A Simple Method for Measuring Relative Barriers to Economic Development

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Abstract

The message conveyed by the pioneer work of Jacob Viner in the middle of the 20th century is that any action plan to propel economic development in a particular country requires sharp focus on the identification of the barriers to economic development observable in that country. Unfortunately, Viner did not provide insight into how to measure the barriers to economic development. This paper argues that it is possible to assess the relative heights of the barriers to economic development between two countries using the indicators underpinning the Global Competitiveness Index (GCI).To evaluate this claim, it helps to have a specific example in mind. The illustration of the simple method for measuring relative barriers to development revolves around a comparison between Argentina and Australia. However, the proposed method has general applicability as a tool for policy design.

Keywords: Relative barriers to economic development; competitiveness; indicators of competitiveness; action plan

1.Introduction

The idea that economic freedom and secure property rights do not necessarily imply economic development goes back at least to Jacob Viner. More than sixty years ago Jacob Viner (1953) wrote a little book comprising the six lectures he delivered at the National University of Brazil in July and August 1950. Approximately one third of hisbook is devoted to economic development. The main theme of Lecture VI –entitled The Economics of Development– centres ona conceptual discussion of the obstacles to economic development. This lecture starts with a point about terminological discipline:

> The output of literature on 'economic development' has in recent years reached massive proportions. The literature, however, is extraordinarily lacking in explicit definition of the basic terms it employs, and if one attempts to find from the context what definitions are implicit one discovers that a wide range of different and often conflicting concepts is being covered by a single verbal label. (…)
> (Viner 1953, p. 94)

According to (Viner1953, pp. 103-119), there are four categories of obstacles: low productivity functions; scarcity of capital; adverse conditions in foreign trade; and rapid population growth. The components of these categories, such as low quality of human capital, inflation, terms of trade deterioration, et cetera, constitute specific impediments to economic development. The overall conclusions are that movement along the development path will be slow and arduous, even taking into account foreign aid, and that the solution must rest predominantly with the efforts of the national economies themselves to overcome the barriers to economic development –conclusions with which most economists would heartily agree today.

The message conveyed by the pioneer work of Viner (1953) is that any action plan to propel economic development in a particular country requires sharp focus on the identification of the barriers to economic development in that country. Unfortunately, Viner did not provide insight into how to measure the barriers to economic development. All in all, Viner's contribution could be characterized as an embryonic theory without measurement but with potential for guiding empirical observations.

No agreed definition of the concept of barrier to economic development exists. The working definition used in this paper is inspired by the vision of the World Economic Forum which can be condensed as follows: in economic development national competitiveness is destiny. Anything that detracts from national competitiveness is a barrier to economic development. Barriers range by degree of "height" from no barrier at all to extremely high barriers that retard economic development in a fundamental way, and they arise from many sources. Quite obviously, estimating their precise height is extremely difficult.

Comparisons of the heights of the barriers between two countries may be useful for policy purposes. For example, if Argentina wants to attain the level of economic development of Australia, the measurement of the relative heights of the barriers to economic development in Argentina with respect to Australia would allow the identification of priority areas in Argentina for development purposes.

The Global Competitiveness Index (GCI), published since 2004, serves as a tool for governments and the private sector to boost future prosperity. The GCIinvolves a variety of indicators and provides a focal point for the discussion of competitiveness policies. This paper argues that it is possible to assess the relative heights of the barriers to economic development between two countries using the indicators underpinning the GCI. To evaluate this claim, it helps to have a specific example in mind. The illustration of the simple method for measuring relative barriers to development revolves around a comparison between Argentina and Australia. However, the proposed method has general applicability as a tool for policy design.

The next section sketches the anatomy of the Global Competitiveness Index and its theoretical background. Section 3 describes how to measure the relative heights of the barriers to economic development. The last section points out that the method for computing relative heights of the development barriers does not depend on the above mentioned specific example of Argentina versus Australia.

2. The Anatomy of the Global Competitiveness Index

The GCI builds on Klaus Schwab's original idea of 1979 and was created by Sala-i-Martin in collaboration with the Forum.[1]

2.1. Global Competitiveness Index: Structure

The notion of competitiveness is defined to capture the determinants of long-run growth. 'Competitiveness's a term encompassing the institutions and other elements that determine the productivity of a country. 'Institutions 'are defined as laws, regulations, and policies affecting material incentives to invest in physical capital, human capital, and innovation. For example, property rights and economic freedom –the foundations stones of economic prosperity– are members of the set of institutions as well as intellectual property tools such as patents, copyrights, trade secrets, and trademarks.

The structure of the GCI consists of 12 pillars of national competitiveness. The pillars are measured using 114 indicators of competitiveness. The numerical value of the indicators results from two sources: hard data and survey information based on the World Economic Forum's Executive Opinion Survey.The World Economic Forum reports cover a significant number of countries. For example, in the 2016 edition the GCI involves a total of 138 countries WEF (2016). The numerical value of the GCI is used to rank countries in terms of national competitiveness. For example, Argentina occupies the 104th position and Australia the 22nd out of 138 countries. WEF (2016, p. 98 and p. 102).

Each indicator of competitiveness can be identified with a symbol such as P.ij consisting of three numbers P, i and j separated by a period. The first number preceding the period indicates to which pillar the indicator belongs and the pair of numbers ij has a descriptive title. For example, the indicator 1.12 belongs to Pillar #1: Institutions, and has the following descriptive title: "Transparency of government policy making". As indicated by first and second columns of Table 1, in correspondence with each pillar there is a fix number of indicators. For example, Pillar # 10 (Market size) contains four indicators: 10.01 Domestic market size index; 10.02 Foreign market size index; 10.03 GDP; and 10.04 Exports as a percentage of GDP.

[1] See Sala-i-Martin and Artadi (2004).

Table 1Global Competitiveness Index: number of indicators in each pillar

Pillars of competitiveness	**Number of P.ijindicators**	**Example of P.ij**
Pillar #1: Institutions	21	1.12Transparency of government policy making
Pillar #2: Infrastructure	9	2.07 Quality of electricity supply
Pillar #3: Macroeconomic environment	5	3.01 Government budget balance, % GDP
Pillar #4: Health and primary education	10	4.09 Quality of primary education
Pillar #5: Higher education and training	8	5.03 Quality of the education system
Pillar #6: Goods market efficiency	16	6.06 Number of procedures to start a business
Pillar #7: Labour market efficiency	10	7.01 Cooperation in labour-employer relations
Pillar #8: Financial market development	8	8.04 Easy access to loans
Pillar #9: Technological readiness	7	9.03 FDI and technology transfer
Pillar #10: Market size	4	10.01 Domestic market size index
Pillar #11: Business sophistication factors	9	11.08 Extent of marketing
Pillar #12: Innovation	7	12.01 Capacity for innovation
12 pillars	Total: 114	

Source: WEF (2016, pp. 39-40)

For a given year and countryC covered by the GCI, each indicator P.ijhas a *rank* out of the total number of countries involved in the computation of the GCI, denoted here by

$$\text{Rank of } I_{\text{Country C}} \qquad [1]$$

whereI can be any indicator P.ij and the year has been omitted to simplify the notation.For example, according to WEF (2016) the indicator 2.07 Quality of electricity supply has rank 119 for Argentina and 22 for Australia, that is, Rank of $2.07_{Arg} = 119$, and Rank of $2.07_{Aus} = 22$.

2.2. Global Competitiveness Index: Theoretical Background

The GCI cannot be subject to the "measurement without theory" charge. Underlying the measurements of national competitiveness there is a narrative model due to Michael E. Porter (1990).In broad terms, Porter's model of economic development can be easily outlined. There are three stages of development encapsulating different types of economies, namely: Stage 1 (Factor-driven economies); Stage 2 (Efficiency-driven economies); and Stage 3 (Innovation-driven economies). In addition, there are economies in transition (from Stage 1 to Stage 2, and from Stage 2 to Stage 3). As a result, the set of all economies E is partitioned into five kinds of economies E_1, E_2, E_3, E_4, and E_5. These subsets can be mapped into time intervals as follows: E_1 is mapped into the interval $T_1 = \{t: 0 \leq t < t^I\}$; E_2 into $T_2 = \{t: t^I \leq t < t^{II}\}$; and so on. Each time interval defines a phase of development: Phase A, defined by the interval T_1; Phase B, defined by T_2; and so on. Economies in E is can be identified by their corresponding GDP per capita,so that the subsets $E_1, \ldots, E_5$ consist of income thresholds.[2]

Assuming in addition that $T = \{T_1, T_2, T_3, T_4, T_5\}$ represents the set of non-negative real numbers, the image of $E = \{E_1, E_2, E_3, E_4, E_5\}$ originated by the set-to-set map

$$P: E \rightarrow T, \qquad [2]$$

defined as

$$P(E_i) = T_i \qquad (i = 1, \ldots, 5) \qquad [3]$$

[2]See WEF (2016, Table 1, p. 38) for the numerical specifications of the income thresholds.

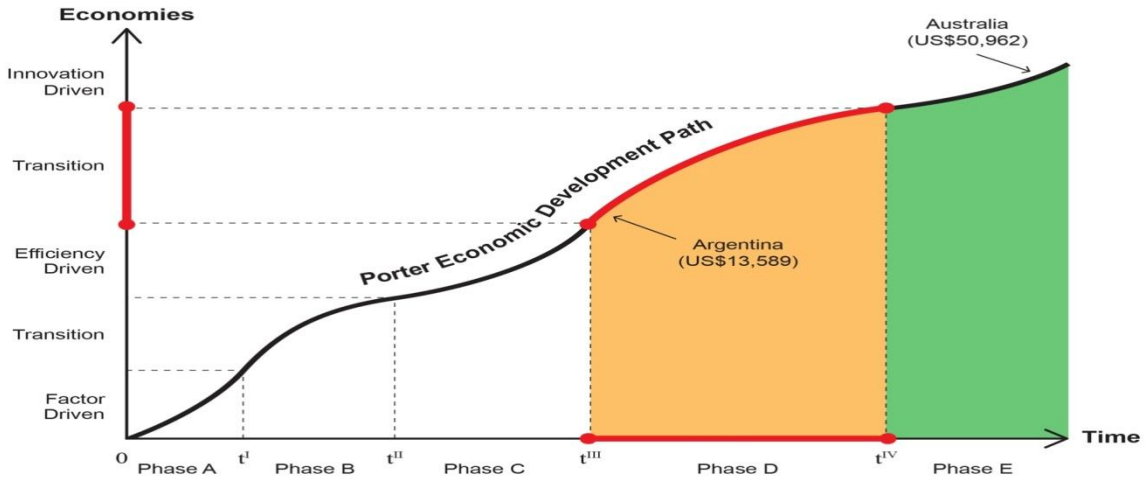
Can be called *Porter's economic development path*.[3]Figure 1 shows the position of Argentina and Australia on this path based on the standard partition of E, that is, the subset E_4 (all economies in transition from Stage 2 to stage 3) is defined by the range of GDP per capita: US$9,000-US$17,000; and the subset E_5(all innovation-driven economies) is defined by GDP per capita > $17,000.

The GCI takes the five phases of development into account by attributing higher weights to those pillars that are more relevant for an economy given its position on the Porter's development path. To operationalize this concept, the pillars of competitiveness are assigned to three subindices (termed Basic Requirements, Efficiency Enhancers, and Innovation and Sophistication Factors) each critical to a particular phase of development.[4]

1. Quantification of the Relative Heights

Given a particular country, the rank of an indicator can be thought of as a proxy for the absolute height of the barrier associated with that indicator. For example, the absolute height of the barrier associated with starting a new business (indicator 6.06 No. of procedures to start a business) is Rank of 6.06_{Arg} = 134, and Rank of 6.06_{Aus} = 11 WEF (2016, p. 99 and p. 103).

Figure 1Pictorial description of the Porter's narrative model



Although the absolute heights provide information in relation to the whole set of countries[5], the selection of a benchmark country mayprovide further insight into the indicators to be targeted in one country in order to achieve the position of another(benchmark) country on the development path. For example, if Argentina (country in transition from the efficiency-driven economy to the innovation-driven economy) wants to attain the current position of Australia (innovation-driven economy) it may be useful to compute the relative height of the barriers of Argentina with respect to Australia. This would help to assess gaps and priority areas relevant for the economic development of Argentina.

Assume that we want to compute the relative height of the barriers to economic development of Argentina (target country) with respect to Australia (benchmark country). Let I_{Arg} beany indicator for Argentina out of 114 indicators in the Global Competitiveness Index and I_{Aus} the same indicator for Australia. The height of *relative* barrier to economic development corresponding to the selected indicator I can be measured as

$$H_{Arg/Aus} = \text{Rank of } I_{Arg} - \text{Rank of } I_{Aus} \qquad [4]$$

For example, the indicator 4.09 Quality of primary education has rank 95 for Argentina and rank 14 for Australia so that the relative height of this barrier is $H_{Arg/Aus}$ = 81.

The relative height of a barrier can be 'extremely high,' 'very high,' 'substantial,' and 'moderate to low.' In practice, the lines of separation between these categories involve an inevitable element of arbitrariness. To draw the line of separation between the first two categories of heights we proffer the following numerical representation: $100<H_{Arg/Aus}< 138$ ('extremely high' barrier to economic development), and $50<H_{Arg/Aus}\leq 100$ ('very high' barrier to economic development).

[3] More details about the Porter model can be found in Porter (2002), (2005), and Sala-i-Martin et al. (2007), (2014).
[4] The relative weights can be found in (WEF 2016, Table 1, p. 38).
[5] To reiterate, the total number of countries in WEF (2016) is 138 countries.

Furthermore, to facilitate visualization, we use an impressionistic device: a double red flag ⚑x⚑ is attached to any indicator of relative national competitiveness falling into the 'extremely high' category, and a single red flag ⚑identifies any indicator falling into the 'very high' category. The complete classificatory scheme is shown in Table 2.

Table 2Categories of relative height

Intervals of relative heights	Categories	Red Flags
$100 < H_{Arg/Aus} < 138$	Extremely high	⚑x⚑
$50 < H_{Arg/Aus} \leq 100$	Very high	⚑
$30 < H_{Arg/Aus} \leq 50$	Substantial	
$0 \leq H_{Arg/Aus} \leq 30$	Moderate to low	

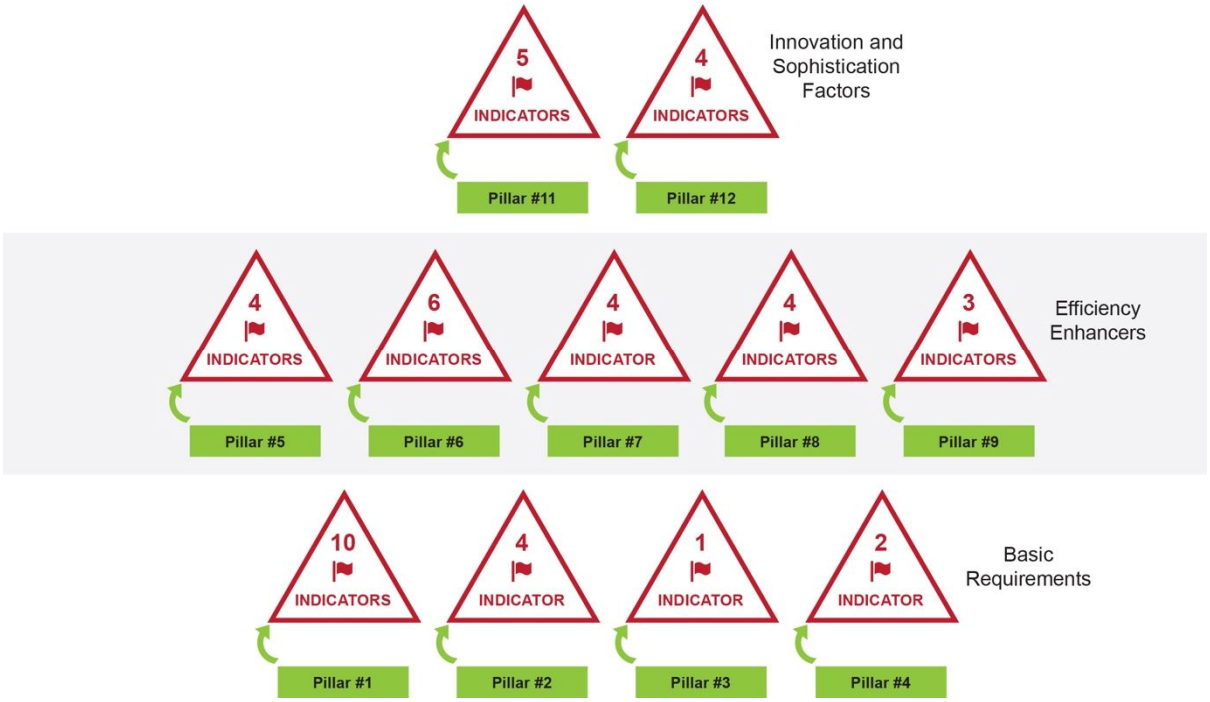
A clear picture of the key weaknesses that need to be tackled in Argentina can be obtained by computing the relative heights of the barriers to economic development of Argentina with respect to Australia for all the 114 indicators. Appendix I and II identify the indicators displaying double and single red flags, respectively.

It may be useful to summarize diagrammatically the number of noticeable impediments associated with each pillar. Figure 2 shows a quick display of the pillars that contain extremely high barriers to development with reference to subindex 1: Basic requirements (10 double red flags) and subindex 2: Efficiency enhancers (9 double red flags). Subindex 3: Innovation and sophistication factors does not show any extremely high relative barrier to development for the year 2016.

Figure 2 does not capture all the retardatory factors in Argentina. Additional factors that may be at work retarding economic development in Argentina are shown in Figure 3. There are 21 indicators that fall into the 'very high' category: subindex 1 (17 single red flags), subindex 2 (21 single red flags), and subindex 3 (9 single red flags).

Figure 2Pillars of national competitiveness containing indicators with extremely high relative barriers to economic development (Argentina with respect to Australia)

Figure 3Pillars of national competitiveness containing indicators with very high relative barriers to economic development (Argentina with respect to Australia)



Over time there are fluctuations of the relative heights of the barriers to development in Argentina with respect to Australia. A concrete example of this tendency can be seen in Table 3 which shows the total number of red flags for two consecutive years. However, numerous indicators signalling pervasive impediments have remained within the interval: $50 < H_{Arg/Aus} < 138$.

Table 3Fluctuations of double and single red flags

Global Competitiveness Report	Double red flags	Single red flags	Total red flags
Year 2015-2016	28	25	53
Year 2016-2017	19	47	66

Figures 2 and 3 provide a telescopic view of the relative weaknesses signalized by theindicators of the GCI and can be thought of as a road map to put forward a proposal for economic development in Argentina. A second approximation would require further analysis of the problematic indicators to be carried out by experts in the corresponding areas. For example, the indicator 6.06 Number of procedures to start a business signals a massive discrepancy between Argentina and Australia, namely: $H_{Arg/Aus} = 123$, but this summary statistics remains silent about the reasons for such a dismal result.

2.Summary and Concluding Remarks

The usefulness of the Global Competitiveness Index (GCI) as a tool for public policy is widely recognized. This paper has argued that the World Economic Forum data on competitiveness can be used to appraise the relative height of the barriers to economic development in one (target) country with respect to another (benchmark) country. The computation of the relative heights of the barriers to economic development between countries helps to assess gaps and priority areas in the target country. This is an additional application of the GCI as a tool for policy design.The method presented in this paper has been illustrated assuming that Argentina is the target country and Australia is the benchmark country but it has general applicability. In general, the method to compute the relative height of the barriers to economic development of consists of a four-step procedure, namely: Step 1: choose a target country; Step 2: select a benchmark country; Step 3: calculate the relative height of the barriers in the target country with respect to the benchmark country for each of the 114 indicators included in the Global Competitiveness Index using the indicator $H_{Arg/Aus}$;and Step 4:use the categories of relative heights to identify gaps and priority areas in the target country.

Countries willing to undertake action plans for economic development may find that the proposed method enables them to draw a road map for reform. Two final points –obvious, but often forgotten– are worth emphasizing. First, the decision to design –and implement– an action plan for economic development is a function to be performed by the national government. This function falls outside the sphere of the individual. Second, any development plan has to be clearly explained to the public in general, and decision makers in particular. Governments are too often unable to convey the message that their fundamental purpose in encouraging national competitiveness is a stronger society and more fulfilled people. In particular, politicians need to explain better to the public that sensible competitive policy is not an end in itself but the means to a better society and people being more able to achieve their potential.

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Appendix I. Extremely high barriers to economic development in Argentina with respect to Australia
This appendix presents the identification of the indicators with double red flagsemerging from the Global Competitiveness Report 2016-2017.

Indicator included in Basic Requirements	**Relative height of the barrier $H_{Arg/Aus}$**	**Extremely high ($100 < H_{Arg/Aus} < 138$)**
1.01 Property rights	110	⚑×⚑
1.03 Diversion of public funds	113	⚑×⚑
1.04 Public trust in politicians	106	⚑×⚑
1.06 Judicial independence	111	⚑×⚑
1.07 Favouritism in decisions of government officials	109	⚑×⚑
1.12 Transparency of government policy making	101	⚑×⚑
1.16 Reliability of policy services	111	⚑×⚑
1.17 Ethical behaviour of firms	119	⚑×⚑
1.20 Protection of minority shareholders' interests	105	⚑×⚑
3.05 Country credit rating	104	⚑×⚑
Indicator included in Basic Requirements	**Relative height of the barrier $H_{Arg/Aus}$**	**Extremely high ($100 < H_{Arg/Aus} < 138$)**
6.01 Intensity of local competition	115	⚑×⚑
6.06 Number of procedures to start a business	123	⚑×⚑
6.07 Time to start a business, days	101	⚑×⚑
6.09 Prevalence of non-tariff barriers	105	⚑×⚑
6.13 Burden of customs procedures	111	⚑×⚑
8.01 Financial services meeting business needs	109	⚑×⚑
8.04 Ease of access to loans	103	⚑×⚑
8.07 Regulation of securities exchanges	116	⚑×⚑
8.08 Legal rights index	104	⚑×⚑

Appendix II. Very high barriers to economic development in Argentina with respect to Australia
This appendix presents the identification of the indicators with single red flagsemerging from the Global Competitiveness Report 2016-2017.

Indicator included in Basic Requirements	**Relative height of the barrier $H_{Arg/Aus}$**	**Very high ($50 < H_{Arg/Aus} \leq 100$)**
1.02 Intellectual property protection	85	⚑
1.05 Irregular payments and bribes	90	⚑
1.08 Wastefulness of government spending	82	⚑
1.09 Burden of government regulation	55	⚑
1.10 Efficiency of legal framework in settling disputes	92	⚑
1.11 Efficiency of legal framework in challenging regulations	91	⚑
1.14 Business costs of crime and violence	70	⚑
1.15 Organized crime	72	⚑
1.18 Strength of auditing and reporting standards	100	⚑
1.19 Efficacy of corporate boards	80	⚑
2.01 Quality of overall infrastructure	76	⚑
2.02 Quality of roads	63	⚑
2.03 Quality of railroad infrastructure	51	⚑
2.07 Quality of electricity supply	97	⚑
3.01 Government budget balance, %GDP	62	⚑
4.05 HIV prevalence, % adult pop.	84	⚑
4.09 Quality of primary education	81	⚑

Indicator included in Basic Requirements	**Relative height of the barrier $H_{Arg/Aus}$**	**Very high ($50 < H_{Arg/Aus} \leq 100$)**
5.03 Quality of the education system	79	⚑
5.04 Quality of math and science education	87	⚑
5.06 Internet access in schools	72	⚑
5.08 Extent of staff training	60	⚑
6.03 Effectiveness of anti-monopoly policy	92	⚑
6.08 Agriculture policy costs	87	⚑
6.10 Trade tariffs, %duty	82	⚑
6.11 Prevalence of foreign ownership	74	⚑
6.12 Business impact of rules on FDI	77	⚑
6.15 Degree of customer orientation	84	⚑
7.01 cooperation in labour-employer relations	67	⚑
7.04 Redundancy costs	80	⚑
7.06 Pay and productivity	79	⚑
7.09 Country capacity to attract talent	85	⚑
8.02 Affordability of financial services	87	⚑
8.03 Financing through local equity market	94	⚑
8.05 Venture capital availability	76	⚑
8.06 Soundness of banks	80	⚑
9.01 Availability of latest technologies	88	⚑
9.02 Firm-level technology absorption	79	⚑
9.03 FDI and technology transfer	94	⚑

Indicator included in Basic Requirements	**Relative height of the barrier $H_{Arg/Aus}$**	**Very high ($50 < H_{Arg/Aus} \leq 100$)**
11.02 Local supplier quality	95	⚑
11.03 State of cluster development	60	⚑
11.04 Nature of competitive advantage	76	⚑
11.06 Control of international distribution	67	⚑
11.09 Willingness to delegate authority	76	⚑
12.01 Capacity for innovation	52	⚑
12.03 Company spending on R&D	67	⚑
12.05 Gov. procurement for advanced tech products	59	⚑
12.06 Availability of scientists and engineers	77	⚑