CHAPTER 1

Assessing Competitiveness of Countries and Regions: The Global Competitiveness Index

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This chapter sets out the basic principles of the Global Competitiveness Index, a benchmarking tool used by the World Economic Forum to assess the competitiveness of nations.[1] The same tool is used in this report to picture competitiveness of Ukraine and its regions.

This report offers businesses and policymakers the instrument to assess relative strengths and weaknesses of a national economy comparing to other countries'. The results may also help to identify the best practices in certain spheres.

One of the main advantages of the methodology used in the report is that it is partially based on business perceptions and therefore informs the government and the public about the view of the CEOs who stimulate economic growth by their investment decisions.

1.1 The 12 pillars of competitiveness

Continuous progress in theoretical and empirical economic research inevitably makes the methodology used by the World Economic Forum to assess national competitiveness to evolve over time. The latest step in this evolution is the Global Competitiveness Index (GCI), which was first introduced in 2004 and which has been developed in cooperation with Professor Xavier Sala-i-Martin of Columbia University. Since then, the GCI has become the World Economic Forum's main tool for assessing competitiveness.

The GCI is designed to evaluate the potential of countries to grow over the medium to longer term, taking into account present level of development, based on the understanding that competitiveness is "the set of institutions, policies and factors that determine the level of productivity of a country".

The GCI sums up the latest thinking on competitiveness and captures the complexity of the economic growth process by taking into account a weighted average of many different components, each of which reflects one aspect of the complex reality of competitiveness. The components are grouped into 12 different categories, called the twelve pillars of competitiveness and described below.[2] The detailed structure of the GCI is presented in Annex A of this chapter.

1st pillar: Institutions

Institutions shape the framework within which individuals, firms and governments interact to generate income and wealth in the economy, and therefore have a strong bearing on competitiveness and growth. The quality of the institutional environment plays a central role in the ways in which societies distribute the benefits and bear the costs of development strategies and policies. It also has an impact on investment decisions and on the organization of production.

2nd pillar: Infrastructure

High-quality infrastructure is critical to ensuring the efficient functioning of the economy. It is also an important factor determining the location of economic

[1] This chapter is based on Sala-i-Martin et al. (2009) and Browne, C., Geiger, T. (2009). For more information on the topic please refer to these sources.

[2] For a more detailed description of each pillar and expanded references, see Sala-i-Martin et al. (2009)

activity and the kinds of activities or sectors that can develop in an economy. Well-developed transport infrastructure reduces the effect of distance between regions, thereby truly integrating the domestic market and connecting it to other markets. It also facilitates the movement of workers around the country to the most suitable jobs. Economies also depend on electricity supplies that are free of interruptions and shortages to ensure that businesses and factories can work unimpeded, while a reliable and extensive telecommunications network allows for a rapid and free flow of information.

3rd pillar: Macroeconomic environment

Although macroeconomic environment alone cannot increase the productivity of a nation, macroeconomic disarray seriously harms the economy. Firms cannot make informed decisions in the absence of price stability, the financial sector cannot function if the government runs huge deficits, and the public sector cannot provide services efficiently if it has to make large interest payments on its past debts.

4th pillar: Health and primary education

A healthy and educated workforce is vital to a country's competitiveness and productivity. Poor health produces significant costs for business, as sick workers are often absent or less productive. Investment in the provision of health services is therefore critical for clear economic, as well as moral, considerations. As basic skills are vital to the productivity of each individual worker, this pillar also takes into account the quantity and the quality of basic education.

5th pillar: Higher education and training

Good quality higher education and training is crucial for economies that want to move up the value chain beyond simple production processes and products. To capture this concept, this pillar measures secondary and tertiary enrollment rates as well as the quality of education. The extent of staff training and the availability of vocational training is also taken into consideration, as it ensures a constant upgrading of workers' skills to meet the changing needs of the production system.

6th pillar: Goods market efficiency

Efficient goods markets allow countries to produce the right mix of products and services given supply and demand conditions, and ensure that these goods can be most effectively traded. Healthy market competition, both domestic and foreign, is important in driving market efficiency and thus business productivity. Such competition ensures that the most efficient firms are those that survive. The pillar also looks at demand conditions that force companies to be more innovative and more customer-oriented, thereby fostering healthy competition.

7th pillar: Labor market efficiency

The efficiency and flexibility of the labor market are critical for ensuring that workers are allocated, or easily re-allocated, to their most efficient use in the economy and provided with incentives to give their best effort in their jobs. Labor market flexibility also implies that businesses can adjust wages independently to a large extent and than their relationships with employees are smooth. Efficiency of labor markets calls for meritocracy in the workplace and the ability to retain talent in the country.

8th pillar: Financial market sophistication

An efficient financial sector allocates the resources saved by a nation's citizens, or those invested from abroad, to its most productive uses. It channels resources to the entrepreneurial or investment projects with the highest expected rates of return, rather than to the politically connected, based on a thorough assessment of risks. A well-functioning financial market also makes different products and services available to businesses and entrepreneurs according to their financing needs, from such sources as loans, security exchanges, or venture capital.

9th pillar: Technological readiness

This pillar measures the readiness of an economy to adopt and use – but not necessarily to develop – new technologies to enhance the productivity of its industries. In today's interconnected world, the ability to adopt and use new technologies has become an important competitive advantage of firms. Information and communication technologies (ICT) have consequently evolved into the "general purpose technology" of our time, given the critical spillovers to the other economic sectors and their role as efficient infrastructure for commercial transactions.

10th pillar: Market size

The size of the market affects productivity because large markets allow firms to exploit economies of scale. Traditionally, the markets available to firms have been constrained by a nation's borders. In the era of globalization, international markets have become a substitute for domestic markets, especially for small countries. This is why both domestic and foreign markets are taken into account when constructing the tenth pillar of economic competitiveness, market size. By including both domestic and foreign markets in the measure of market size, this pillar also avoids discriminating against geographic areas such as the European Union that are broken into many countries, but have one common market.

11th pillar: Business sophistication

Business sophistication concerns the quality of a country's overall business networks, as well as the sophistication of the operations and strategies of individual firms. This is conducive to higher efficiency in the production of goods and services, leading to increased productivity and enhancing a nation's competitiveness. When companies and suppliers are interconnected in geographically proximate groups (clusters), efficiency is heightened, leading to greater opportunities for innovation and to reduced barriers to entry for new firms. Individual firms' operations and strategies – branding, marketing, the presence of a value chain, and the production of unique and sophisticated products – all lead to sophisticated and modern business processes, as they spill over to other companies.

12th pillar: Innovation

The last pillar of competitiveness is technological innovation. In the long run, efficiency gains can be achieved

and standards of living expanded only through technological innovation. Innovation is particularly important for more advanced economies. These tend to operate at the technology frontier, so that the possibilities of integrating and adapting exogenous technologies, as captured in the ninth pillar of technological readiness, are limited. Firms in these countries must design and develop cutting-edge products and processes to maintain a competitive edge. This requires an environment that is conducive to innovative activity, supported by both the public and the private sectors. In particular, this entails sufficient investment in research and development, especially by the business sector; high-quality scientific research institutions; collaboration in research between universities and industry; and the protection of intellectual property.

The interrelation of the 12 pillars

Although the 12 pillars of competitiveness are discussed separately, this should not obscure the fact that they are interdependent: they are related to each other and also tend to reinforce each other. For example, businesses will not innovate at a large scale (12th pillar) if institutions (1st pillar) that protect intellectual property rights are not in place or if the labor force is poorly educated and trained (5th pillar). Although the actual construction of the Index will involve the aggregation of the twelve pillars into a single index, measures are reported for each pillar separately, thereby offering an analysis of the competitive strengths and weaknesses of countries. By highlighting and prioritizing areas for improvement and strengths to build upon, this analysis provides a basis for policy formulation.

1.2 Competitiveness and the stages of economic development

It is clear that different pillars are of different importance to different countries. Cameroon is likely to focus on other issues to improve its competitiveness than France. This is because Cameroon and France are in different stages of development: as countries move along the development path, wages tend to increase, and in order to sustain this higher income, labor productivity must improve.

According to the GCI, in the first stage, the economy is factor-driven and countries compete based on their factor endowments, primarily unskilled labor and natural resources. Maintaining competitiveness at this stage of development hinges primarily on well-functioning public and private institutions (1st pillar), well-developed infrastructure (2nd pillar), a stable macroeconomic framework (3rd pillar), and a healthy and literate workforce (4th pillar).

As wages rise with advancing development, countries move into the efficiency-driven stage of development, when they must begin to develop more efficient production processes and increase product quality. At this point, competitiveness is increasingly driven by higher education and training (5th pillar), efficient goods markets (6th pillar), well-functioning labor markets (7th pillar), sophisticated financial markets (8th pillar), a large domestic or foreign market (10th pillar), and the ability to harness the benefits of existing technologies (9th pillar).

Finally, as countries move into the innovation-driven stage, they are able to sustain higher wages and the associated standard of living only if their businesses are able to compete with new and unique products. At this stage, companies must compete through innovation (12th pillar), producing new and different goods using the most sophisticated production processes (11th pillar).

The concept of stages of development is integrated into the GCI by attributing higher relative weights to those pillars that are relatively more relevant for a country given its particular stage of development. That is, although all twelve pillars matter to a certain extent for all countries, the importance of each one depends on a country's particular stage of development. To take this into account, the pillars are organized into three sub-indexes, each critical to a particular stage of development, as shown in Figure 1.1. Countries are allocated to stages of development based on the level of GDP and the share of minerals exports[3]. The precise thresholds are shown in Table 1.2.

Countries falling in between two of the three stages are considered to be "in transition". For these countries, the weights change smoothly as a country develops, reflecting the smooth transition from one stage of development to another.

Table 1.1 Subindex weights and income threshholds for stages of development

	Stage 1: Factor-driven	Transition from stage 1 to stage 2	Stage 1: Efficiency-driven	Transition from stage 2 to stage 3	Stage 1: Innovation-driven
GDP per capita (USD) thresholds*	<2 000	2 000-2 999	3 000-8 999	9 000-17 000	>17 000
Weights for basic requirements subindex, %	60	40-60	40	20-40	20
Weights for efficiency enhancers subindex, %	35	35-50	50	50	50
Weights for innovation and sophistication factors subindex, %	5	5-10	10	10-30	30

* For economies with a high dependency on mineral resources, GDP per capital is not the sole criterion for the determination of the stage of development. See text for details.

[3] Countries are allocated to stages of development based on two criteria. The first criterion is the level of GDP per capita at market exchange rates. This widely available measure is used as a proxy for wages, as internationally comparable data for the latter are not available for all countries covered. The precise thresholds are shown in Table 1.1. A second criterion measures the extent to which countries are factor driven. We proxy this by the share of exports of primary goods in total exports (goods and services) and assume that countries that export more than 70 percent of primary products (proxied by minerals) are primarily factor driven. See Sala-i-Martin et al (2009).

1.3 The Global Competitiveness Index Data

Out of the 119 indicators composing the index, about one third are hard data, i.e. statistical data typically collected from international organizations. The remaining indicators are obtained from the Executive Opinion Survey (the Survey) based on the methodology of the World Economic Forum in all countries covered by the Report.

The aim of the Survey is to capture the qualitative dimension of specific aspects of competitiveness and to provide comparable data on issues for which hard data indicators do not exist. Business leaders are asked to assess specific aspects of the business environment in the country in which they operate. To conduct the Survey in each country, the Forum relies on a network of 150 Partner Institutes. Typically, the Partner Institutes are recognized economics departments of national universities, independent research institutes, or business organizations. In Ukraine, the Centre for Social and Economic Research Ukraine (CASE) is the Forum's Partner Institute.[4]

1.4 Conclusions

This chapter has presented the Global Competitiveness Index which serves as the main vehicle for assessing competitiveness of Ukraine's regiona in this Report. The GCI captures what government and business leaders have known for a long time. Competitiveness is a complex phenomenon and the overall level of competitiveness of a nation can be improved only through a wide array of reforms in different areas. The GCI also highlights the fact that the priorities are different for different countries, depending on their level of development.

The GCI is constructed by combining hard data with perception data gathered through the Executive Opinion Survey. As a result, the relative scores of the various subcategories of the GCI provide useful information as to what the priorities for reform should be, both from the cold reality of the hard data and from the point of view of the business community that is currently operating in the country.

The GCI is an instrument that can be used to identify the competitive strengths of a country as well as the barriers to its economic progress. It can also be used to establish comparisons with neighboring countries and the relative position in the overall rankings that a particular country holds. In this context, the particular strength of the World Economic Forum's competitiveness work is that it provides a platform for dialogue among government, business, and civil society that can serve as a catalyst for productivity-raising reforms, with the aim of improving living standards.

References

1. Browne, C. and T. Geiger. 2009. "The Executive Opinion Survey: Capturing the Views of the Business Community". The Global Competitiveness Report 2009-2010. World Economic Forum. 49-57.

2. Sala-i-Martin, X., J. Blanke, M. Drzeniek Hanouz, T. Geiger, and I. Mia. 2009. "The Global Competitiveness Index 2009–2010: Contributing to Long-Term Prosperity amid the Global Economic Crisis". The Global Competitiveness Report 2009-2010. World Economic Forum. 3–47.

[4] For more detailed information about the survey process and the treatment of survey data, please refer to Browne, C. Geiger, T. (2009).

Table 1.2 Countries/economies at each stage of development

Stage 1: Factor-driven (37 economies)	Transition from stage 1 to stage 2 (24 economies)	Stage 2: Efficiency-driven (28 economies)	Transition from stage 2 to stage 3 (18 economies)	Stage 3: Innovation-driven (35 economies)
Bangladesh	Algeria	Albania	Argentina	Australia
Benin	Angola	Belize	Barbados	Austria
Bolivia	Armenia	Bosnia and Herzogovina	Brasil	Bahrain
Burkina Faso	Azerbaijan	Bulgaria	Chile	Belgium
Burundi	Botswana	Cape Verde	Croatia	Canada
Cambodia	Brunei Darussalam	China	Estonia	Cyprus
Cameroon	Egypt	Colombia	Hungary	Czech Republic
Chad	Georgia	Costa Rica	Latvia	Denmark
Cote d'Ivoire	Guatemala	Dominican Republic	Lebanon	Finland
Ethiopia	Guyana	Ecuador	Lithuania	France
Cambodia, The	Honduras	El Salvador	Mexico	Germany
Ghana	Iran, Islamic Rep.	Indonesia	Oman	Greece
Haiti	Jamaica	Jordan	Poland	Hong Kong SAR
India	Kazakhstan	Macedonia, FYR	Russian Federation	Iceland
Kenya	Kuwait	Malaysia	Slovak Republic	Ireland
Kyrgyz Republic	Mongolia	Mauritius	Trinidad and Tobago	Israel
Lesotho	Paraguay	Montenegro	Turkey	Italy
Madagascar	Philippines	Morocco	Uruguay	Japan
Malawi	Qatar	Namibia		Korea, Rep.
Mali	Saudi Arabia	Panama		Luxemburg
Mauritania	Sri Lanka	Peru		Malta
Moldova	Syria	Romania		Netherlands
Mozambique	**Ukraine**	Serbia		New Zealand
Nepal	Venezuela	South Africa		Norway
Nicaragua		Suriname		Portugal
Nigeria		Swaziland		Puerto Rico
Pakistan		Thailand		Singapore
Rwanda		Tunisia		Slovenia
Senegal				Spain
Tajikistan				Sweden
Tanzania				Switzerland
Timor-Leste				Taiwan, China
Uganda				United Arab Emirates
Vietnam				United Kingdom
Yemen				United States
Zambia				
Zimbabwe				

Appendix A: Calculation and structure of Global Competitiveness Index in 2011

This appendix provides details on the structure and calculation procedure of the Global Competitiveness Index (GCI). The structure and calculation procedure of the Ukraine's regions Competitiveness Index is the same.

The numbering of the variables matches the numbering of the Data Tables of the World Economic Forum's Global Competitiveness Report 2011–2012. The number preceding the period indicates the pillar to which the variable belongs (e.g. variable 1.01 belongs to the 1st pillar, variable 12.04 belongs to the 12th pillar). Published numbers are rounded to the nearest integer, but when calculating the GCI accurate data are used.

The calculation of the GCI is based on successive aggregation of scores from the indicator level (the most disaggregated level) up the overall GCI score. Unless otherwise specified, an arithmetic mean is used to aggregate individual variables within a same category at all level of aggregation. [a]

For aggregation of the variables a percentage indicated next to each category is used. It is a weight of a category within the parent group of indicators. For example, a 9th pillar score a country is 17 percent of the efficiency enhancers subindex score regardless of its stage of development. Similarly, the transport infrastructure score accounts for 50 percent of a infrastructure pillar score.

In contrast to lower aggregation levels, shares of each of the three sub-indices (the basic requirements, efficiency enhancers and innovation and sophistication factors) are not constant. They depend on the stage of development of a country, as noted in the first chapter. [b]

For example, Ukraine is between the first and second stages of development, and the weight the basic requirements subindex in the overall GCI index for the country is 40 percent, while for Norway's (a country at the third stage of development) GCI it is only 20.

Variables that are not derived from the Executive Opinion Survey (Survey) are identified by an asterisk (*). For technical notes and data sources please refer to the Appendix B. To make the aggregation possible, these variables are transformed into a 1-to-7 scale in order to align them with the Survey results. We apply a transformation method that preserves the order of, and the relative distance between, country scores. [c] Indicators marked with a "½" superscript means that we assign a half-weight to each instance. To avoid double counting, they are assigned to half their weight in each case. [d]

Weight (%) within immediate parent category

BASIC REQUIREMENTS

1st pillar: Institutions 25%

A. Public institutions 75%

Property rights 20%
- 1.01 Property rights
- 1.02 Intellectual property protection* [1/2]

Ethics and corruption 20%
- 1.03 Diversion of public funds
- 1.04 Public trust of politicians
- 1.05 Irregular payments and bribes

Undue influence 20%
- 1.06 Judicial independence
- 1.07 Favoritism in decisions of government officials

Government inefficiency 20%
- 1.08 Wastefulness of government spending
- 1.09 Burden of government regulation
- 1.10 Efficiency of legal framework in settling disputes
- 1.11 Efficiency of legal framework in challenging regulations
- 1.12 Transparency of government policymaking

Security 20%
- 1.13 Business costs of terrorism
- 1.14 Business costs of crime and violence
- 1.15 Organized crime
- 1.16 Reliability of police services

B. Private institutions 25%

Corporate ethics 50%
- 1.17 Ethical behavior of firms

Accountability 50%
- 1.18 Strength of auditing and reporting standards
- 1.19 Efficacy of corporate boards
- 1.20 Protection of minority shareholders' interests
- 1.21 Strength of investor protection*

2nd pillar: Infrastructure 25%

A. Transport infrastructure 50%
- 2.01 Quality of overall infrastructure
- 2.02 Quality of roads
- 2.03 Quality of railroad infrastructure
- 2.04 Quality of port infrastructure
- 2.05 Quality of air transport infrastructure
- 2.06 Available seat kilometers*

B. Energy and telephony infrastructure 50%
- 2.07 Quality of electricity supply
- 2.08 Fixed telephone lines* [1/2]
- 2.09 Mobile telephone subscriptions* [1/2]

3rd pillar: Macroeconomic environment 25%
- 3.01 Government budget balance *
- 3.02 National savings rate*
- 3.03 Inflation* [e]
- 3.04 Interest rate spread*
- 3.05 Government debt*
- 3.06 Country credit rating*

4th pillar: Health and primary education 25%

A. Health 50%
- 4.01 Business impact of malaria [f]
- 4.02 Malaria incidence* [f]
- 4.03 Business impact of tuberculosis [f]
- 4.04 Tuberculosis incidence* [f]
- 4.05 Business impact of HIV/AIDS [f]
- 4.06 HIV prevalence* [f]
- 4.07 Infant mortality*
- 4.08 Life expectancy*

B. Primary education 50%
- 4.09 Quality of primary education
- 4.10 Primary education enrollment rate*

EFFICIENCY ENHANCERS

5th pillar: Higher education and training.....17%

A. Quantity of education.....33%
- 5.01 Secondary education enrollment rate*
- 5.02 Tertiary education enrollment rate*

B. Quality of education.....33%
- 5.03 Quality of the educational system
- 5.04 Quality of math and science education
- 5.05 Quality of management schools
- 5.06 Internet access in schools

C. On-the-job training.....33%
- 5.07 Local availability of specialized research and training services
- 5.08 Extent of staff training

6th pillar: Goods market efficiency.....17%

A. Competition.....67%

Domestic competition.....75%
- 6.01 Intensity of local competition
- 6.02 Extent of market dominance
- 6.03 Effectiveness of anti-monopoly policy
- 6.04 Extent and effect of taxation [1/2]
- 6.05 Total tax rate*
- 6.06 Number of procedures required to start a business* [h]
- 6.07 Time required to start a business* [h]
- 6.08 Agricultural policy costs

External competition.....25% [g]
- 6.09 Prevalence of trade barriers
- 6.10 Trade tariffs*
- 6.11 Prevalence of foreign ownership
- 6.12 Business impact of rules on FDI
- 6.13 Burden of customs procedures
- 6.14 Imports as a percentage of GDP* [i]

B. Quality of demand conditions.....33%
- 6.15 Degree of customer orientation
- 6.16 Buyer sophistication

7th pillar: Labor market efficiency.....17%

A. Flexibility.....50%
- 7.01 Cooperation in labor-employer relations
- 7.02 Flexibility of wage determination
- 7.03 Rigidity of employment*
- 7.04 Hiring and firing practices
- 7.05 Redundancy costs*
- 6.04 Extent and effect of taxation [1/2]

B. Efficient use of talent.....50%
- 7.06 Pay and productivity
- 7.07 Reliance on professional management [1/2]
- 7.08 Brain drain
- 7.09 Female participation in labor force*

8th pillar: Financial market development.....17%

A. Efficiency.....50%
- 8.01 Availability of financial services
- 8.02 Affordability of financial services
- 8.03 Financing through local equity market
- 8.04 Ease of access to loans
- 8.05 Venture capital availability

B. Trustworthiness and confidence.....50%
- 8.06 Soundness of banks
- 8.07 Regulation of securities exchanges
- 8.08 Legal rights index*

9th pillar: Technological readiness.....17%

A. Technological adoption.....50%
- 9.01 Availability of latest technologies
- 9.02 Firm-level technology absorption
- 9.03 FDI and technology transfer

B. ICT use.....50%
- 9.04 Internet users*
- 9.05 Broadband Internet subscriptions*
- 9.06 Internet bandwidth*
- 2.08 Fixed telephone lines* [1/2]
- 2.09 Mobile telephone subscriptions* [1/2]

10th pillar: Market size.....17%

A. Domestic market size.....75%
- 10.01 Domestic market size index* [i]

B. Foreign market size.....25%
- 10.02 Foreign market size index* [k]

INNOVATION AND SOPHISTICATION FACTORS

11th pillar: Business sophistication.....50%
- 11.01 Local supplier quantity
- 11.02 Local supplier quality
- 11.03 State of cluster development
- 11.04 Nature of competitive advantage
- 11.05 Value chain breadth
- 11.06 Control of international distribution
- 11.07 Production process sophistication
- 11.08 Extent of marketing
- 11.09 Willingness to delegate authority
- 7.07 Reliance on professional management [1/2]

12th pillar: Innovation.....50%
- 12.01 Capacity for innovation
- 12.02 Quality of scientific research institutions
- 12.03 Company spending on R&D
- 12.04 University-industry collaboration in R&D
- 12.05 Government procurement of advanced technology products
- 12.06 Availability of scientists and engineers
- 12.07 Utility patents*
- 1.02 Intellectual property protection* [1/2]

References

a. For each category i that consist from K indicators:

$$category_i = \frac{\sum_{k=1}^{K} indicator_k}{K}$$

b. As described in the chapter, the weights are the following:

Stage of development				
Stage 1: Factor-driven	Transition from stage 1 to stage 2	Stage 1: Efficiency-driven	Transition from stage 2 to stage 3	Stage 1: Innovation-driven
GDP per capita (USD) thresholds*				
<2000	**2 000-2 999**	**3 000-8 999**	**9 000-17 000**	**>17 000**
Weights for basic requirements subindex				
60	40-60	40	20-40	20
Weights for efficiency enhancers subindex				
35	35-50	50	50	50
Weights for innovation and sophistication factors subindex				
5	5-10	10	10-30	30

* For economies with a high dependency on mineral resources, GDP per capita is not the sole criterion for the determination of the stage of development. See text for details.

Note: There is inverse dependence between GDP per capita and weight in the range of subindex weights. For example, for a country with GDP per capita of USD 2999 the weight used for subindex "Basic Requirements" is 40%.

Ukraine is between the 1st and the 2nd stages of development.

c. The standard formula for converting hard data is the following:

$$6 \times \frac{\text{(country score - sample minimum)}}{\text{(sample maximum - sample minimum)}} + 1$$

The "sample minimum" and "sample maximum" are, respectively, the lowest and highest country scores in the sample of countries covered by the GCI. In some instances, adjustments were made to account for extreme outliers. For those hard data variables for which a higher value indicates a worse outcome (eg, disease incidence, government debt), we rely on a normalization formula that, in addition to converting the series to a 1-to-7 scale, reverses it, so that 1 and 7 still cor-

responds to the worst and best possible outcomes, respectively:

$$-6\times\frac{\text{(country score - sample minimum)}}{\text{(sample maximum - sample minimum)}}+7$$

d. For those groups of variables that contain one or several half weight variables, country scores for those groups are computed as follows:

$$\frac{\text{(sum of scores on full weight variables)}+\frac{1}{2}\times\text{(sum of scores on half weight variables)}}{\text{(count of full weight variables)}+\frac{1}{2}\times\text{(count of full weight variables)}}$$

e. In order to capture the idea that both high inflation and deflation are detrimental, inflation enters the model in a U-shaped manner as follows: for values of inflation between 0.5 and 2.9 percent, a country receives the highest possible score of 7. Outside this range, scores decrease linearly as they move away from these values.

f. The impact of malaria, tuberculosis, and HIV/AIDS on competitiveness depends not only on their respective incidence rates, but also on how costly they are for business. Therefore, in order to estimate the impact of each of the three diseases, we combine its incidence rate with the Survey question on its perceived cost to businesses. To combine these data we first take the ratio of each country's disease incidence rate relative to the highest incidence rate in the whole sample. The inverse of this ratio is then multiplied by each country's score on the related Survey question. This product is then normalized to a 1-to-7 scale. Note that countries with zero reported incidence receive a 7, regardless their scores on the related Survey question.

g. The "Competition" sub-pillar is the weighted average of two components: "Domestic competition" and "Foreign competition". In both components, the included variables provide an indication of the extent to which competition is distorted. The relative importance of these distortions depends on the relative size of domestic versus foreign markets. This interaction between the domestic market and the foreign market is captured by the way we determine the weights of the two components. Domestic competition is the sum of consumption (C), investment (I), government spending (G), and exports (X), while foreign competition is equal to imports (M). Thus we assign a weight of (C+I+G+X)/(C+I+G+X+M) to "Domestic competition" and a weight of M/(C+I+G+X+M) to "Foreign competition". For Ukraine, the calculation yields a weight of 0.75 for the Domestic competition component and of 0.25 for the Foreign competition component.

h. Variables 6.06 and 6.07 combine to form a single variable.

i. The values of this variable are normalized.

j. The size of the domestic market is constructed by taking the natural log of the sum of the gross domestic product valued at PPP, plus the total value (PPP estimates) of imports of goods and services, minus the total value (PPP estimates) of exports of goods and services. Data are then normalized on a 1-to-7 scale. PPP estimates of imports and exports are obtained by taking the product of exports as a percentage of GDP and GDP valued at PPP.

k. The size of the foreign market is estimated as the natural log of the total value (PPP estimates) of exports of goods and services, normalized on a 1-to-7 scale. PPP estimates of exports are obtained by taking the product of exports as a percentage of GDP and GDP valued at PPP.

Annex B: Ukrainian National Competitiveness Index 2011 data

Property rights
Property rights, including over financial assets (1 = are poorly defined and not protected by law, 7 = are clearly defined and well protected by law)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Intellectual property protection
Intellectual property protection in your region (1 = is weak and not enforced; 7 = is strong and enforced)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Diversion of public funds
In your region diversion of public funds to companies, individuals, or groups due to corruption (1 = is common, 7 = never occurs)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Public trust of politicians
Public trust in the financial honesty of politicians is (1 = very low, 7 = very high)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Irregular payments and bribes
In your region, how common is it for firms to make undocumented extra payments or bribes connected with the following

a. Import and export permits?
b. Public utilities (e.g., telephone or electricity)?
c. Tax payments?
d. Awarding of public contracts and licenses?
e. Obtaining favorable judicial decisions?
(1 - common, 7 - never occurs)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Judicial independence
Is the judiciary in your region independent from political influences of members of government, citizens, or firms? (1 = no – heavily influenced, 7 = yes – entirely independent)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Favoritism in decisions of government officials
When deciding upon policies and contracts, government officials (1 = usually favor well-connected firms and individuals, 7 = are neutral)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Wastefulness of government spending
Public spending in your region (1 = is wasteful, 7 = provides necessary goods and services not provided by the market)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Burden of government regulation
Complying with administrative requirements (permits, regulations, reporting) issued by the government in your region is (1 = burdensome, 7 = not burdensome)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Efficiency of legal framework in settling disputes
How efficient is the legal framework in your region for private businesses in settling disputes? (1 = Extremely inefficient, 7 = Highly efficient)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Efficiency of legal framework in challenging regulations
How efficient is the legal framework in your region for private businesses in challenging the legality of government actions and/or regulations? (1 = Extremely inefficient, 7 = Highly efficient)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Transparency of government policymaking
Are firms in your region usually informed clearly by the government on changes in policies and regulations affecting your industry? (1 = never informed; 7 = always informed)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Business costs of terrorism
The threat of terrorism in your region (1 = imposes significant costs on business, 7 = does not impose significant costs on business)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Business costs of crime and violence
The incidence of common crime and violence (e.g., street muggings, firms being looted) (1 = imposes significant costs on businesses, 7 = does not impose significant costs on businesses)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Organized crime
Organized crime, such as mafia-oriented racketeering, extortion in your region (1 = imposes significant costs on businesses, 7 = does not impose significant costs on businesses)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Reliability of police services
Police services (1 = cannot be relied upon to protect businesses from criminals, 7 = can be relied upon to protect businesses from criminals)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Ethical behavior of firms
The corporate ethics (ethical behavior in interactions with public officials, politicians, and other enterprises) of firms in your region are (1 = among the world's worst, 7 = among the best in the world)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Efficacy of corporate boards
Corporate governance by investors and boards of directors in your region is characterized by (1 = management has little accountability, 7 = investors and boards exert strong supervision of management decisions)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Protection of minority shareholders' interests
Interests of minority shareholders in your region are (1 = not protected by law and seldom recognized by majority shareholders, 7 = protected by law and actively enforced)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Strength of investor protection*
Strength of investor protection, 0–10 (best), 2010

Source: The World Bank, Doing Business 2010

Quality of overall infrastructure
General infrastructure (transport, telephony and energy) in your region is (1 = underdeveloped, 7 = as extensive and efficient as the

world's best)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Quality of roads
Roads in your region are (1 = underdeveloped, 7 = extensive and efficient by international standards)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Quality of railroad infrastructure
Railroads in your region are (1 = underdeveloped, 7 = as extensive and efficient as the world's best)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Quality of port infrastructure
Port facilities and inland waterways in your region are (1 = underdeveloped, 7 = as developed as the world's best) | * For landlocked regions, this measures the ease of access to port facilities and inland waterways.

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Quality of air transport infrastructure
Passenger air transport in your region is (1 = infrequent, limited, and inefficient, 7 = as frequent, extensive, and efficient as the world's best)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Available seat kilometers*
Air transport passenger turnover in a region per week, million seat kilometers

Source: State Statistics Committee of Ukraine

Quality of electricity supply
The quality of electricity supply in your region (lack of interruptions and lack of voltage fluctuations) is (1 = worse than in most other countries, 7 = meets the highest standards in the world)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Fixed telephone lines*
Main telephone lines per 100 population, 2010

Source: National Commission for Communications Regulation of Ukraine

Government budget balance*
Central government gross surplus/deficit as a percentage of GDP, 2010

Source: National Bank of Ukraine

Gross national savings*
National savings rate as a percentage of GDP, 2010

Source: National Bank of Ukraine

Inflation*
Annual percent change in consumer price index, 2010

Source: State Statistics Committee of Ukraine

Interest rate spread*
Average interest rate spread (difference between typical lending and deposit rates), 2010

Source: National Bank of Ukraine, Calculation: Foundation for Effective Governance

General government debt*
Government gross debt as a percentage of GDP, 2010

Source: National Bank of Ukraine

Business impact of malaria
How serious do you consider the future impact of malaria on your company in the next 5 years? (1 = extremely serious, 7 = not a problem)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Malaria cases*
Number of malaria cases per 100,000 population, 2010

Source: State Statistics Committee of Ukraine

Business impact of tuberculosis
How serious do you consider the future impact of tuberculosis on your company in the next 5 years? (1 = extremely serious, 7 = not a problem)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Tuberculosis incidence*
Number of tuberculosis cases per 100,000 population, 2010

Source: Ministry of healthcare of Ukraine

Business impact of HIV/AIDS
How serious do you consider the future impact of HIV/AIDS on your company in the next 5 years? (1 = extremely serious, 7 = not a problem)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

HIV prevalence*
HIV prevalence as a percentage of adults aged 15-49 years, 2010

Source: Ukrainian AIDS prevention and control center

Infant mortality*
Infant (children aged 0–12 months) mortality per 1,000 live births, 2010

Source: State Statistics Committee of Ukraine

Life expectancy*
Life expectancy at birth (years), 2010

Source: State Statistics Committee of Ukraine

Quality of primary education
Primary schools in your region are (1 = of poor quality, 7 = among the best in the world)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Primary education enrollment*
Net primary education enrollment rate, 2010

Source: State Statistics Committee of Ukraine

Secondary education enrollment*
Gross secondary education enrollment rate, 2010

Source: State Statistics Committee of Ukraine

Tertiary education enrollment, gross %*
Gross tertiary education enrollment rate (18-23), 2010

Source: State Statistics Committee of Ukraine, Caclulation: Foundation for Effective Governance

Quality of the educational system
The educational system in your region (1 = does not meet the needs of a competitive economy, 7 = meets the needs of a competitive economy)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Quality of math and science education
Math and science education in your region's schools (1 = lag far behind most other countries, 7 = are among the best in the world)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Quality of management schools
Management or business schools in your region are (1 = limited or of poor quality, 7 = among the best in the world)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Internet access in schools
Internet access in schools is (1 = very limited, 7 = extensive—most children have frequent access)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Availability of research and training services
In your region specialized research and training services are (1 = not available, 7 = available from world-class local institutions)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Extent of staff training
The general approach of companies in your region to human resources is (1 = to invest little in training and employee development, 7 = to invest heavily to attract, train, and retain employees)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Intensity of local competition
Competition in the local market is (1 = limited in most industries, 7 = intense in most industries)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Extent of market dominance
Corporate activity in your region is (1 = dominated by a few business groups, 7 = spread among many firms)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Effectiveness of anti-monopoly policy
Anti-monopoly policy in your region is (1 = lax and not effective at promoting competition, 7 = effective and promotes competition)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Extent and effect of taxation
The level of taxes in your region (1 = significantly limits the incentives to work or invest, 7 = has little impact on the incentives to work or invest)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Total tax rate*
This variable is a combination of profit tax (% of profits), labor tax and contribution (% of profits), and other taxes (% of profits), 2010

Source: The World Bank, Doing Business 2010

No. procedures to start a business*
Number of procedures required to start a business, 2010

Source: The World Bank, Doing Business 2010

No. days to start a business*
Number of days required to start a business, 2010

Source: The World Bank, Doing Business 2010

Agricultural policy costs
Agricultural policy in your region (1 = is excessively burdensome for the economy, 7 = balances the interests of taxpayers, consumers, and producers)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Prevalence of trade barriers
In your region, tariff and non-tariff barriers significantly reduce the ability of imported goods to compete in the domestic market (1 = strongly agree, 7 = strongly disagree)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Trade-weighted tariff rate*
Average import tariff, 2010

Source: International Trade Centre

Prevalence of foreign ownership
Foreign ownership of companies in your region is (1 = rare and limited, 7 = prevalent and encouraged)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Business impact of rules on FDI
In your region, rules governing foreign direct investment (1 = discourage foreign direct investment, 7 = encourage foreign direct investment)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Burden of customs procedures
Customs procedures (formalities regulating the entry and exit of merchandise) in your region are (1 = extremely slow and cumbersome, 7 = rapid and efficient)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Degree of customer orientation
Customer orientation: Firms in your region (1 = generally treat their customers badly, 7 = are highly responsive to customers and customer retention) | 2008-09

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Buyer sophistication

Buyers in your region make purchasing decisions (1 = based solely on the lowest price, 7 = based on a sophisticated analysis of performance attributes)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Cooperation in labor-employer relations
Labor-employer relations in your region are (1 = generally confrontational, 7 = generally cooperative)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Flexibility of wage determination
In your region, wages are (1 = set by a centralized bargaining process, 7 = up to each individual company)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Rigidity of employment index *
Rigidity of Employment Index on a 0–100 (worst) scale

Source: The World Bank, Doing Business 2010

Hiring and firing practices
The hiring and firing of workers is (1 = impeded by regulations, 7 = flexibly determined by employers)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Redundancy costs, weeks of salary*
Firing costs (in weeks of wages), 2010

Source: The World Bank, Doing Business 2010

Pay and productivity
In your region, pay is (1 = not related to worker productivity, 7 = strongly related to worker productivity)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Reliance on professional management
Senior management positions in your region are (1 = usually held by relatives or friends without regard to merit, 7 = mostly held by professional managers chosen based for their superior qualification)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Brain drain
Your region's talented people (1 = normally leave to pursue opportunities in other countries, 7 = almost always remain in the region)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Women in labor force*
Female participation in the labor force as a percentage of male participation, 2010

Source: State Statistics Committee of Ukraine

Availability of financial services

The level of sophistication of financial markets in your region is (1 = poor by international standards, 7 = excellent by international standards)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Affordability of financial services
Does the financial sector in your region provide a wide variety of financial products and services to businesses? (1 = Not at all, 7 = Provides a wide variety)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Financing through local equity market
Raising money by issuing shares on the stock market in your region is (1 = impossible, 7 = very easy)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Ease of access to loans
How easy is it to obtain a bank loan in your region with only a good business plan and no collateral? (1 = impossible, 7 = very easy)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Venture capital availability
In your region, how easy is it for entrepreneurs with innovative but risky projects to find venture capital? (1 = impossible, 7 = very easy)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Soundness of banks
Banks in your region are (1 = insolvent and may require a government bailout, 7 = generally healthy with sound balance sheets)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Regulation of securities exchanges
Regulation of securities exchanges in your region is (1 = not transparent, ineffective and subject to undue influence from industry and government, 7 = transparent, effective and independent of undue influence from industry and government)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Legal rights index*
Strength of legal rights index on a 0–10 (best) scale

Source: The World Bank, Doing Business 2010

Availability of latest technologies
In your region, the latest technologies are (1 = not widely available or used, 7 = widely available and used)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Firm-level technology absorption
Companies in your region are (1 = not able to absorb new technology, 7 = aggressive in absorbing new technology)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

FDI and technology transfer
Foreign direct investment in your region (1 = brings little new technology, 7 = is an important source of new technology)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Mobile telephone subscriptions*

Mobile telephone subscribers per 100 population

Source: National Commission for Communications Regulation of Ukraine

Internet users*
Internet users per 100 population, 2010

Source: Gemius/GFK-Ukraine

Broadband Internet subscriptions*
Broadband internet subscribers per 100 population, 2010

Source: IKS-consulting

Internet bandwidth*
Internet bandwidth, kb/s/capita, 2010

Source: International Telecommunications Unit

Domestic market size index*
Sum of gross domestic product plus value of imports of goods and services, minus value of exports of goods and services, normalized on a 1–7 (best) scale

Source: Calculations: Foundation for Effective governance.
See Annex A

Foreign market size index*
Value of exports of goods and services, normalized on a 1–7 (best) scale

Source: Calculations: Foundation for Effective governance.
See Annex A

Local supplier quantity
Local suppliers in your region are (1 = largely nonexistent, 7 = numerous and include the most important materials, components, equipment, and services)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Local supplier quality
The quality of local suppliers in your region is (1 = very poor, 7 = very good)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

State of cluster development
In your region's economy, well-developed and deep clusters are (1 = rare or absent, 7 = widespread in many fields)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Control of international distribution
Competitiveness of your region's companies in international markets is primarily due to (1 = low-cost or local natural resources, 7 = unique products and processes)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Value chain breadth
Exporting companies in your region are (1 = primarily involved in individual steps of the value chain, e.g., resource extraction or production, 7 = present across the entire value chain, e.g., do not only produce but also perform product design, marketing sales, logistics and after-sales services)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Control of international distribution
International distribution and marketing from your region (1 = take place through foreign companies, 7 = are owned and controlled by local companies)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Production process sophistication
In your region, production processes use (1 = labor-intensive methods or previous generations of process technology, 7 = the world's best and most efficient process technology)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Extent of marketing
In your region, the extent of marketing is (1 = limited and primitive, 7 = extensive and employs the world's most sophisticated tools and techniques)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Willingness to delegate authority
In your company, willingness to delegate authority to subordinates is (1 = low— top management controls all important decisions, 7 = high—authority is mostly delegated to business unit heads and other lower-level managers)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Capacity for innovation
In your region, companies obtain technology (1 = exclusively from licensing or imitating foreign companies, 7 = by conducting formal research and pioneering their own new products and processes)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Quality of scientific research institutions
Scientific research institutions in your region (e.g., university laboratories, government laboratories) are (1 = nonexistent, 7 = the best in their fields internationally)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Company spending on R&D
Companies in your region (1 = do not spend money on research and development, 7 = spend heavily on research and development relative to international peers)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

University-industry collaboration in R&D
In the area of R&D, collaboration between the business community and local universities is (1 = minimal or nonexistent, 7 = intensive and ongoing)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Gov't procurement of advanced tech products
In your region, government procurement decisions result in technological innovation (1 = strongly disagree, 7 = strongly agree)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Availability of scientists and engineers
Scientists and engineers in your region are (1 = nonexistent or rare, 7 = widely available)

Source: Foundation for Effective Governance, Executive Opinion Survey, 2011

Utility patents granted*
Number of utility patents (i.e., patents for invention) granted by USA patent authority, per million population, 2010

Source: USPTO, State Statistics Committee of Ukraine. Calculations: Foundation for Effective Governance