able to improve their competitiveness in relation to their own opportunities.

Notes

[1] see: https://24.hu/fn/gazdasag/2018/10/31/magyarorszag-53-versenykepessegi-rangsor/, https://www.napi.hu/kulfold/melyponton_magyarorszag_versenykepessege.563610.html

[2] http://www3.weforum.org/docs/WEF_Annual_Report_2017-2018.pdf

[3] Otherwise, we opine that the differentiating used by the authors is inaccurate, considering that the only data sources recognized by the WEF as subjective indicators are the data sources of *Executive Opinion Survey.* However, the index also uses additional, derived data sources, wherein, collection of data was done by expert assessments or public opinion surveys.

[4] https://www.eda.admin.ch/eda/en/home/foreign-policy/international-law/privileges-and-immunities/host-state-act.html

[5] http://www3.weforum.org/docs/WEF_Forum_Statutes_2015.pdf

[6] https://www.weforum.org/system-initiatives

[7] https://www.weforum.org/agenda/2017/03/what-you-need-to-know-about-lgbt-rights-in-11-maps/

[8] https://rsf.org/en/detailed-methodology

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