00-01UserGuide 1904.1.4 6:36 AM ˘ ` 017 001 2438-200-process-670

USER GUIDE

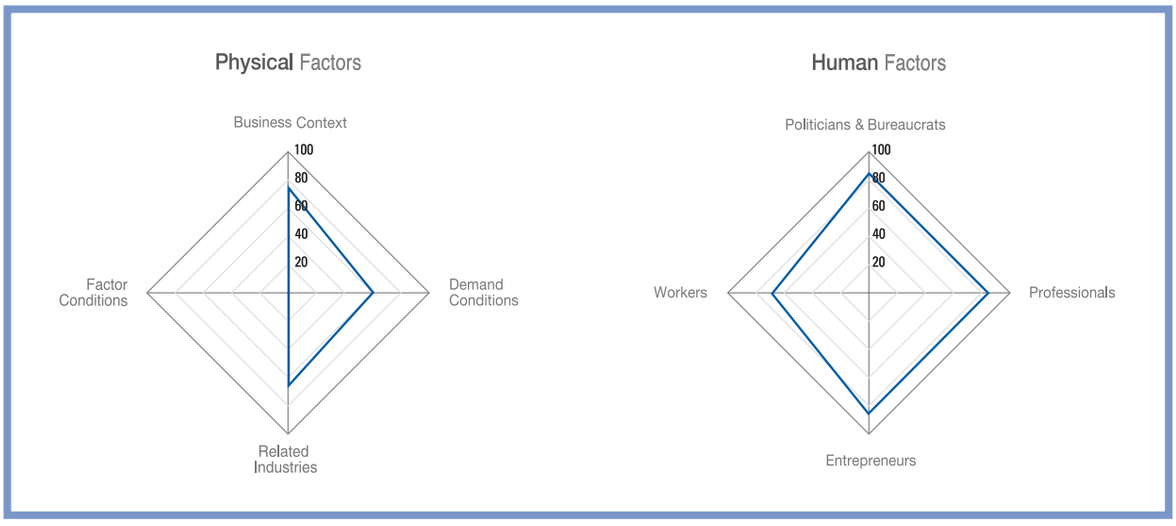
00-01UserGuide 1904.1.4 6:36 AM ˘ ` 019 001 2438-200-process-670

IPS National Competitiveness Research is structured with a series of tools for assessing national competitiveness. MASI (Measure-Analyze-Simulate-Implement) is the foundation on which IPS National Competitiveness Research addresses policy implications for enhancing national competitiveness. The MASI approach includes (1) the Double Diamond (DD) Based 9-Factor Model (IPS Model) for measuring national competitiveness (Measure); (2) the 3 X 3 framework for classifying country groups (Analyze); (3) an application of business strategy models (cost vs. differentiation) to the analysis of national competitiveness (Simulate); and (4) a series of viable strategies for enhancing national competitiveness (Implement).

Measure: The DD Based 9-Factor Model (IPS Model)

IPS National Competitiveness Research measures the competitiveness of 65 countries using the IPS Model. This model measures both the scope and source of national competitiveness. The scope of national competitiveness encompasses both domestic and international contexts, and the source of national competitiveness is composed of both physical and human factors. Physical factors include Factor Conditions, Demand Conditions, Related Industries, and Business Context, while human factors include Workers, Politicians & Bureaucrats, Entrepreneurs, and Professionals. Figure 1 shows the measurement of Singapore's 2011 competitiveness using the IPS Model.

Figure 1. The IPS Model (Singapore)



The eight sources (or factors) of national competitiveness in the IPS Model are composed of 23 sub-factors, which are further made up of 207 criteria. About half (107) of the criteria are hard data, and the other half (100) are soft data. Table 1 shows the number of criteria in each of the eight factors.

Table 1. Number of Criteria of the Eight Factors

Physical Factors		Human Factors	
Factors	No. of Criteria	Factors	No. of Criteria
Factor Conditions	19	Workers	16
Demand Conditions	20	Politicians & Bureaucrats	17
Related Industries	78	Entrepreneurs	11
Business Context	31	Professionals	15
Total	148	Total	59

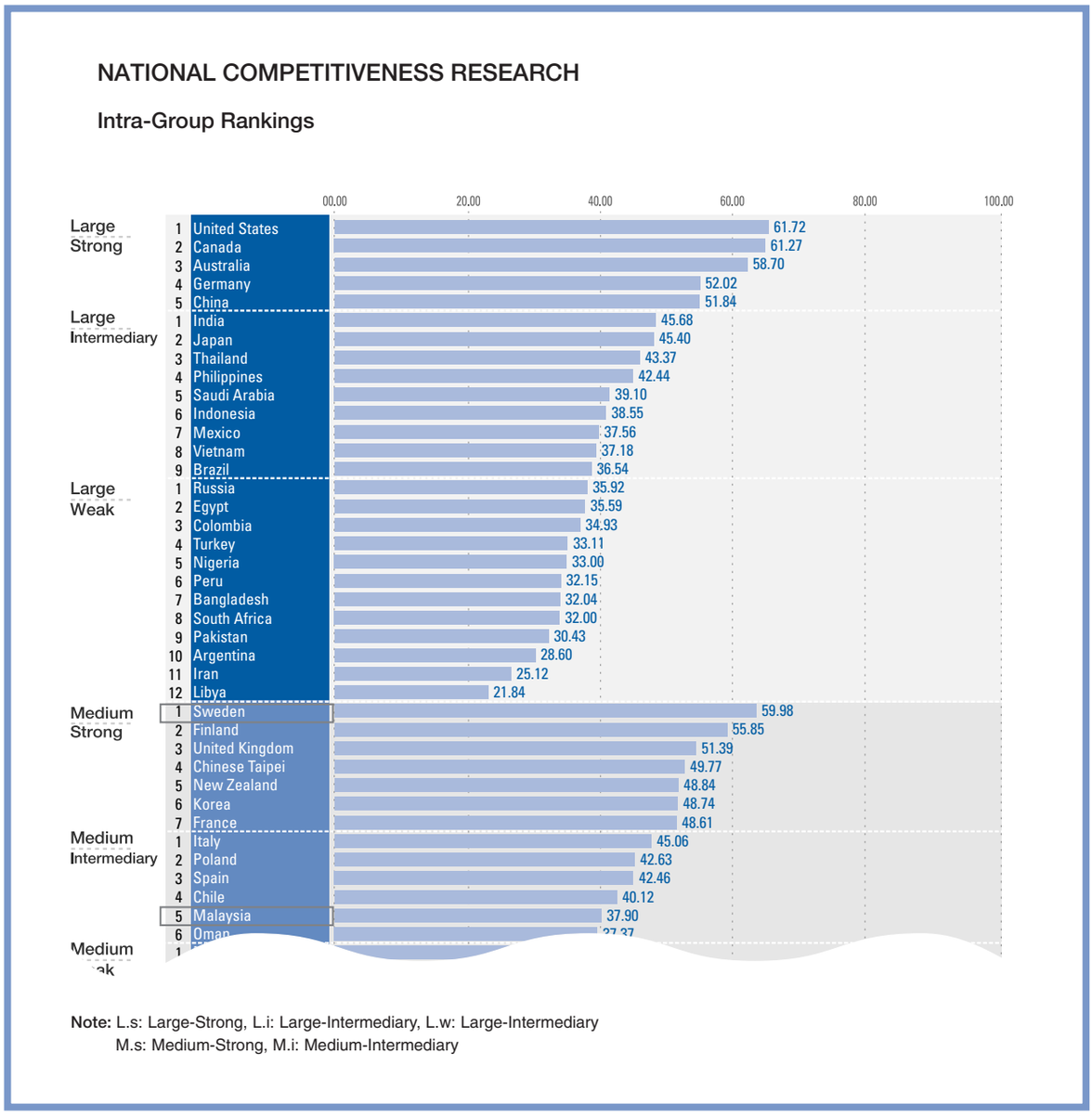
We use a three-year moving average methodology to minimize the effects of random variances in a particular year. The three-year moving average methodology is applied in the sub-factor and factor levels by using data collected in 2009, 2010, and 2011. This methodology is also used in some other studies such as the *Index of Economic Freedom* by the Heritage Foundation & The Wall Street Journal and the *Corruption Perception Index* by Transparency International, in order to reduce the abnormal variations, which might arise due to an external shock in a certain year.

00-01UserGuide 1904.1.4 6:36 AM ˘ ` 020 001 2438-200-process-670

Analyze: Country Groups

Competitiveness has more meaningful implications when assessed among nations with similar characteristics because competitiveness implies a relative position among competitors in the same competitive group. This intra-group analysis is very helpful for deriving countries' policy directions to enhance their competitiveness. For example, in selecting a benchmarking country for Malaysia, Sweden is more comparable and appropriate than the United States because Malaysia and Sweden are more similar in terms of size (See Figure 2).

Figure 2. Country Group: Intra-Group Rankings (World Rankings)



Note: L.s: Large-Strong, L.i: Large-Intermediary, L.w: Large-Intermediary
M.s: Medium-Strong, M.i: Medium-Intermediary

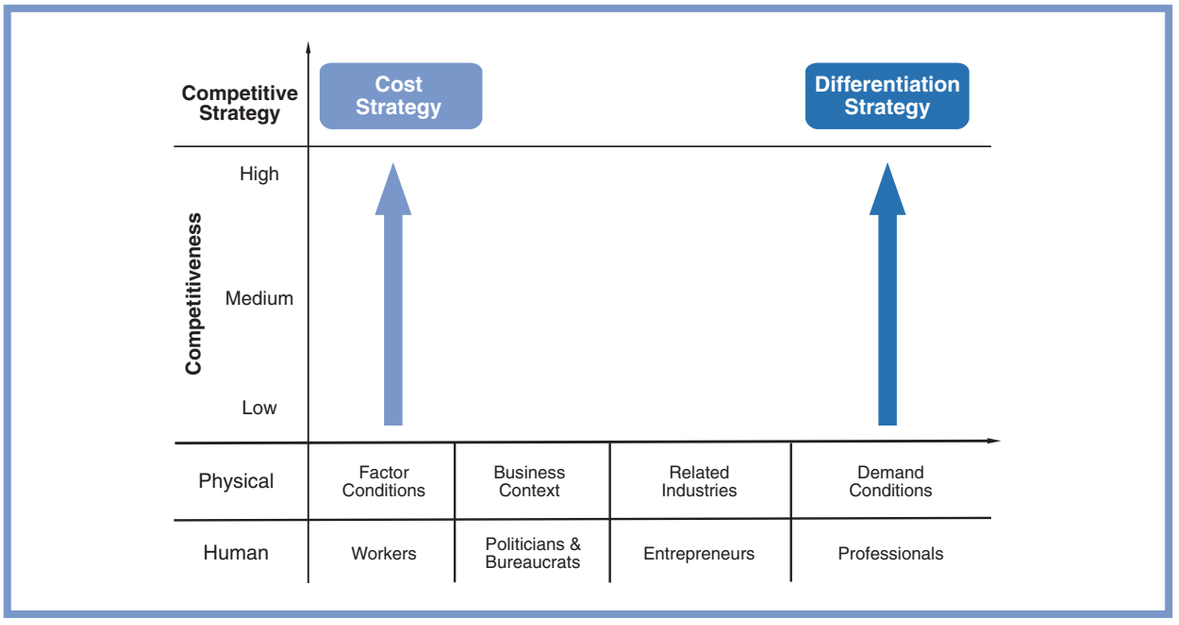
IPS National Competitiveness Research classifies 65 countries into nine country groups according to their size and competitiveness. For size, countries are categorized as large, medium, or small with regard to population and land size. For competitiveness, countries are classified as strong, intermediate, or weak with regard to the score of overall national competitiveness. By considering size and competitiveness simultaneously, users can meaningfully compare the relative positions of countries.

00-01UserGuide 1904.1.4 8:59 AM ˘ ` 021 001 2438-200-process-670

Simulate: Strategy Simulation

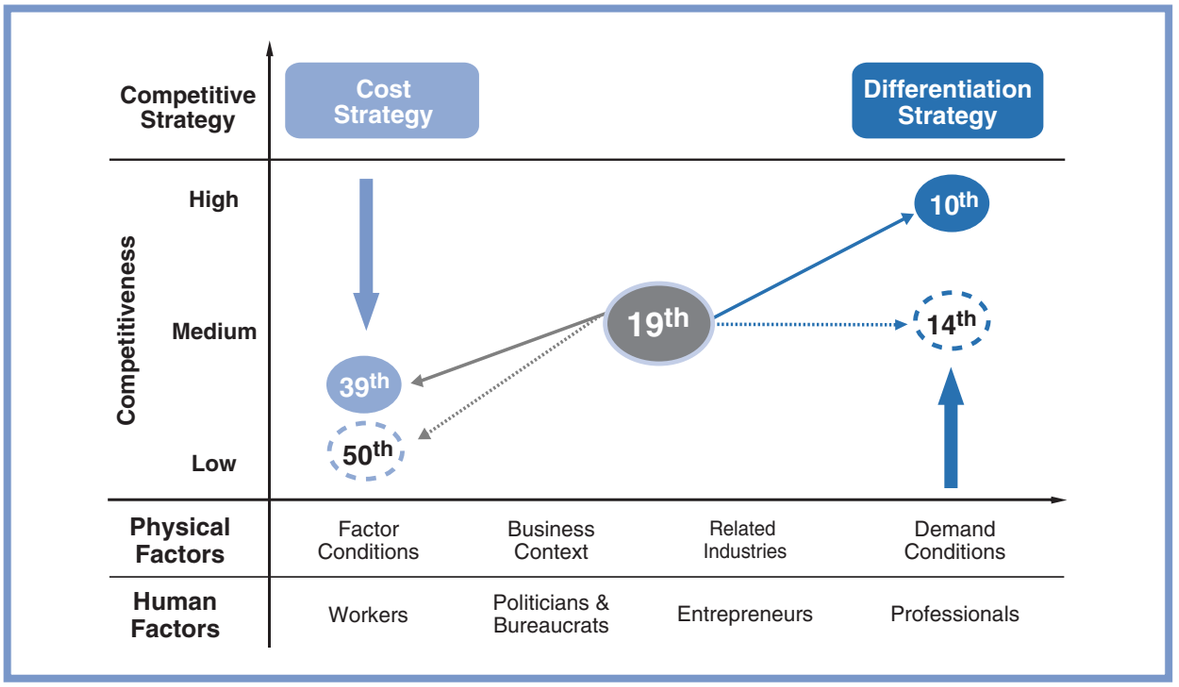
In strategy simulation, both cost and differentiation strategies are applied to each nation in order to determine which strategy is more effective in enhancing national competitiveness. The cost strategy focuses on "low cost and high efficiency," mainly utilizing Factor Conditions and Workers. In contrast, the differentiation strategy refers to "high cost with high value" and focuses more on Demand Conditions and Professionals (See Figure 3). Through strategy simulation, each nation may ascertain the best possible strategy to enhance its competitiveness.

Figure 3. Competitive Strategies of Nations



For example, if Korea pursues cost strategy, it would rank 39th. However, if Korea employs differentiation strategy, its standing would jump to the 10th place, which is much higher than the 19th position that it currently holds (See Figure 4). This example demonstrates that Korea should compete not with cost, but with differentiation strategy. Thus, the choice of a relevant strategy is very important if a nation wishes to strengthen its competitive position.

Figure 4. Changes of Rankings in Strategy Simulation: The Case of Korea



00-01UserGuide 1904.1.4 6:36 AM ˘ ` 022 001 2438-200-process-670

Implement

The implementation of the MASI methodology consists of two types of strategy with each one focusing on different levels of national competitiveness. The first strategy is Optimal Strategic Mix, which focuses on the macro level (factor level) of national competitiveness. The other is Term-Priority Matrix, which addresses national competitiveness at a more micro level (criteria level).

Optimal Strategic Mix (Macro Level)

Once strategic implications are clarified from the previous steps (i.e., measure, analyze, and simulate), a series of concrete strategies appropriate for each country in different stages of economic development can be suggested for further enhancement of national competitiveness. Countries can be positioned based on group rankings for each factor. Countries in the weak group are categorized as the developing stage, countries in the intermediary group are in the transitional stage, and countries in the strong group are in the developed stage. In order to move to a higher stage of national competitiveness, countries need to implement appropriate strategies such as those listed in the far right column of Table 2. Countries should then consider the competitiveness determinants of the IPS Model, evaluate their relative competitiveness position in their respective group, and select the appropriate strategy from strategy simulation.

Let's look at Korea as an example. In the case of Factor Conditions, Korea's deficiency in natural resources can be overcome through internationalization such as imports or investment in foreign extractive industries. In addition, Korea's manufacturing-based economy can be upgraded to a knowledge-based economy by creating high value-added products.

Table 2. Optimal Strategic Mix: Korea

Item \ Stage		Developing	Transitional	Developed	Strategy for Enhancing Competitiveness
Physical Factors	Factor Conditions	Resource-based	Manufacturing-based	Knowledge-Based	• Overcome problems by internationalization • Create high value-added products by applying knowledge (such as technology, design and so on) to production processes
	Business Context	Protectionism	Efficiency	Competition	• Enhance corporate competence, such as management techniques and labor-management relations • Attract investments and establish a competition system with active market openess
	Related Industries	Physical Infrastructure (Roads & Ports)	Industrial Cluster	Regional Integration	• Enhance R&D competence by strengthening academic-industrial cooperation and increasing R&D expenditures • Regional integration for efficient usage and procurement of technology, human resources, and services
	Demand Conditions	Quantity	Quality	Sophistication	• Enlarge the market size by opening the market • Pay more attention to the sophistication of the market
Human Factors	Workers	Cheap	Motivated	Skilled	• Establish the mutually beneficial labor-management relations and improve the working willingness • Improve labor's skill level by establishing a life-long education system
	Politicians & Bureaucrats	Facilitation	Support & Regulation	Advice	• Enhance the stability and efficiency of the political system • Regulate as an advisor the critical issues such as environment, health, and safety; reduce other regulation and arbitrary intervention
	Entrepreneurs	Risk Taking	Efficiency Developing	Value Creating	• Improve the market mechanism for enhancing entrepreneurs' creative mindset and reduce direct support for start-up firms
	Professionals	Operational	Managerial	Strategic	• Improve the tertiary education system and open the skilled-labor market • Create the social context for professionals to optimality play their roles

00-01UserGuide 1904.1.4 7:14 AM ˘ ` 023 001 2438-200-process-670

Term-Priority Matrix (Micro Level)

Term-Priority Matrix is a combination of Terms and Priorities of polices into a single matrix, which visually presents the priorities of policy prescriptions for different time periods. By identifying the strengths and weaknesses more specifically at the criteria level, countries can focus their policy on more important areas and thus, effectively allocate limited resources.

The first step of deriving the Term-Priority Matrix is to classify the 207 criteria into strong (criteria in which a country displays relative strengths), mediocre (criteria in which a country ranks in moderate positions) and weak categories (criteria in which a country shows relative weaknesses).

The next step is to categorize the sub-factors with weak criteria into 12 groups by terms and priorities of policies. The term (horizontal) is classified into short, mid, long, and very long depending on whether the sector is public or private. The sub-factors that are more related to private sectors are categorized under a longer term because these are less controllable than those of the public sectors and, thus, less likely to have immediate impact on government policy. The level of priority (vertical) is determined by the degree of correlation between sub-factors and GDP per capita. The sub-factors categorized under higher priority are those that have higher correlation coefficients with GDP per capita, which is the most important variable for measuring the prosperity of an economy.

Table 3 shows the Term-Priority Matrix of Korea, which lists the sub-factors with weak criteria of Korea. Thus, the upper-left corner (of the triangle in the shaded area) represents the more important and immediate polices on which the Korean government should focus for enhancing its competitiveness.

Table 3. Term-Priority Matrix: Korea

Priority	Short	Mid	Long	Very long
High	• **Social Context of Professionals** -Availability of professionals -Professional job's openness	• **Global Mindset** -Equal treatment	• **Business Culture** -Labor & management relationship -Social responsibility	• **Overall Living Environment** -National living environment -Social safety net
Medium	• **POliticians** -Bribery & corruption -Leaders of society **Social Context of** • **Entrepreneurs** -Foreign entrepreneurs	• **Finance** -Exchange rate stability • **Foreign Investment** -FDI inward stock, % of GDP -FDI inward flow, % of GDP	• **Edution** -English education -Competitiveness of education market • **Strate & Structure** -Firm restructuring -Corporate govemance	• **Demand Quality** -Consumer sophistication on intellectual property rights • **Science & Technology** -Global standards of scientific research insitutions
Low	• **Bureaucrats** -Foreign investment promotion -Leaders of society	• **Cluster Development** -Local supplier quality -Local supplier quantity	• **Demand SIze** -Service openness	• **Personal Competence of Professionals** -Decision making

Term

For Users in the Public Sector

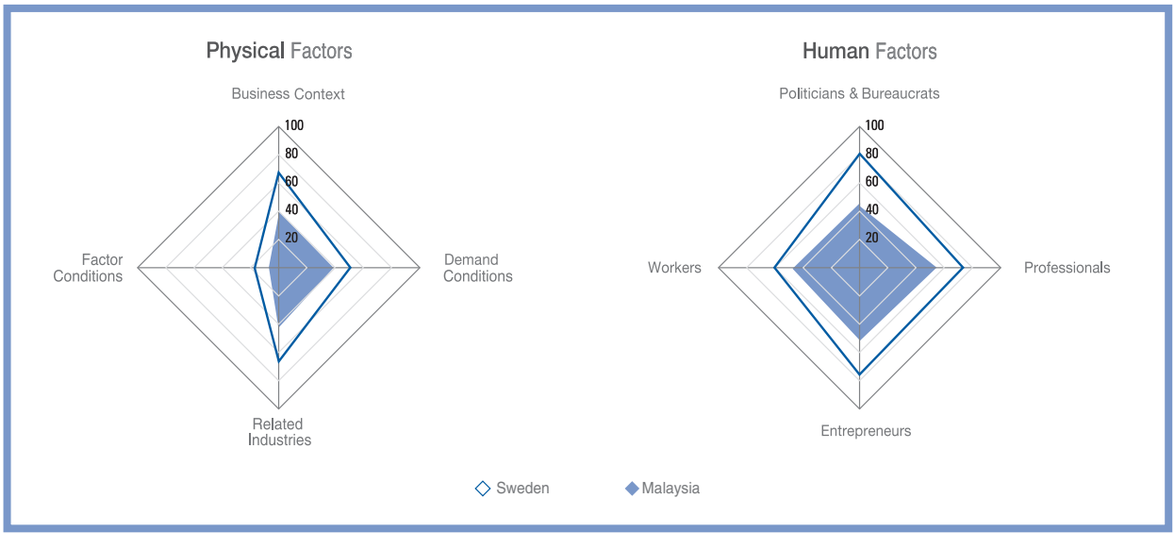
We suggest that users who wish to set up strategic development plans for countries utilize the following step-by-step directions.

The first step is to identify the competitiveness structure of the country and verify its strengths and weaknesses by comparing it with other countries. The benchmark can be a country or a group of countries with higher competitiveness but a similar size with regards to population and land size.

Let's look at Malaysia as an example. Sweden, the most competitive country in the medium size group, is selected as a benchmark for comparison. As shown in Figure 5, Malaysia is behind Sweden in terms of both physical factors and human factors.

00-01UserGuide 1904.1.4 6:36 AM ˘ ` 024 001 2438-200-process-670

Figure 5. Comparison between Malaysia and Sweden (Factor Level)

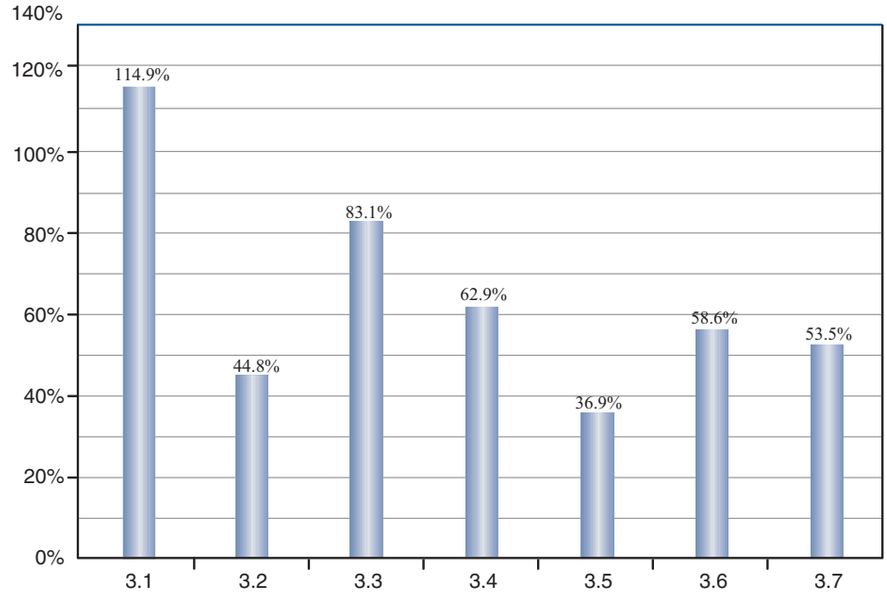


The next step is to conduct a comparative analysis at the 23 sub-factor level in order to identify strengths and weaknesses in detail. Two methods are suggested and countries can select one of the two depending on their purpose. The difference between the two methodologies is the number of benchmarking countries. The first methodology uses one benchmarking country for all sub-factors that are being compared, while the other uses different benchmarking countries for different sub-factors.

Method 1: Same benchmarking country for different sub-factors

We give 100 points to the base country (a country for benchmark; in this case, Sweden, which has the highest competitiveness index in the medium size group), and calculate the relative index of Malaysia, ($I_{Malaysia}/I_{Sweden}$) multiplied by 100, where $I_{country}$ denotes the standardized score of relevant sub-factors. The relative index represents the relative development level of Malaysia compared to Sweden. For example, the factor of Related Industries is composed of seven sub-factors, including Transportation, Communication, Finance, Education, Science & Technology, Cluster Development, and Overall Living Environment. Figure 6 shows that Malaysia is higher than Sweden in Transportation, but lower in all other sub-factors, especially in Communication and Science & Technology, which are lower than 50% of the level of Sweden.

Figure 6. Relative Position of Malaysia Compared to Sweden in Related Industries (Method 1)



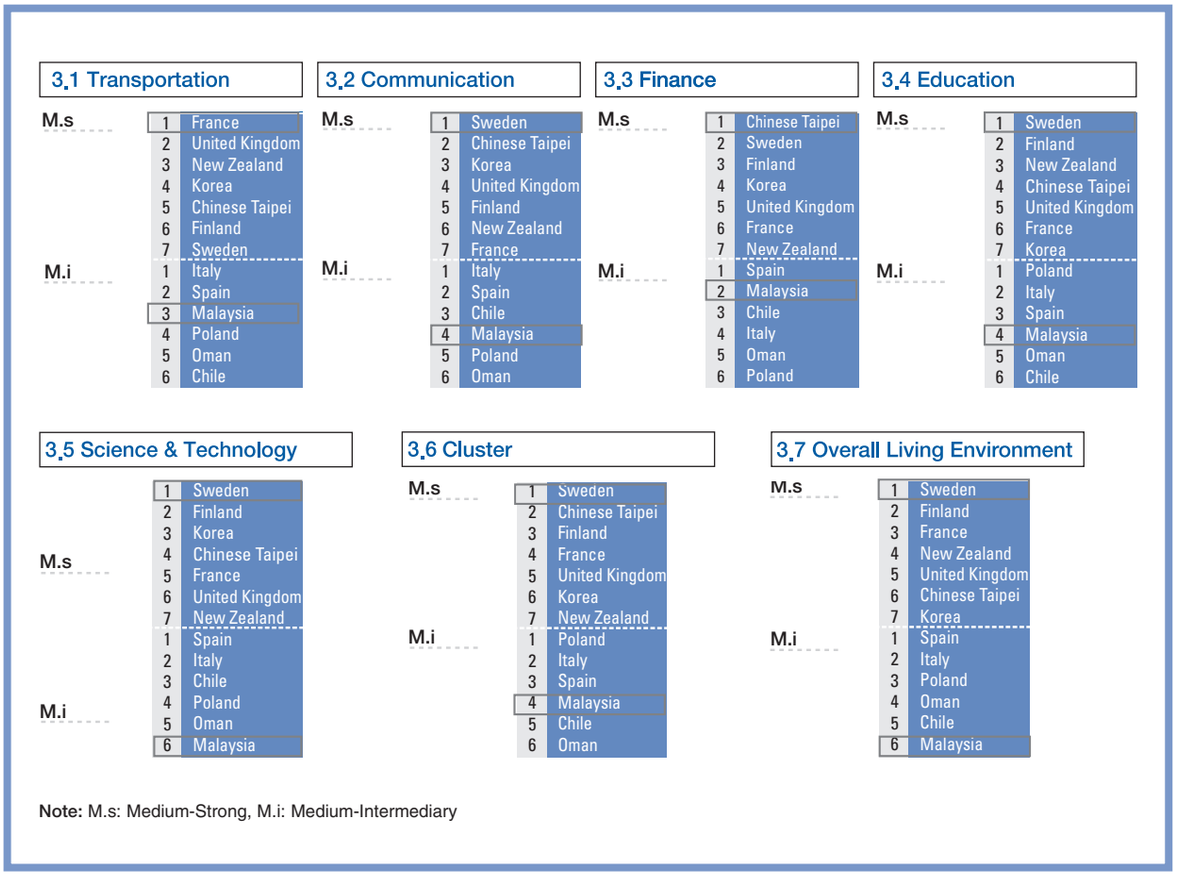
Note: 3.1: Transportation, 3.2: Communication, 3.3: Finance, 3.4: Education
3.5: Science and Technology, 3.6: Cluster, 3.7: Overall Living environment

00-01UserGuide 1904.1.4 6:36 AM ˘ ` 025 001 2438-200-process-670

Method 2: Different benchmarking countries for different sub-factors

Users can compare the target country (the country being analyzed) with the most competitive country in a similar size group for each sub-factor. For the sub-factor of Transportation, France ranks as the top country in the medium size group, so it can be benchmarked as the basis of comparison. The user can compare Malaysia with France and compute Malaysia's relative competitiveness by using the formula suggested in Method 1. Similarly, the indices for other sub-factors can be obtained by comparing Malaysia with other top countries for other variables, as shown in Figure 7.

Figure 7. Relative Position of Malaysia Compared to Sweden in Related Industries (Method 2)



Note: M.s: Medium-Strong, M.i: Medium-Intermediary

The third step is to break down the analysis further into criteria level in order to identify weaknesses that can be improved.

The final step is to set up policy initiatives that best suit the country's political, economic, and social environments considering the country's development stage.

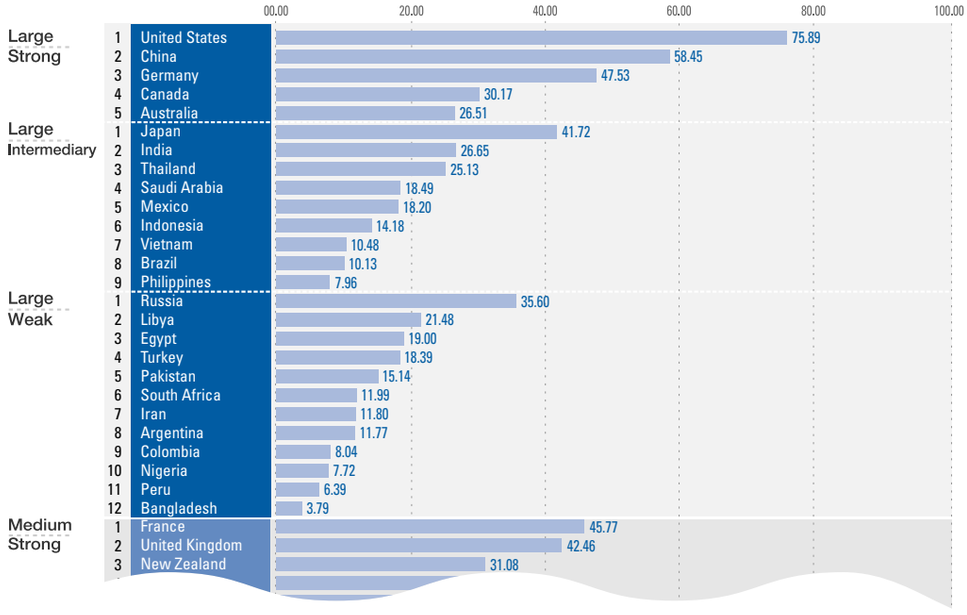
For Users in Business

This analytical framework also helps business people understand a nation's business environment. For example, an international investor seeking to invest in a country may need comprehensive data for analysis. The data can include, but are not limited to, infrastructure, workers, host country policies, and so on. For information regarding infrastructure, the investor can refer to sub-factors such as Transportation and Communication under the factor of Related Industries. For information on workers, the investor can find relevant data under the factor of Workers, and policy data can be found in the criteria level under the sub-factor of Bureaucrats. Through comprehensive intra-group comparisons (See Figure 8), the investor can analyze relative competitiveness more accurately and narrow down potential candidates for investment.

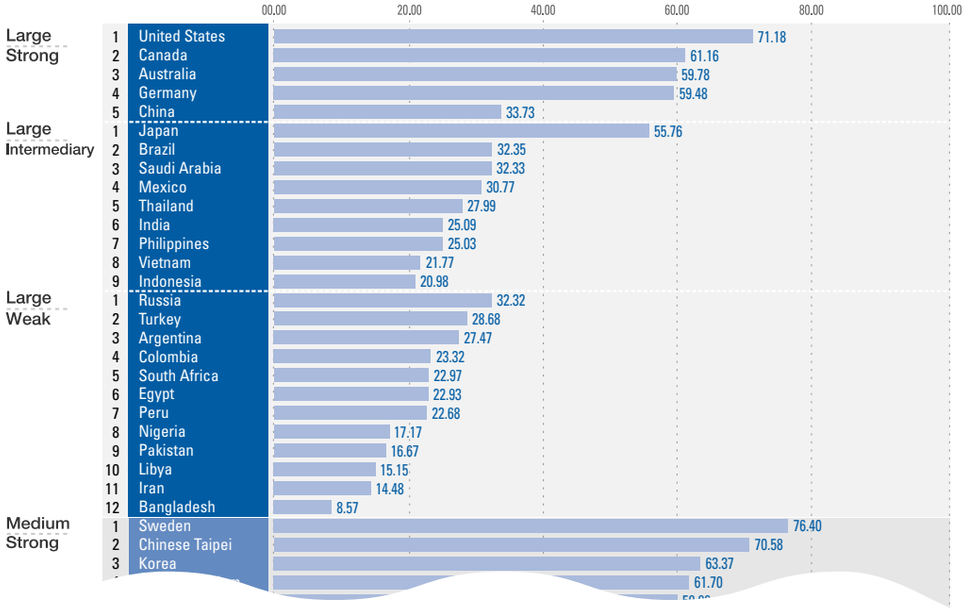
00-01UserGuide 1904.1.4 6:36 AM ˘ ` 026 001 2438-200-process-670

Figure 8. Intra-Group Rankings

3.1 Transportation (Intra-Group Rankings) 2011

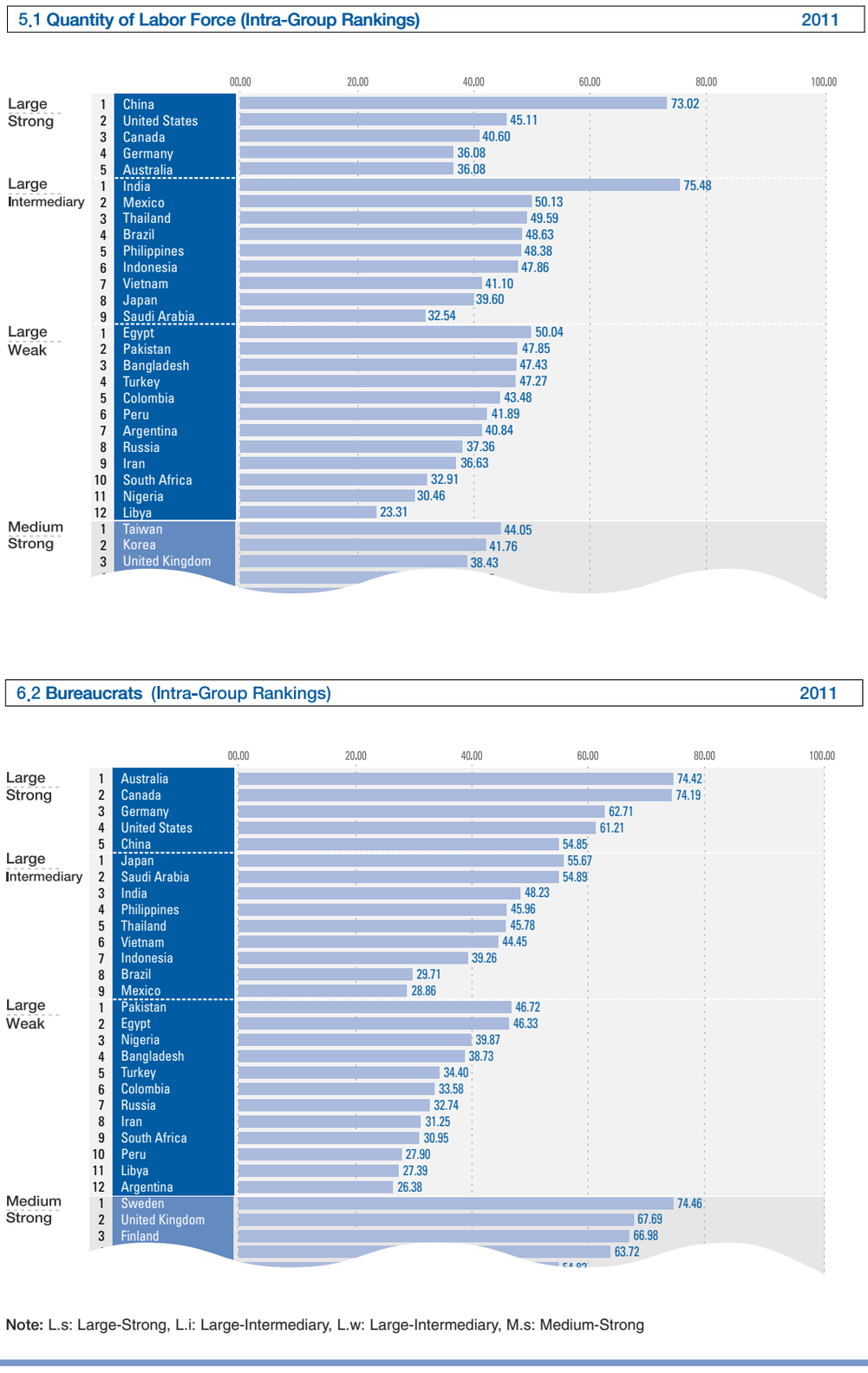


3.2 Communication (Intra-Group Rankings) 2011



00-01UserGuide 1904.1.4 6:36 AM ˘ ` 027 001 2438-200-process-670

Figure 8. Intra-Group Rankings



Note: L.s: Large-Strong, L.i: Large-Intermediary, L.w: Large-Intermediary, M.s: Medium-Strong

00-01UserGuide 1904.1.4 6:36 AM ˘ ` 028 001 2438-200-process-670

Please contact Ms. Min-young Im and Ms. Wenyan Yin for further information.

Ms. Min-young Im
Senior Researcher
The Institute for Industrial Policy Studies
Email: myim@ips.or.kr

Ms. Wenyan Yin
Researcher
The Institute for Industrial Policy Studies
Email: wyyin@ips.or.kr

00-02Highlight1904.1.46:36AM˘ ` 029 0012438-200-process-670

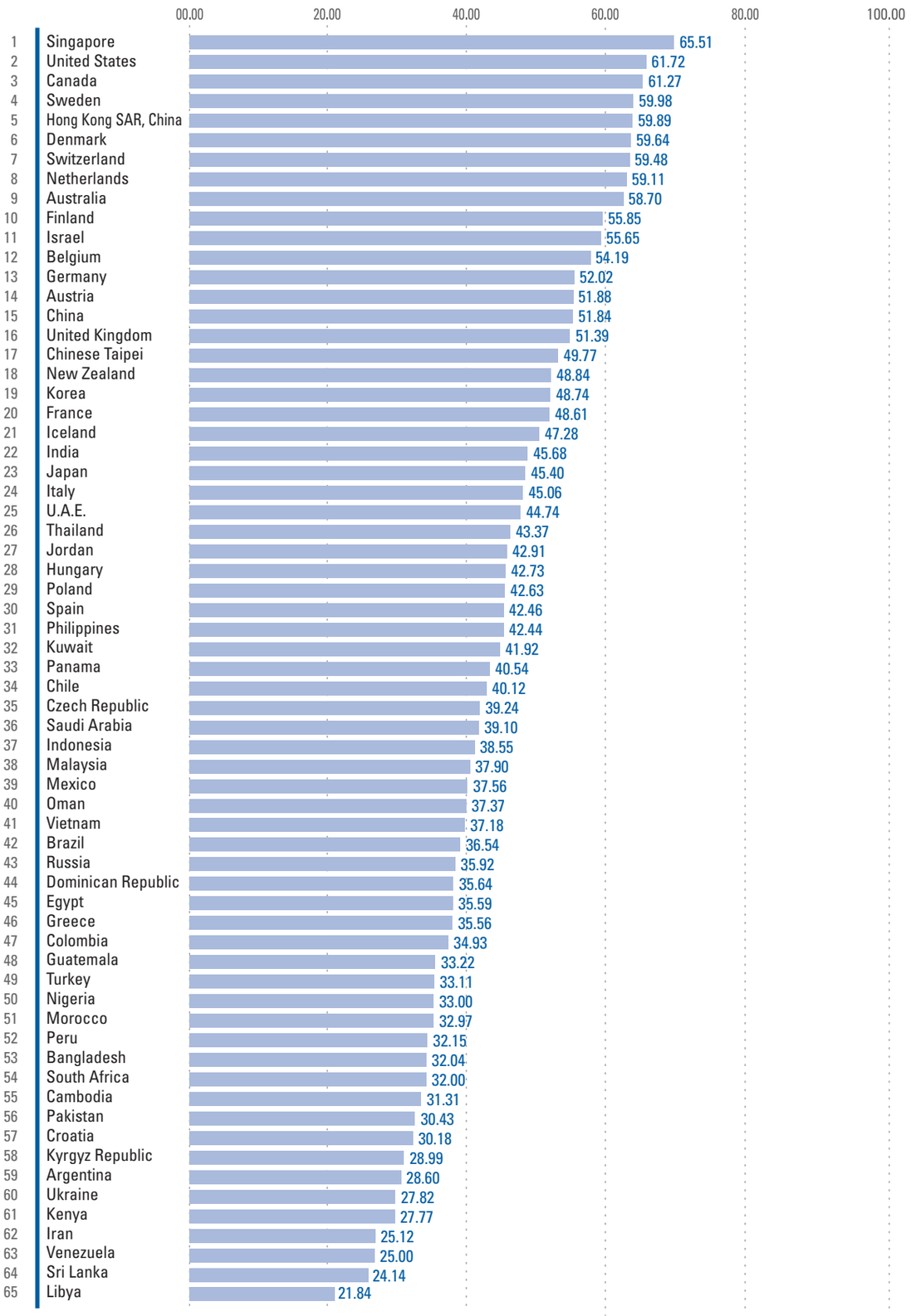
HIGHLIGHTS

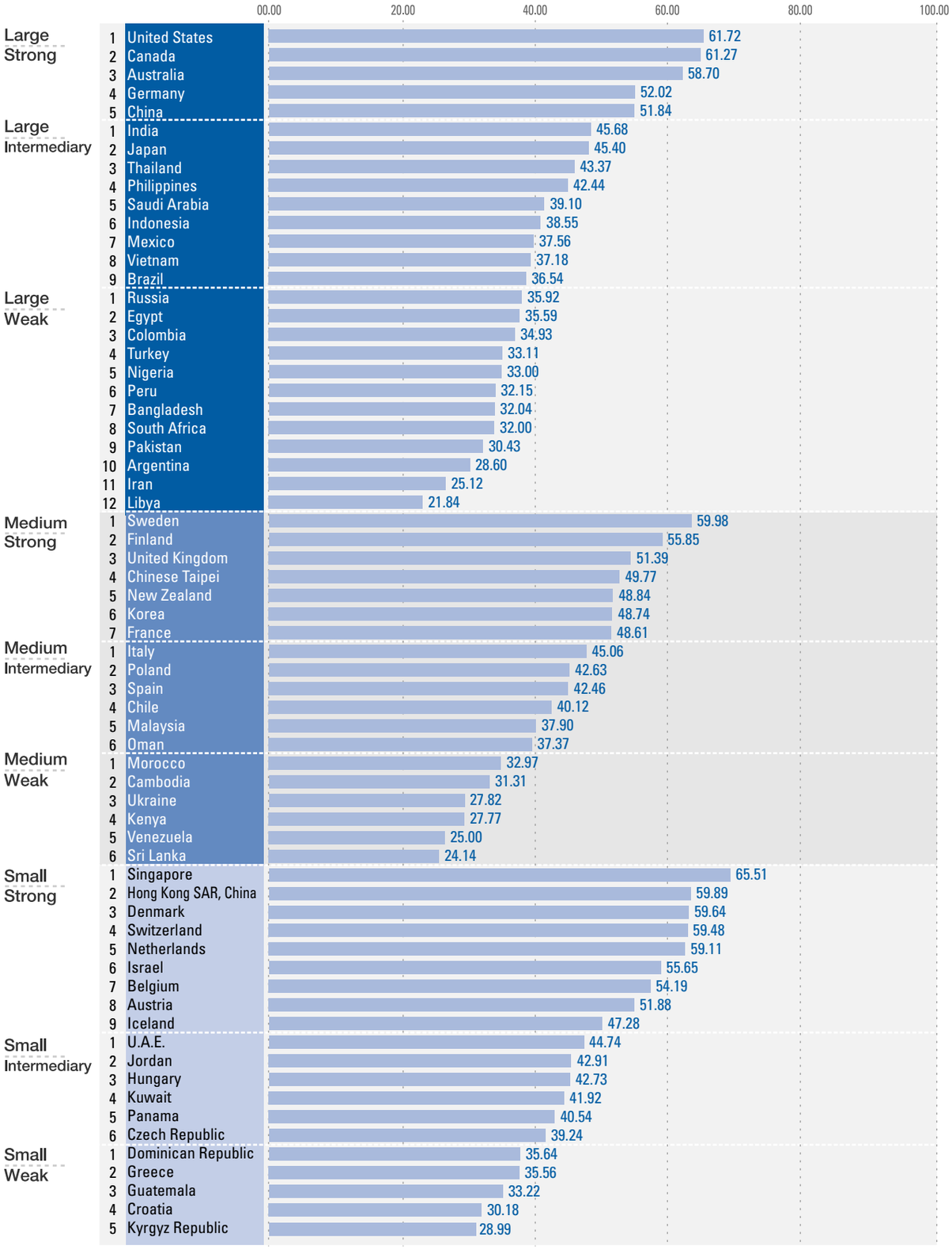
00-02Highlight1904.1.46:36AM˘ ` 030 0012438-200-process-670

00-02Highlight1904.1.46:36AM ` 031 0012438-200-process-670

NATIONAL COMPETITIVENESS RESEARCH

World Rankings



00-02Highlight1904.1.47:15AM ` 032 001 2438-200-process-670

Intra-Group Rankings